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Liogenys Guérin-Méneville, 1831 (Coleoptera: Scarabaeidae: Melolonthinae) from the southern South American Transition Zone and boundaries: taxonomic overview with four new species

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Abstract

The biodiversity of *Liogenys* Guérin-Méneville, 1831 (Coleoptera: Scarabaeidae: Melolonthinae: Diplotaxini) from the southern South American Transition Zone and boundaries is presented. Four new species are described: *L. brachyclypeata* Cherman, **new species**; *L. lucialmeidae* Cherman, **new species**; *L. martinezi* Cherman, **new species**; and *L. maxillaricuspis* Cherman, **new species**. The synonymy of *L. flaveola* Moser, 1924 (= *L. kadleci* Frey, 1970) is proposed. Lectotypes are designated for *L. flavida* Moser, 1918; *L. pallidicornis* Blanchard, 1851 (currently *L. xanthocera* Harold, 1869); and *L. rufoflava* Moser, 1918. Redescriptions are provided for all the species mentioned above plus *L. calcarata* Frey, 1970 and *L. kunzteni* Moser, 1921, as well as an identification key and updated geographical distributions to all species in the region. All species are present in the Monte province, except of *L. kuntzeni* (Andean provinces of Chile). *Liogenys flavida* and *L. rufoflava* have the broadest distribution, the latter here expanded to Paraguay and Chile.

Key words. Chafers, Diplotaxini, Monte province, New World, Patagonian Steppe, Scarabaeoidea, systematics, white grubs

Introduction

Liogenys Guérin-Méneville, 1831, the most specious Neotropical Diplotaxini (Coleoptera: Scarabaeidae: Melolonthinae), comprises 91 species distributed from Panama through most of South America to southern Argentina and Chile (Cherman *et al.* 2017, 2019). The South American Transition Zone (hereafter STZ) spans across Argentina, Bolivia, Chile, Peru, Ecuador, and Colombia and is bordered in the southwest by the Andean region and in the north and east by the Neotropical region (Morrone 2014). The STZ comprises eight provinces (Roig-Juñent *et al.* 2018): Páramo, Desert, Puna, Atacama, Cuyan High Andean, Monte, Comechingones, and Patagonian Steppe. Most of the STZ is within Argentina, the southernmost country of South America, which includes five of these provinces (Arana *et al.* 2017). The southern part of the STZ (Monte and Patagonian Steppe regions) and its Neotropical and Andean boundaries (Morrone 2014, 2015; Roig-Juñent *et al.* 2018; Figs. 14–15), are where several quite similar species of *Liogenys* occur. The *Liogenys* from this region were first studied by Moser (1918, 1921, 1924), who described *L. flavida* Moser, 1918; *L. rufoflava* Moser, 1918; *L kuntzeni* Moser, 1921; and *L. flaveola* Moser, 1924. Subsequently, Frey (1970) described two more species (*L. calcarata* Frey, 1970 and *L. kadleci* Frey, 1970) and suggested that

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they comprise a species group. These species share a similar body size and color (dull yellow or yellowish brown); dorsal fovea of distal maxillar palpomere noticeably smaller than in other species; posterior margin of metafemur with a row of thick and erect bristles; males with protarsomere II wide; metatibial spurs uneven in shape, smaller spur wide and truncate; and shape of parameres similar in shape. Cherman *et al.* (2016) proposed a morphological phylogenetic hypothesis of *Liogenys* with equal weighting analysis, in which: *L. kuntzeni* + (*L. flavida* + (*L. kadleci* + *L. calcarata*)) are clustered in a clade supported by the transformations of characters listed above.

Other *Liogenys* species occurring mainly at the boundaries of the Chacoan region (Morrone 2014) could overlap their distribution in some points with the group of species revised here, such as: *L. densicollis* Moser, 1921; *L. mendozana* Moser, 1918; *Liogenys opacicollis* Fairmaire, 1892; *L. obscura* Blanchard, 1851; *L. pallens* Blanchard, 1851; and the Chilean *L. obesula* Gutierrez, 1951. Those species are being revised in full in another manuscript regarding the *Liogenys* biodiversity of the Chacoan region and boundaries which will be published soon.

The purpose of this paper is to revise the *Liogenys* species of the southern STZ region and boundaries, describe the four new species, and update the geographic distributions for all the species.

Material and methods

Material examined

Eight hundred specimens of *Liogenys* were studied during this work. The material is deposited in the following institutions, using acronyms from Evenhuis (2020) when available, and curators are between brackets:

AMNH—American Museum of Natural History, New York, New York, United States of America (Lee Herman)
CASC—California Academy of Sciences, San Francisco, California, United States of America (Christopher Grinter)
CEMT—Setor de Entomologia da Coleção Zoológica, Universidade Federal de Mato Grosso, Cuiabá, Brazil (Fernando Vaz-de-Mello)
CMNC—Canadian Museum of Nature, Ottawa, Ontario, Canada (Robert Anderson, François Génier)
CNCI—Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Ontario, Canada (Patrice Bouchard)
DZUP—Coleção Entomológica Pe. J.S. Moure, Curitiba, Brazil (Lúcia M. Almeida)
FMNH—Field Museum of Natural History, Chicago, Illinois, United States of America (Alfred Newton, Margaret Thayer)
IADIZA—Instituto Argentino de Investigaciones de Zonas Áridas, Mendoza, Argentina (Sergio Roig-Juñent)
INPA—Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil (Augusto Henriques)
LEMQ–Lyman Entomological Museum, McGill University, Sainte-Anne-de-Bellevue, Quebec, Canada (Stéphanie Boucher)
MACN—Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires, Argentina (Arturo Roig Alsina, Pablo Mullieri)
MLPA –Museo de La Plata, La Plata, Argentina (Analia Lanteri)
MNHN—Muséum National d'Histoire Naturelle, Paris, France (Antoine Mantilleri)
MNNC—Museo Nacional de Historia Natural, Santiago, Chile (Mario Elgueta)
MZSP—Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (Sônia Casari)
NHMB—Naturhistorisches Museum, Basel, Switzerland (Isabelle Zuercher)
NHMUK—The Natural History Museum, London, United Kingdom (Maxwell Barclay, Michael Geiser)
NHMW—Naturhistorisches Museum Wien, Wien, Austria (Heinrich Schönmann)
UMCE—Instituto de Entomología, Universidad Metropolitana de Ciencias de la Educación, Santiago, Chile (Patricia Estrada Mansilla, Jaime Solervicens)
USNM—United States National Museum of Natural History, Lincoln, Nebraska, United States of America (currently housed at the University of Nebraska State Museum) (M. J. Paulsen)
VMDC—Víctor Manuel Diéguez M. Collection, Santiago, Chile (Manuel Diéguez)
ZMHB—Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Berlin, Germany (Johaness Frisch, Bernd Jäger, Joachim Willers)

ZMUC—University of Copenhagen, Zoological Museum, Copenhagen, Denmark (Alexey Solodovnikov)

Morphological study

Mouthparts and male genitalia were dissected and examined according for all species. The standards for characters used in the species descriptions follow Lawrence (1999), Cherman & Almeida (2015), Cherman *et al.* (2016), and Cherman *et al.* (2017).

The species descriptions and redescriptions are presented following the Ratcliffe (2013) recommendations. The author of all the new species is the first author of this work, Mariana Cherman, who was responsible for satisfying all availability criteria.

Each species name is followed by author(s), publication year, and figure(s) number. Labels of the type material are arranged in sequence from top to bottom, where the data for each label are within double quotes (“”), a slash (/) separates the rows and “,” separates labels. Information between square brackets ([ ]) provides additional details written on the labels.

The geographical distribution is based on previously published records and specimens examined. In the section Non-type material examined, country names are uppercase and state names are in italics. New geographical distribution records are in bold.

Shapefiles from biogeographical regionalization of the Neotropical and Andean regions (Morrone 2014, 2015) by Löwenberg-Neto (2014, 2015), and the one of the STZ provinces (Arana *et al.* 2017) were used to perform the distributional maps.

The identification key to the *Liogenys* presented in this work is a complementary tool to the interactive key to New World Diplotaxini available at: http://keys.lucidcentral.org/keys/v3/diplotaxini/ (Cherman *et al.* 2019). This digital project includes all *Liogenys* species recently revised by M.A.C. Changelog files provided at the main page of the key enables anyone to track the changes from the original database (Cherman *et al.* 2017) and to use them for further studies. For more information concerning Lucid keys, visit www.lucidcentral.org.

Identification key to *Liogenys* from the southern South American Transition Zone and boundaries *

*Note on dimorphism: Males have protarsi and mesotarsi flat (wide or not) and females have all tarsi cylindrical.

1. Length of antennal club two times longer than the funicle or almost so (Fig. 10D); head, pronotum, and scutellum dark purplish brown, elytra yellow (Fig. 10A); elytra glabrous; metatibia with inner margin not carinate in both sexes. . . . . *Liogenys xanthocera* Harold, 1869
- Length of antennal club as long as or slightly longer than funicle; head, pronotum, scutellum, and elytra unicolored, yellow or light brown, elytra sometimes slightly lighter in color than pronotum; elytra glabrous or with bristles; male with metatibia weakly or strongly carinate toward apex 2
2. Head more coarsely punctate than pronotum (Fig. 8B); pronotum wider than elytra at its humeral callus; galea with a single, long, hook-like tooth (Fig. 13G); antenna with 9 antennomeres; elytra with bristles . . . . . *Liogenys maxillaricuspis* Cherman, **new species**
- Head as punctate as or less coarsely punctate than pronotum; pronotum as wide as or slightly narrower than elytra at its humeral callus; galea with four or five teeth (Fig. 13E), the superior tooth slightly larger than the other teeth; antenna with 9–10 antennomeres; elytra glabrous or with bristles 3
3. Pygidium longer than wide (Fig. 1E) and always with bristles 4
- Pygidium as wide as or wider than long, glabrous or with bristles 6
4. Antenna with 10 antennomeres; body length up to 8.5 mm; clypeus emargination in general deep, eventually shallow, narrower than the distance between eyes in both sexes; protibia with three teeth in both sexes; males with inner margin of metatibia carinate towards apex or not. 5
- Antenna with 9 antennomeres; body length more than 8.5 mm; clypeus emargination noticeably shallow, females with emargination narrower than the distance between eyes, males with emargination as wide as the distance between eyes (Fig. 4F); protibia in males with two teeth and in females with three teeth; males with inner margin of metatibia carinate . . . . . *Liogenys flavida* Moser, 1918
5. Head as wide as or narrower than posterior margin of pronotum (Fig. 9C); clypeus as long as frons; vertex finely to coarsely punctate; males with inner margin of metatibia carinate straight towards apex; protarsi noticeably enlarged, protarsomere II wider than long . . . . . *Liogenys rufoflava* Moser, 1918
- Head distinctly wider than posterior margin of pronotum (Fig. 1B); clypeus noticeably shorter than frons; vertex smooth (Fig.

1B); males with inner margin of metatibia not carinate; protarsi slightly enlarged, protarsomere II longer than wide . . . . . *Liogenys brachyclypeata* Cherman, **new species**

6. Elytra and pygidium glabrous; males with inner margin of metatibia carinate towards apex; protarsomere II noticeably wider than long; apex of parameres lanceolate in a single plane (Figs. 3F, 9F). . . . . *Liogenys flaveola* Moser, 1924
- Elytra and pygidium with bristles; males with inner margin of metatibia weakly or not carinate, if carinate, carina never reaching the apex; protarsomere II as long as or longer than wide; apex of parameres lanceolate or not, if lanceolate, never in a single plane (Figs. 2F, 5F, 7F). 7
7. Elytra dull yellow, never pruinose or if so, not uniformly, pronotum unicolored with elytra; males with metatibial transverse carinae incomplete (Fig. 6E) 8
- Elytra light brown, uniformly pruinose, pronotum dark brown, darker than elytra; metatibia with one or two transverse carinae complete in both sexes (Fig. 5D. 9
8. Clypeal lateral margin with a blunt projection (Fig. 2D), convex; clypeal teeth well developed in both sexes, teeth acute; protibia with three teeth in both sexes; males with protarsomere and mesotarsomere II equally wide; spurs of metatibia uneven in shape (Fig. 2E) . . . . . *Liogenys calcarata* Frey, 1970
- Clypeal lateral margin not produced, straight or concave, clypeal teeth well developed only in males, teeth broad; protibia in males with two teeth and in females with three teeth; males with protarsomere II noticeably wider than mesotarsomere II; spurs of metatibia even in shape (Fig. 6C) . . . . . *Liogenys lucialmeidae* Cherman, **new species**
9. Elytra shiny or semiopaque, never pruinose; ventrites and pygidium with few bristles; males with two protibial teeth and females with three teeth. . . . . *Liogenys kuntzeni* Moser, 1921
- Elytra opaque, noticeably pruinose (Fig. 7E); ventrites and pygidium with thick, scale-like bristles; both sexes with three protibial teeth . . . . . *Liogenys martinezi* Cherman, **new species**

Liogenys brachyclypeata Cherman, new species

Figs. 1; 13B, D; 15

Type material. Holotype, male, labeled (CMNC): [white typeset] "ARGENTINA, Mendoza / 40km. N. San Rafael, 1100m., 6.XII.1983 / L. Peña", [red typeset and handwritten] "LIOGENYS / BRACHYCLYPEATA / HOLOTYPE / Cherman M.A.", genitalia mounted. Paratypes (42) labeled [yellow typeset and handwritten] "LIOGENYS / BRACHYCLYPEATA / PARATYPE / Cherman M. A.": Two males and seven females with the same data as the holotype (one male at DZUP (402736), four females at LEMQ, one male and three females at CMNC). Four female paratypes (CEMT): [white typeset] "ARGENTINA: Rio Negro / Dto. Gral Roca, Catriel / 37º52,83'S 67º50,16'W / 4 Jan. 2005. 311 m / F. C. Ocampo". Seven males and 15 females (four males and 10 females CMNC, two males and four females DZUP (402737-42), one male and one female CEMT): [white typeset] "ARGENTINA: Mendoza / Reserva Ecológica de Nacuñan / S34°02′42″ W67°54′34″ / Jan-17-2003, 824 m / F.C.Ocampo, A.B.T.Smith". One female (CMNC): [white typeset] "ARGENTINA: Rio Negro / Dto Gral Roca, Catriel / 37°52′30″ S 67°50′10″ W / 4 Jan. 2005. 311 m / F.C. Ocampo", [white typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029592". One female (CMNC): [white typeset] "ARGENTINA: Rio Negro / Dto Gral Roca, Catriel / 37°52′30″ S 67°50′10″ W / 4 Jan. 2005. 311 m / F.C. Ocampo", [white typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029593". One female (CMNC): [white typeset] "ARGENTINA: Rio Negro / Dto Gral Roca, Catriel / 37°52'30''S 67°50'10''W / 4 Jan. 2005. 311 m / F.C. Ocampo", [white typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029594". One female (CMNC): [white typeset] "ARGENTINA: Rio Negro / Colonia Catriel; Ruta Nac. 151 / 37º52'33''S 67º49'50''W / 315 m; 23 Jan. 2006; at light / F.C.Ocampo, E.Ruiz, G.Zalazar", [white typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3003257", [white typeset] "A.B.T. SMITH DNA / BARCODE VOUCHER / SPECIMEN ABTS693" (DNA specimen stored in alcohol at -80 ºC). One female paratype (IADIZA) with the labels: [white typeset] "Arg. Rio Negro / Gral. Rocas / Cnia. Catriel 311 m / S. Roig / G. Flores / 04/I/05", [white typeset] "37º52.83' S / 67º56.16'W". One female (IADIZA): [white typeset] "ARGENTINA: Chubut Biedma / Península de Valdes Ea San Pablo / 30 km SW Pto. Pirámides 42º 41' / 43.2''S 64º 10' 42,7''W 66 m / 06-I-2010 Coll: G. Flores, G. Cheli, / R. Carrara". One female (IADIZA): [white typeset] "ARGENTINA: Chubut / Península Valdez, Golfo Nuevo / Ea. San Pablo, 50 m / 27 Nov. 2005", [white typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002680".

Holotype and 22 paratypes deposited at CMNC. Seven paratypes deposited at DZUP. Four paratypes deposited at LEMQ. Six paratypes deposited at CEMT. Three paratypes deposited at IADIZA.

Diagnosis. Body elongate, yellow; pronotum slightly darker; pronotum and elytra with bristles throughout,

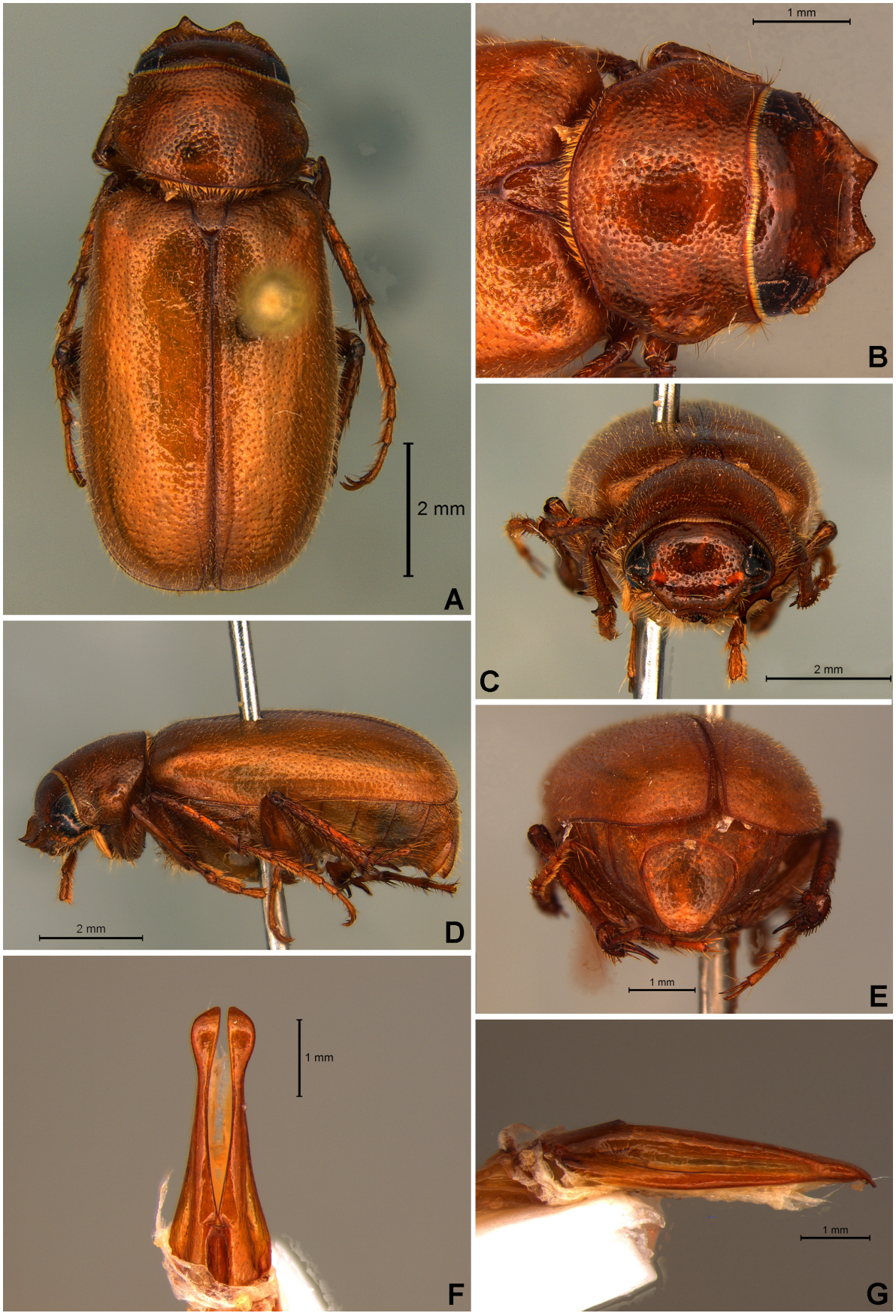

FIGURE 1. *Liogenys brachyclypeata* Cherman, **new species**, male holotype views: A) dorsal, B) clypeus and pronotum, C) frontal, D) lateral, E) pygidium, and parameres views: F) dorsal, G) lateral.

elytra pruinose on its margins (Fig. 1A); antenna with 10 antennomeres; frons very swollen and longer than clypeus; clypeal emargination deep, narrow, and rounded; teeth short, subparallel; clypeal lateral margin barely produced in males; almost straight in females; pronotum as long as one half its width, posterior margin narrower than anterior margin (Fig. 1B); elytra with only the sutural and the outer ridge distinguishable; protibia with three teeth (Fig. 1C); mesotibia and metatibia with one transverse carina complete (Fig. 1D); pygidium elongate, with long, decumbent bristles (Fig. 1E); males with protarsomeres slightly enlarged (Fig. 1D); paramere length at least three times the length of the apex; apex lanceolate in a single plane (Fig. 1F).

Holotype. **Male**. Length 8.7 mm; width: 3.9 mm. Yellow. *Head:* distance between eyes three times the width of one eye; frons longer than clypeus, swollen; frontoclypeal surface with long bristles; clypeal emargination deep, narrow, and rounded; outer sides of anterior teeth subparallel; clypeal lateral margin weakly produced; distance between clypeal lateral projection and anterior tooth longer than the basal width of anterior tooth, distance between clypeal lateral projection and anterior margin of eye half the length of one eye, margin continuous, not forming a sharp angle between outer side of anterior teeth and clypeal lateral projection; distal maxillary palpomere, maximum width more than two times the apical width; fovea deep, very small, not reaching the transverse midline of the palpomere; antenna with 10 antennomeres, club lighter in color and equal in length to the funicle. *Thorax*: anterior margin of pronotum slightly produced medially, pronotum anteriorly slightly narrowed forming a depressed ring strongly impressed; disc with bristles throughout, mainly at the sides; pronotal disc with punctures coarse and sparse; posterior corners obtusely angulate; pronotal posterior margin narrower than anterior margin; hypomere with long bristles; mesepisternum, sides of metaventrite, and metacoxae with sparse bristles; distance between mesocoxae and metacoxae less than twice the metacoxa length; scutellum ogival, finely punctate throughout and with bristles. *Elytra*: disc shiny, pruinose along the margins, mainly on posterior and lateral surfaces; bristles on disc disposed randomly; elytral suture and elytron unicolored, elevated; elytral ridges undistinguishable, exept for the outer ridge. *Legs*: procoxa with bristles and punctate; protibia with three teeth, middle and apical teeth robust and equal in size, distance between basal and middle teeth slightly less than middle and apical teeth; mesotibia cylindric in cross section; mesotibial surface finely sculptured; one transverse carina almost complete; inner margin of metatibia not carinate towards apex; surface finely sculptured; metatibia with two transverse carinae, the apical carina almost complete; metatibial apical spurs subequal in size, the longer spur slightly longer than the diameter of the tibial apex, the smaller spur narrower and truncate; metatarsomere I equal in size to tarsomere II; protarsomeres I–IV slightly enlarged, protarsomere II elongate; claw bifid, symmetrical, superior tooth of claw longer and equal in width to the inferior tooth; distance between teeth equal to the length of inferior tooth. *Abdomen*: ventrites with uniform bristles on the disc and sides; propygidium with bristles; pygidium flat; subquadrate; elongate; pygidial width not exceeding distance between spiracles of propygidium; pygidial disc finely punctate and with long decumbent bristles throughout; pygidial apex subquadrate. *Parameres*: basal region wider than both sections of the parameres at maximum width, parameral split at 2/3 the length of the basal region; inner margins convex; paramere length at least three times the length of the apex; apex lanceolate-like shaped in one plane; parameres in lateral view straight, coplanar (Fig. 1G).

Variation. Male paratypes. Length: 8.6–9.0 mm; width: 3.9–4.0 mm. As the holotype except in the clypeal lateral margin not produced. Female paratypes. Length: 8.0–9.2 mm; width: 3.8–4.2 mm. As the holotype except in the clypeal lateral margin straight; pronotum shorter and coarsely punctate, and elytra less pruinose.

Etymology. Adjective in the nominative singular. From Ancient Greek βραχύς (*brakhús*, "short") + Latin *clypeata* ("relative to clypeus"). The name is referring to the clypeus shorter than the frons, a rare feature in *Liogenys*.

Type locality. ARGENTINA, Mendoza, 40 km. N. San Rafael [34°10'40.9''S 68°20'41.3''W], 1100 m.

Geographical distribution. ARGENTINA (Mendoza, Río Negro, Chubut).

Remarks. *Liogenys brachyclypeata* **new species** resembles *L. rufoflava* in the body size and color, antenna with 10 antennomeres, elytra with bristles, protibia with three teeth in both sexes, and pygidium elongate and with bristles. *Liogenys brachyclypeata* **new species** differs from *L. rufoflava* (in parenthesis) mainly in the frons noticeable swollen and smooth, longer than clypeus (less swollen and punctate, as long as clypeus); clypeal emargination deep (shallow); pronotum shorter; lateral margin of pronotum with concavity more acute (unique among the *Liogenys*, which have broader concavity); pronotal posterior margin slightly narrower than the anterior margin and the head, with sharp corners (wider than head, subangulate corners); mesotibiae and metatibiae with one transverse carina complete (as in *L. kuntzeni*; in *L. rufoflava* males with transverse carina incomplete or only posteriorly);

bristles of pygidium longer, and in males protarsomeres slightly enlarged (distinctly enlarged). The shape of the parameres closely resembles those of *L. rufoflava*, but in *L. brachyclypeata* **new species** they are longer, while the apex is thinner and narrower.

Liogenys calcarata Frey, 1970

Figs. 2, 13E, 14

Liogenys calcaratus Frey, 1970: 283; Krajčík 2012: 144 (checklist).
Liogenys calcarata: Evans 2003: 207 (checklist); Evans & Smith 2009: 176 (checklist); Cherman *et al.* 2016: 759 (systematics); Cherman *et al.* 2017: 16 (taxonomy).

Type material. Male holotype of *Liogenys calcarata* (NMHB): [white, typeset] "ARGENTINA / 20 km N. La Rioja / 24.9.68 leg. Pena", [red typeset] "TYPE", [white typeset and handwritten] "Type / Liogenys / calcaratus / n. sp. / det. G. Frey, 1970", genitalia mounted. One male paratype (NHMB), five males and one female paratypes (AMNH) with the same data of the holotype. Male paratype (ZMHB): [white, typeset] "ARGENTINA / 20 km N. La Rioja / 24.9.68 leg. Pena", [red typeset] "PARATYPE", [white, typeset and handwritten] "Liogenys / calcaratus / n. sp. / det. G. Frey, 1970". Four male and two female paratypes (CMNC): [white, typeset] "ARGENTINA / 20 km N. La Rioja / 24.9.68 leg. Pena", [yellow handwritten and typeset] "LIOGENYS / CALCARATUS / FREY / PARATYPE", [white, typeset and handwritten] "Liogenys / calcaratus / det. G. Frey, 1970 / n sp", [white, typeset] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.".

Non-type material (12). ARGENTINA. *San Juan*: El Baldecito, Valle Fertil, XII.1964, A. Martínez, 1 male (CMNC); *Buenos Aires:* Estancia Barraú (30 km SW Villa Iris), XII.1946, A. Martínez, 1 male (CMNC); Puán, Felipe Solá, XII.1953, A. Martínez, 1 female (CMNC); *San Luis*: Arizona (18 km S), 250 m, 18–23.I.1982, H. & A. Howden, 1 female (CMNC); *Mendoza*: San Rafael, 6.XII.1988, L. Peña, 4 females (INPA); *Río Negro*: Coronel Gómez, I.1958, A. Martínez, 2 females (NHMUK); *Chubut*: Dolavon, Angostura, 1.V.2011, 43°18'36''S, 65°42'36''W, D. Rojas Lanus, 1 female (VMDC).

Diagnosis. Body elongate; dull yellow (Fig. 2A), pronotum shiny, unicolored with elytra; elytra shiny or semiopaque, with bristles, inconspicuous bristles throughout the elytron and also on frontoclypeal surface; clypeal emargination deep, wide and rounded; clypeal lateral margin convex, blunt projected; antenna with 10 antennomeres; pronotal posterior corners rounded (Fig. 2B); protibia with three teeth, distance between basal and middle teeth longer than the distance between middle and apical teeth; mesotibia quadrate in cross section (Fig. 2D); pygidium flat; subtrapezoidal; pygidial disc smooth, inconspicuous bristles throughout, bristles longer towards the apex (Fig. 2C); in males inner margin of metatibia weakly carinate towards apex; metatibial apical spurs of different lengths and shape, the longer spur equal to the diameter of the tibial apex, the shorter spur wider and projected laterally (Fig. 2E); protarsomere II very wide; inner margins of parameres concave; parameres three times the length of the apex; apex lanceolate, outer margins expanded in a plane below at the base (Fig. 2F).

Redescription. Length: 8.2–9.5 mm; width: 3.4–4.8 mm. Dull yellow. *Head*. Distance between eyes twice the width of one eye; frons swollen, longer than the clypeus, frontoclypeal surface with inconspicuous bristles; clypeal emargination deep, wide and rounded; outer sides of anterior teeth subparallel; clypeal lateral margin convex, blunt projected; canthus exceeding the outer margin of the eye; distal maxillary palpomere, maximum width slightly wider than the apex; fovea deep, very small, only at the base; antenna with 10 antennomeres, club lighter in color than funicle. *Thorax*: anterior margin of pronotum slightly produced medially; pronotal disc with punctures fine and sparse; posterior corners rounded; hypomere with short bristles; mesepisternum, sides of metaventrite and metacoxae with bristles; disc of metaventrite with abundant spine-like bristles; distance between mesocoxae and metacoxae twice the metacoxa length; scutellum ogival, smooth. *Elytra*: shiny or semiopaque, inconspicuous bristles throughout the elytron, a row of short bristles on the fourth ridge; elytral suture and elytron unicolored, slightly elevated; all four elytral ridges barely noticeable. *Legs*: procoxa with bristles, weakly scaly and punctate; protibia with three teeth equal in size; distance between basal and middle teeth longer than the distance between middle and apical teeth; mesofemur with thick, erect bristles along the inferior margin; mesotibia quadrate in cross section, mesotibial surface smooth; mesotibia with two transverse carinae present posteriorly; metafemur with thick, erect bristles along the inferior margin; males with inner margin of metatibia weakly carinate towards apex; surface finely sculptured, almost smooth; metatibia with two transverse carinae present posteriorly; males with metatibial apical

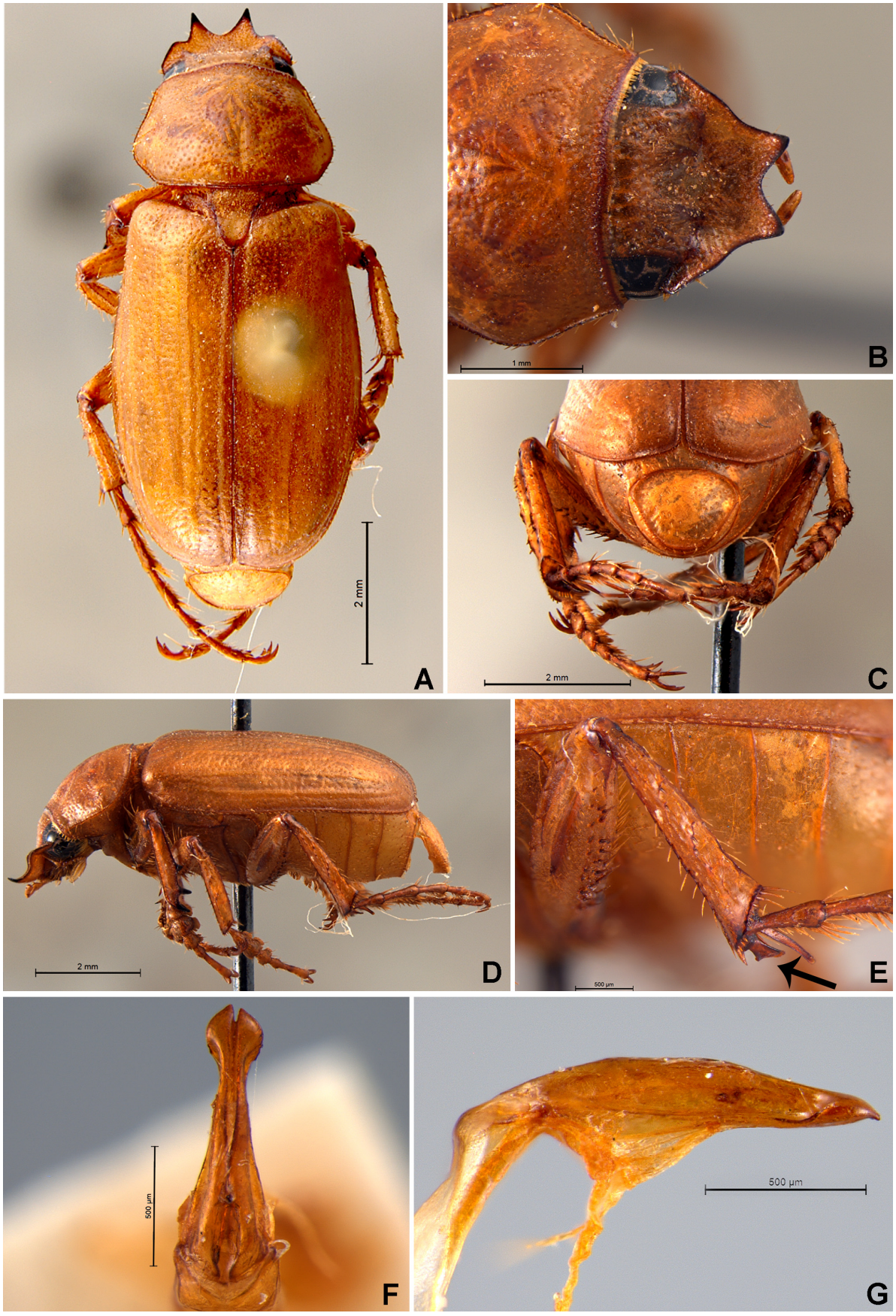

FIGURE 2. *Liogenys calcarata* Frey, 1970, male holotype views: A) dorsal, B) clypeus and pronotum, C) pygidium, D) lateral, E) metatibia, black arrow indicating short, modified spur, and parameres views: F) dorsal, G) lateral.

spurs of different lengths and shape, the longer spur equal to the diameter of the tibial apex, the shorter spur wider and projected laterally; metatarsomere I shorter and equal in width to tarsomere II; protarsomeres and mesotarsomeres I–IV enlarged, protarsomere II very wide; protarsomeres less than twice wider than the mesotarsomeres; claw bifid, symmetrical, superior tooth of claw longer and wider than the inferior tooth; distance between teeth longer to the length of inferior tooth. *Abdomen*: ventrites with erect bristles at the disc, more abundant on ventrites II and III; propygidium with few bristles; pygidium flat; subtrapezoidal; pygidial width not exceeding distance between spiracles of propygidium; pygidial disc smooth, inconspicuous bristles throughout, a few longer bristles towards the apex; pygidial apex subquadrate. *Parameres*: basal region slightly wider than both sections of the parameres at its maximum width, parameral split at 2/3 the length of the basal region; inner margins concave; three times the length of the apex; apex lanceolate, outer margins weakly expanded in a plane below at the base; parameres in lateral view convex, coplanar (Fig. 2G).

Type locality. ARGENTINA. 20 km N La Rioja [near El Cantadero, 29°14'28.9''S 66°51'20.3''W].

Geographical distribution. ARGENTINA (La Rioja, **San Juan**, **Buenos Aires**, **Mendoza, San Luis, Río Negro, Chubut**).

Remarks. *Liogenys calcarata* resembles *L. flaveola* in the body color, size, and in the shape of tibiae and pygidium. *Liogenys calcarata* differs from *L. flaveola* (in parenthesis) in the clypeal emargination deep (shallow); pronotal punctures finer; pygidial disc with bristles (glabrous); males with metatibial spurs uneven, the shorter spur wider and asymmetrically projected (truncate but not projected). The parameres of both species have apex lanceolate, in *L. calcarata* the outer margins are expanded in a plane below (in one plane). This species also resembles *L. kuntzeni* in the shape of the apex lanceolate, and at its base the outer margin is also expanded in a plane below. In the case of *L. calcarata*, the expanded portion at the base of the apex is very narrow.

Liogenys flaveola Moser, 1924

Figs. 3, 11A–B, 14

Liogenys flaveolus Moser, 1924: 122; Dallas 1926: 41 (teratologic case); Frey 1969: 47 (key).
Liogenys flaveola: Blackwelder 1944: 227 (checklist); Evans 2003: 209 (checklist); Evans & Smith 2009: 177 (checklist); Krajčík 2012: 144 (checklist); Cherman *et al.* 2017: 4 (generic history).
Liogenys kadleci Frey, 1970: 281; Evans 2003: 210 (checklist); Evans & Smith 2009: 178 (checklist); Krajčík 2012: 145 (checklist); Cherman *et al.* 2016: 759 (systematics); Cherman *et al.* 2017: 5, 6 (generic history, taxonomy); **new synonym.**

Type material. Male holotype of *Liogenys flaveola* (ZMHB): [white, typeset, outlined] "RCA. ARGENTINA / Gob. Chubut / 190 [space] / C. Bruch", [white handwritten] "Camarones / J. Wiederrecht", [white handwritten] "Liogenys / flaveolus / Typen Mos", [red typeset] "Typus", [white typeset] "Liogenys / flaveolus / Mos.".

Male holotype of *Liogenys kadleci* (NMHB): [white, typeset] "ARGENTINA / Villa Regina / Rio Negro / 20.XI.63 leg. Pena", [red typeset] "TYPE", [white, typeset and handwritten] "Type / Liogenys / kadleci / n. sp. / det. G. Frey, 1970", genitalia mounted. Male paratype (ZMHB): [white, typeset] "ARGENTINA / Villa Regina / Rio Negro / 20.XI.63 leg. Pena", [red typeset] "PARATYPE", [white, typeset and handwritten] "Type / Liogenys / kadleci / n. sp. / det. G. Frey, 1970". Male paratype (CMNC): [white, typeset] "ARGENTINA / Villa Regina / Rio Negro / 20.XI.63 leg. Pena", [red typeset] "PARATYPE", [white, typeset and handwritten] "*Liogenys* / *kadleci* / det. G. Frey, 1970 / n sp", [white, typeset] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.", [white, typeset] "Southern Neotropical Scarabs / database # AS2614382 / *Liogenys kadleci* / Frey, 1970 ♂ / DET: A.B.T.SMITH 2008" Male paratype (CMNC): [white, typeset] "ARGENTINA / Villa Regina / Rio Negro / 20.XI.63 leg. Pena", [red typeset] "TYPE", [white, typeset and handwritten] "Type / *Liogenys* / *kadleci* / det. G. Frey, 1970 / n sp", [white, typeset] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.", [white, typeset] "Southern Neotropical Scarabs / database # AS2614381 / *Liogenys kadleci* / Frey, 1970 ♂ / DET: A.B.T.SMITH 2008".

Non-type material (67). ARGENTINA. *Buenos Aires:* Without locality and collector, 1 male (MLPA); Monte Hermoso, XII.1955, A. Martínez, 1 female (DZUP); Puán, Felipe Solá, XII.1953, A. Martínez, 1 male (CMNC); *Mendoza*: without locality, 9.XI.1987, L. Peña, 1 male (CEMT); Pata Mora (36 km W), 36º58'20''S 69º6'19''W, 7.I.2003, 1145 m, F.C. Ocampo & A.B.T. Smith, 1 male (CMNC); San Rafael, 6.XII.1988, L. Peña, 1 female (INPA); *Río Negro*: without locality, date and collector, 1 male (MLPA); General Roca, 24.XI.1920, A. Wetmore, 1 male (CASC); Villa Regina, XII.1961, A. Maller, 3 females (1 CMNC, 2 DZUP); 20.XI.1963, L. Peña, 1 male

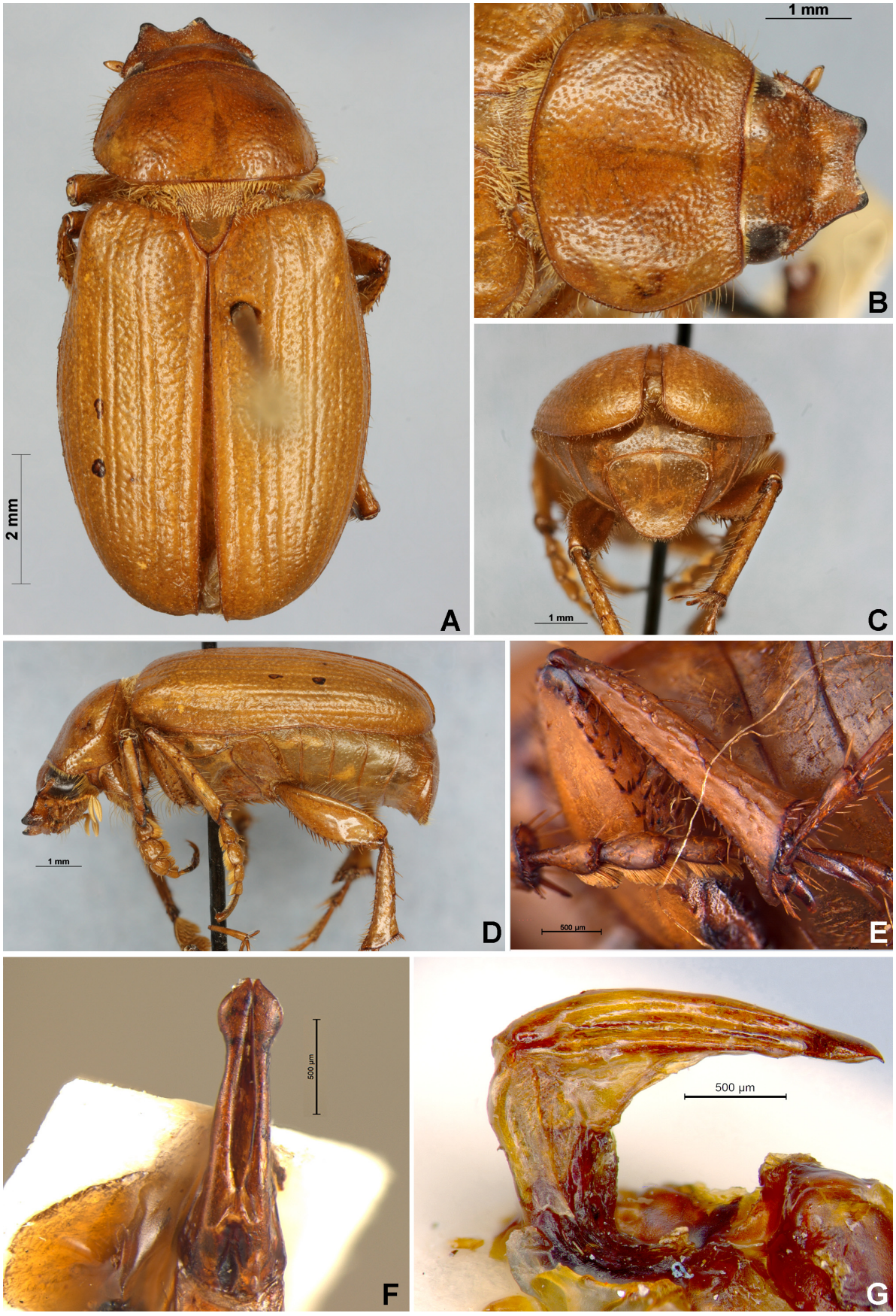

FIGURE 3. *Liogenys flaveola* Moser, 1924, male holotype views: A) dorsal, B) clypeus and pronotum, C) pygidium, D) lateral, E) metatibia, and parameres views: F) dorsal, G) lateral.

(NHMB); San Antonio Oeste, 15.XII.1966, E.I. Schlinger & M.E. Irwin, at lights, 7 males and 10 females (CASC); San Antonio Oeste, XII.1992, A. Martínez, at lights, 5 males (CMNC); San Antonio Oeste, Los Grutas, XII.1992, A. Martínez, 2 males and 4 females (CMNC); Valcheta, XII.1992, A. Martínez, 1 male (CMNC); *Chubut*: Península de Valdés, Golfo Nuevo, Estancia San Pablo, 42°41'42''S, 64°10'46''W, 27.XI.2005, 50 m, 15 males and 3 females (CMNC); Península de Valdés, Golfo Nuevo, Estancia San Pablo, 42°41'42''S, 64°10'46''W, 15.XII.2005, 50 m, G. Cheli, 1 male, 1 female (CMNC); Puerto Madryn (13 KM N), 14.XII.1966, M.E. Irwin & E.I. Schlinger, 1 female (CASC); Puerto Pirámides, XII.1992, 44 males and 39 females (CMNC).

Diagnosis. Body elongate, sides parallel in males, wider on posterior third in females; dull yellow, pronotum shiny, unicolored with elytra; elytra shiny or semiopaque, glabrous (Fig. 3A); clypeal emargination shallow, wide and rounded; clypeal lateral margin concave; antenna with 10 antennomeres; pronotal posterior corners subangulate to rounded (Fig. 3B); protibia with three teeth equally spaced; mesotibia quadrate in cross section (Fig. 3D); pygidium flat; subtrapezoidal; pygidial disc smooth and glabrous (Fig. 3C); in males inner margin of metatibia carinate towards apex and curved frontwards; the smaller metatibial spur wider and ½ the length of the larger, apex slightly curved frontwards (Fig. 3E), protarsomere II very wide; inner margins of parameres convex; four times the length of the apex; apex lanceolate in a single plane (Fig. 3F).

Redescription. Length: 9.0–10.7 mm; width: 4.7–4.9 mm. Dull yellow. *Head*. distance between eyes slightly more than twice the width of one eye; frons swollen, as long as the clypeus; clypeal emargination shallow, wide and rounded; outer sides of anterior teeth subparallel or follow the lateral margin of clypeus; clypeal lateral margin concave, clypeus in males (Fig. 11A) with teeth longer and broader than in females (Fig. 11B); distal maxillary palpomere, maximum width slightly wider than the apex; fovea deep, very small, only at the base; antenna with 10 antennomeres, club lighter in color than funicle. *Thorax*: anterior margin of pronotum straight; pronotal disc with punctures coarse and sparse; posterior corners subangulate to rounded; hypomere with long bristles; mesepisternum, sides of metaventrite and metacoxae with bristles, disc of metaventrite with spine-like bristles; distance between mesocoxae and metacoxae twice the metacoxa length; scutellum ogival, finely punctate at the sides. *Elytra*: shiny, glabrous; elytral suture and elytron unicolored, slightly elevated; inner two pairs of elytral ridges more defined than the outer ridges. *Legs*: procoxa with bristles and punctate; protibia with three teeth, middle and apical teeth equal in size, basal teeth slightly shorter; three teeth equally spaced; mesofemur with thick, erect bristles along the inferior margin; mesotibia quadrate in cross section, mesotibial surface almost smooth; mesotibia with two transverse carinae present posteriorly, in females the apical one complete; metafemur with thick, erect bristles along the inferior margin; inner margin of metatibia carinate towards apex and curved frontwards; surface finely sculptured, almost smooth; metatibia with two transverse carinae present posteriorly; metatibial apical spurs of different lengths, the longer spur equal to the diameter of the tibial apex, males with the smaller spur half the length of the longer spur, apex truncate, slightly curved frontwards, females with longer, wider spurs and apex rounded; metatarsomere I slightly shorter and wider apically than metatarsomere II; protarsomeres and mesotarsomeres I–IV enlarged, protarsomere II very wide; protarsomeres almost two times wider than the mesotarsomeres; claw bifid, symmetrical, superior tooth of claw longer and as wide as the inferior; distance between teeth equal to the length of inferior tooth. *Abdomen*: ventrites uniformly with bristles; propygidium with a few bristles; pygidium flat; subtrapezoidal; pygidial width not exceeding distance between spiracles of propygidium; pygidial disc smooth and glabrous; pygidial apex subquadrate. *Parameres*: basal region slightly wider than both sections of the parameres at its maximum width, parameral split at 2/3 the length of the basal region; inner margins convex; apex lanceolate in a single plane; parameres in lateral view straight, not coplanar (Fig. 3G).

Type locality. *Liogenys flaveola*: ARGENTINA. Chubut, Camarones [44°47'56.8''S, 65°42'36.2''W]. *Liogenys kadleci*: ARGENTINA. Río Negro, Villa Regina [39°06'01.2''S, 67°05'19.6''W].

Geographical distribution. ARGENTINA (**Buenos Aires, Mendoza,** Neuquén, Río Negro, Chubut).

Remarks. *Liogenys flaveola* is most similar to *L. calcarata* (see remarks of *L. calcarata*). We compared the holotypes of *L. flaveola* and *L. kadleci*, the former only differs in the outer sides of anterior clypeal teeth following the lateral margin, and the pronotal posterior corners are rounded. Unfortunately, the parameres of the holotype of *L. flaveola* are lost. Since the non-type material of *L. kadleci* showed intraspecific variations that match with the holotype of *L. flaveola*, we concluded that *L. kadleci* is a junior synonym of *L. flaveola*.

Dallas (1926) described the teratology found in a female specimen of *L. flaveola* from Río Negro (Argentina), collected in 1922 by Carlos Bruch. It consisted in the right protarsus bifid, ramified from the second tarsomere, with a normal pair of claws on the inner tarsus and a double pair of claws on the outer one. This kind of deformation is

called melomelia, the presence of more than the usual number of limbs, or their ramification (Dallas 1926). We were unable to find the Dallas collection.

Liogenys flavida Moser, 1918

Figs. 4, 11C–D, 14

Liogenys flavidus Moser, 1918: 106; Frey 1969: 38 (key); Krajčík 2012: 144 (checklist); Cherman *et al.* 2017: 4 (generic history).

Liogenys flavida: Blackwelder 1944: 227 (checklist); Evans 2003: 209 (checklist); Evans & smith 2009: 177 (checklist); Cherman *et al.* 2016: 759 (systematics); Cherman *et al.* 2017: 16, 51, 69 (taxonomy).

Type material. Male lectotype of *Liogenys flavida* here designated (ZMHB): [white handwritten] "Liogenys / flavidus / Mos / Type ♂", [white handwritten] "Patagonien", [light red typeset] "Typus", [white typeset] "Liogenys / flavidus / Mos.", [red typeset] "SYNTYPUS / Liogenys / flavida Moser, 1918 / labelled by MNHUB 2012", [white, outlined in red, typeset] "LECTOTYPE / Liogenys flavida / Moser, 1918 / [des.] Cherman M. A. 2013", genitalia mounted. One female paralectotype (ZMHB) bearing the following labels: [white handwritten] "Liogenys / flavidus / Mos / Type ♀", [white handwritten] "Patagonien", [light red typeset] "Typus", [white typeset] "Liogenys / flavidus / Mos.", [red typeset] "SYNTYPUS / Liogenys / flavida Moser, 1918 / labelled by MNHUB 2012", [white, outlined in red, typeset] "PARALECTOTYPE / Liogenys flavida / Moser, 1918 / Cherman M. A. 2013".

Non-type material (78). ARGENTINA. *Salta*: La Viña, 24.IX.1983, L. Peña, 1 female (INPA); *Córdoba*: Rio Cuarto, without date, Bremer, 1 female (ZMHB); *Buenos Aires*: Azul, I.1975, Dacluk, 1 male (CMNC); Estancia Barraú (30 km SW Villa Iris), XI.1946, A. Martínez, 3 females (CMNC); *Mendoza*: Reserva la Payunia, Los Relinchos, 36º00'59''S, 68º48'39''W, 6.I.2003, 1714 m, F. Ocampo & A.B.T. Smith, 7 males and 12 females (CMNC); El Nihuil, 35º11'54''S, 68º43'09''W, 5.I.2003, 1311 m, F. Ocampo & A.B.T. Smith, 2 males and 4 females (CMNC); San Rafael, 6.XII.1988, L. Peña, 3 males and 1 female (INPA); Malvinas, 10.IX.1987, L. Peña, 2 females (INPA); Malargüe, without date, Hurk, 1 male (ZMHB); *San Luis*: Arizona (18 km S), 250 m, 18–23.I.1982, H. & A. Howden, 1 male and 1 female (CMNC); *Neuquén*: without locality, date, and collector, 1 male (MLPA); Arroyo Picún Leufú, Ruta Nacional 40, 1.1965, A. Martínez, 1 male (CMNC); Chos Malal, 37°22'17''S, 70°16'30''W, 1.VIII.2003, 850 m, F.C. Ocampo & A.B.T. Smith, 1 female (CMNC); Bariloche, Fortín Chacabuco, 17.I.1964, Pair on Senecio, Lloyd, 1 male and 1 female (CMNC); Laguna Blanca, XII.1975, A. Martínez, 1 female (CASC); Loncopué, Ñireco, 1200 m, 17.II.1974, M. Gentilli, 2 females, (CMNC); Paso Coihue, 18.I.1975, M. Gentilli, 2 females, (CMNC); Reserva Epu Lauquen, 36°49'5''S, 71°4'25''W, 1.IX.2003, 1474 m, F.C Ocampo & A.B.T. Smith, 1 male (CMNC); San Martín de los Andes, XII.1955, A. Giai, 1 female (CMNC); Sierra Cuchillo Curá, 38°37'S, 70°22'0''W, 15.XII.1974, 975 m, M. Gentili, 1 male and 1 female (CMNC); Sierra Vaca Muerta, 14.XII.1974, 950 m, M. Gentili, 1 female (CMNC); Añelo, [38°21'S, 68°47'W], 26.X.1981, Kovac, 3 males and 2 females (NHMW); Río Malleo, [39°49'60''S, 70°52'60''W], 27.XII.1973, 1000 m, M. Gentili, 1 male and 1 female (CMNC); RP 49, Cañadon a 15,800 del LT2S5 Estepa de Neneo y suelo con canto rodado > 10 cm, 40°5'39.83''S, 70°53'27.64''W, 31.I.2005, 727 m, P. Sackmann, 1 male; *Río Negro*: Colonia Catriel, Ruta Nacional 151, 37°52'33''S, 67°49'50''W, 23.I.2006, 315 m, F.C. Ocampo, E. Ruiz, G. Zalazar; at light, 1 male (CMNC); General Roca, I.1962, Bachmann, 1 female (CMNC); Paso Flores [40°33'40.75''S, 70°38'11.43''W], 8.XII.1955, S. Schajovskoy, 5 males (CMNC); Paso Flores [40°33'40.75''S, 70°38'11.43''W], 13.II.1956, S. Schajovskoy, 1 male and 3 females (CMNC); San Antonio Ouest, 15.XII.1966, E.I. Schlinger & M.E. Irwin, 1 female (CASC); San Antonio Oeste, Los Grutas, XII.1973, C. Bordón, 1 male (CMNC); RP 23, llegando a Pilcaniyeu, Estepa de Neneo y Anartrophylum, 41°7'28.51''S, 70°45'21.87''W, 31.I.2005, 976 m, P. Sackmann, 1 male (CMNC); *Chubut*: Comodoro Rivadavia, Patagonia, without date, Merkle, 2 females (MLPA) and 1 female (MACN); Peninsula Valdés, Golfo Nuevo, Estancia San Pablo, 42°41'42''S, 64°10'46''W, 15.XII.2005, 50 m, G. Cheli, 1 male (CMNC); Puerto Pirámides, XII.1992, 5 males (CMNC); Trelew, 1.IX.1996, D. Rojas Lanus, 1 female (VMDC); *Santa Cruz*: Bahia del Fondo, [46°3'16''S, 67°37'23''W], without date and collector, 1 female (MLPA).

Diagnosis. Body elongate, sides parallel; dull yellow, pronotum unicolored with elytra; elytra shiny or semi-opaque, with a few inconspicuous, short bristles throughout the elytron (Fig. 4A); clypeal emargination very shallow, wide and rounded; clypeal lateral margins straight (Fig. 4F); antenna with 9 antennomeres; pronotal posterior corners sharp, obtusely angulate; males with two protibial teeth (Fig. 4D), females with three protibial teeth; meso-

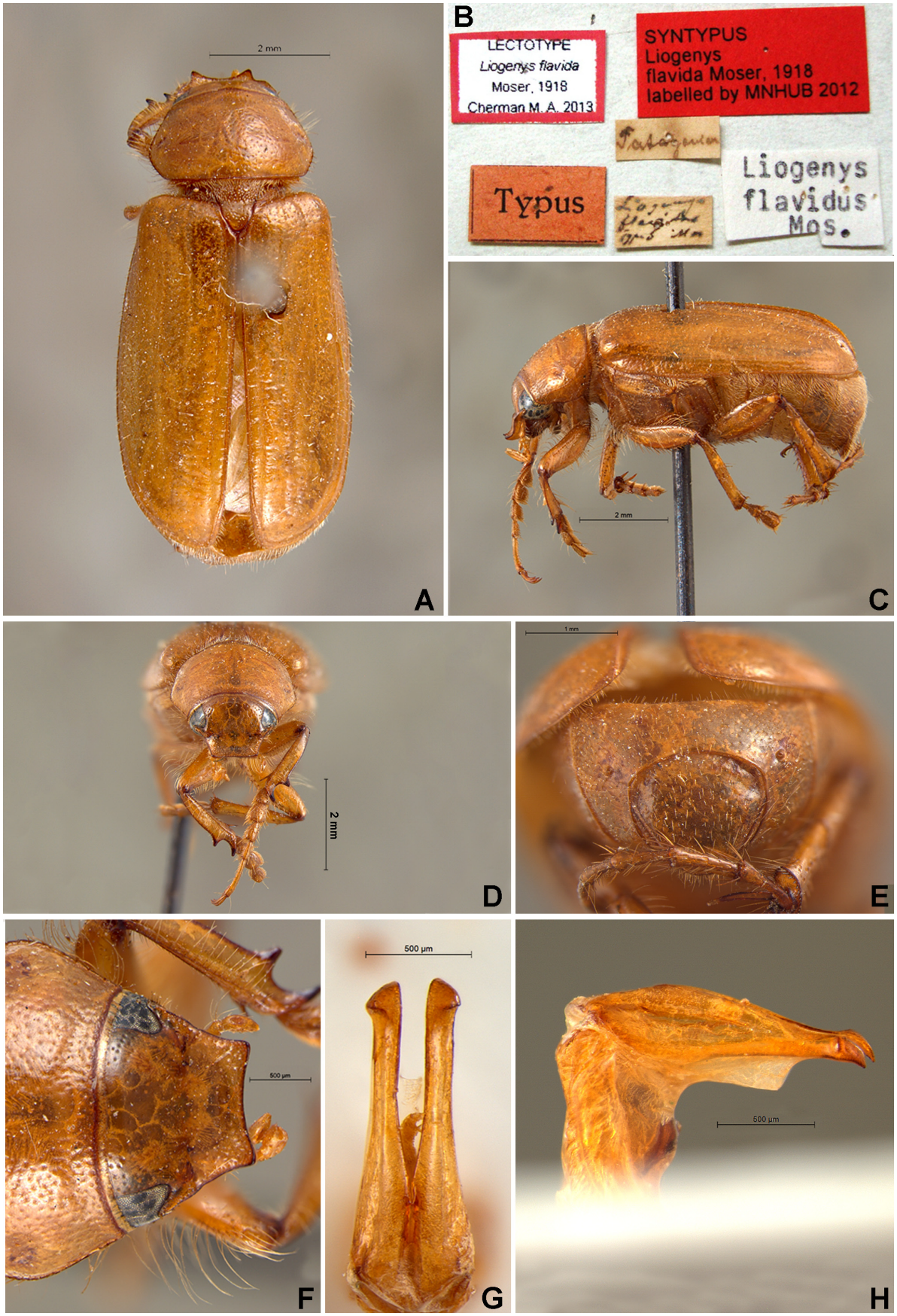

FIGURE 4. *Liogenys flavida* Moser, 1918, male lectotype views: A) dorsal, B) labels, C) lateral, D) frontal, E) pygidium, F) clypeus, and parameres views: G) dorsal, H) lateral.

tibia subquadrate in cross section in males (Fig. 4C); cylindrical in females; pygidium flat, elongate, subrounded; pygidial disc smooth, long bristles throughout (Fig. 4E); in males inner margin of metatibia carinate and slightly curved frontwards; the smaller metatibial spur with apex wider, blunt; protarsomere II as wide as it is long; parameres long, inner margins straight; apex projected laterally forming an acute angle (Fig. 4G).

Redescription. Length: 8.5–9.0 mm; width 4.1–4.4 mm. Dull yellow. *Head*. Distance between eyes at least three times the width of one eye; frons swollen in females (Fig. 11D); clypeus longer in males, disc sometimes with a few bristles; clypeal emargination very shallow, wide and rounded, in males outer sides of anterior teeth parallel, outer margin of anterior teeth as long as the eye; in females teeth undistinguishable, following the lateral margin of clypeus; clypeal lateral margins straight; distal maxillary palpomere, maximum width near two times the apical width; fovea deep, rounded, not reaching the midline; antenna with 9 antennomeres; club lighter in color and equal in length to the funicle in males, shorter in females. *Thorax*. anterior margin of pronotum slightly produced medially; pronotum anteriorly slightly narrowed forming a depressed ring; pronotal posterior corners sharp, obtusely angulate; hypomere with few long bristles; disc of metaventrite with spine-like bristles; scutellum ogival in males, triangular and longer in females, smooth or punctate at the sides. *Elytra*: shiny or semiopaque, inconspicuous bristles throughout the elytron, bristles more abundant around the outer ridge; elytral suture and elytron unicolored, slightly elevated; all four elytral ridges weakly defined. *Legs*. procoxa with bristles, smooth; males with two protibial teeth, females with three protibial teeth, basal tooth vestigial, distance between basal and medial tooth slightly shorter than that between medial and apical tooth; mesofemural and metafemural inner margin with spine-like bristles; mesotibia subquadrate in cross section in males; cylindrical in females; mesotibia with two transverse carinae, the apical carina complete only in females; in males inner margin of metatibia carinate and slightly curved frontwards; metatibia with two transverse carinae present posteriorly; metatibial apical spurs of different lengths, the longer spur equal to the diameter of the tibial apex, males with the shorter spur wider and truncate; metatarsomere I and II equal in size; protarsomeres and mesotarsomeres I–IV enlarged in males, protarsomere II as wide as it is long; protarsomeres slightly wider than the mesotarsomeres; claw bifid, symmetrical, superior tooth of claw longer and as wide as the inferior tooth; distance between teeth shorter than the length of inferior tooth. *Abdomen*: disc of ventrites with abundant bristles in males, in females abundant only on ventrite I and on the anterior half of ventrite II; propygidium with abundant bristles; pygidium flat, elongate; pygidial disc smooth, with bristles throughout, bristles long; pygidial apex rounded. *Parameres*: Outer margins expanded laterally along the entire length; width of basal region slightly wider than both sections of the parameres at its maximum width; parameral split at 2/3 the length of the basal region; inner margins straight; apex projected laterally forming an acute angle with apex blunt; parameres in lateral view slightly concave, not coplanar (Fig. 4H).

Type locality. ARGENTINA."Patagonien", which may be Viedma, Río Negro (see the Remarks section of *Liogenys xanthocera*).

Geographical distribution. ARGENTINA (**Salta, Córdoba**, **Buenos Aires, Mendoza**, **San Luis**, Neuquén, Río Negro, Chubut, Santa Cruz).

Remarks. *Liogenys flavida* resembles other species (*L. flaveola*, *L. calcarata*) with dull yellow body; disc of metaventrite and posterior margin of the mesofemur and metafemur with spine-like bristles; and males with metatibial spurs uneven in shape. This species differs from the most similar ones in the clypeal emargination shallower; antenna with 9 antennomeres (10 antennomeres); males with two protibial teeth (as in *L. kuntzeni*, *L. calcarata* and *L. flaveola* with three teeth), females with three teeth, but basal tooth weakly defined; and pygidium longer than wide and with bristles (similar to *L. rufoflava*, although longer in the latter, for more detail see remarks of *L. rufoflava*). In the other species the pygidium is as long as wide, *L. calcarata* with bristles and *L. flaveola* glabrous. *Liogenys flavida* is somewhat similar to *L. lucialmeidae* **new species** (see remarks of the latter species).

Liogenys kuntzeni Moser, 1921

Figs. 5, 11E–F, 14

Liogenys kuntzeni Moser, 1921: 139; Blackwelder 1944: 227 (checklist); Gutiérrez 1949: 20 (geographic records); Gutiérrez 1951: 132, 134 (key, redescription); Frey 1969: 48 (key); Evans 2003: 210 (checklist); Evans & Smith 2009: 178 (checklist); Krajčík 2012: 145 (checklist); Cherman *et al.* 2016: 759 (systematics); Cherman *et al.* 2017: 4, 16 (generic history, taxonomy).

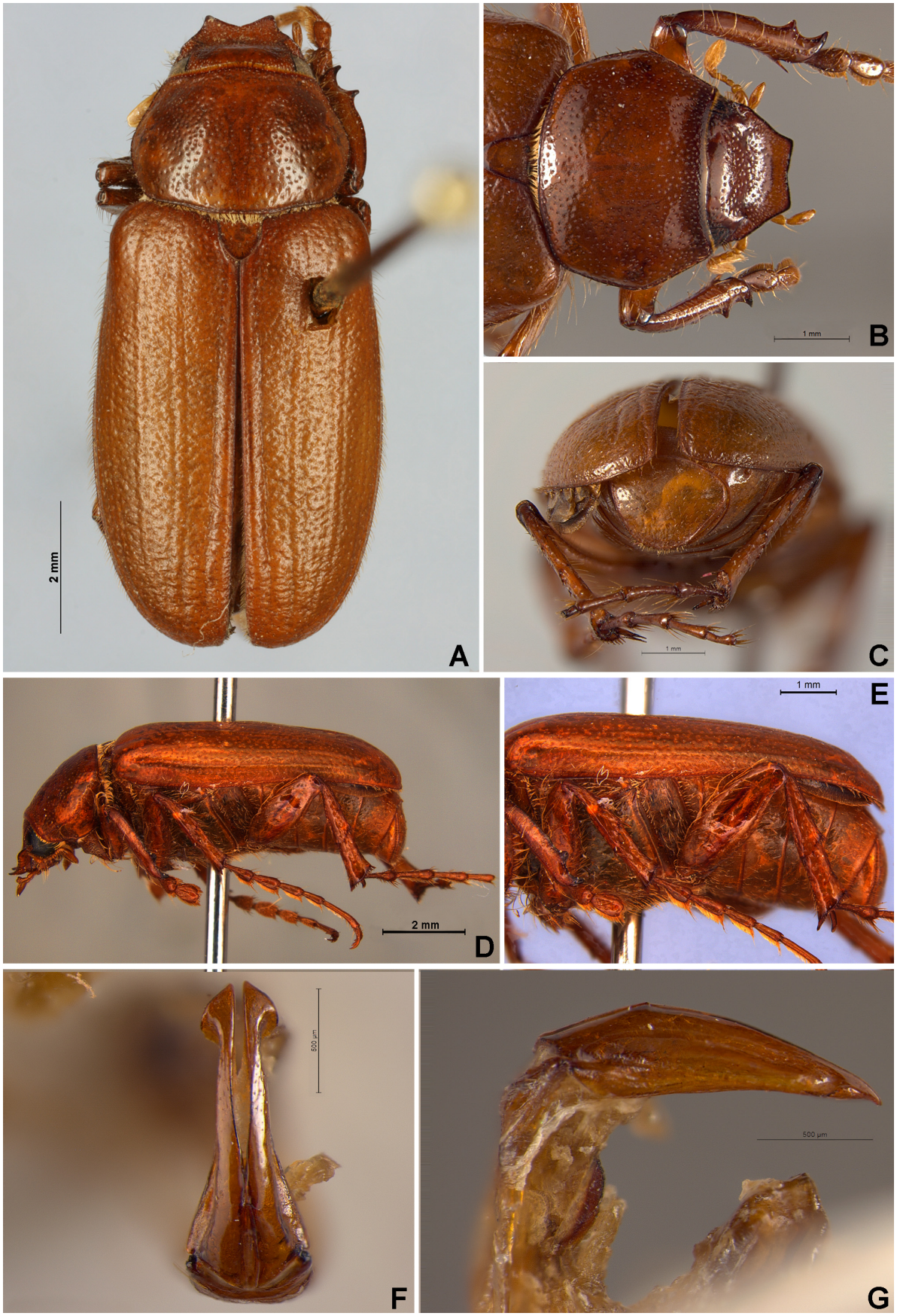

FIGURE 5. *Liogenys kuntzeni* Moser, 1921, male holotype views: A) dorsal, B) clypeus and pronotum, C) pygidium, D) lateral, E) meso- and metatibia, and parameres views: F) dorsal, G) lateral.

Type material. Male holotype of *Liogenys kuntzeni* (ZMHB): [white typeset] "Chili", [white handwritten] "Liogenys / kuntzeni / Typen / Mos", [red typeset] "Typus", [white typeset] "Liogenys / kuntzeni / Mos.", genitalia mounted.

Non-type material (53). CHILE. *Valparaíso*: Algarrobo, I.1987, L. Peña, 2 males (INPA); 21.VII.1951, [33°22'S, 71°40'W], Kuschel & L.E. Peña, 1 male (FMNH); NW Algarrobo. Mirasol, 22.I.1978, L. Peña, 1 male (INPA); NW Algarrobo. Mirasol, 12.I.1975, [33°19'26.93''S, 71°38'48.88''W], NW Algarrobo. Mirasol, 12.I.1975, P. Vidal, 6 males and 1 female; NW Algarrobo. Mirasol, 16.I.1975, 4 males and 2 females (FMNH); Horcones, [32°43'12''S, 71°29'24''W], 19.II.1963, L.E. Peña, 2 males (FMNH), Viña del Mar, [33°1'30.78''S, 71°33'3.73''W], 1–31.X.1975, Herrera, 3 males (UMCE); Zapallar, Cachagua, II.1977, Alcaino, 1 male (MNNC); Llay-Llay, [33°51'S, 70°58'W], 1–30.XI.1934, without collector; 1 male (MNHN); San Antonio, [32°53'S, 71°15'W], without date and collector, 1 male (NHMUK); *Santiago*: San Cristobal, without date, Zapata, 3 males (UMCE); La Dehesa, I.1975; without collector, 1 specimen; El Principal, IX.1953, L.E. Peña, 1 female (FMNH); [Refugio] Lo Valdés. Cajón del Maipo, 16.I.2005, 2200 m, Ramirez, 1 male (MNNC); *Maule*: Curicó, Cajón de Teno [near Quilpoco], 3.I.1980, 2000 m, J.R. Barriga, 2 males (USNM); Talca, Rio Maule, 2.X–2.XI.1956, 1400 m, L.E. Peña, 1 male (FMNH); Los Cipreses [Romeral], 14.I.1968, 1000 m, L.E. Peña, 2 males, 1 female (CMNC); *Ñuble*: 50 km E San Carlos [Punilla Provence, near San Fabián], 26.XII.1950, Ross & Michelbacher, 1 male (NHMB); *Biobío*: Laguna del Laja [Los Ángeles], 16.I.1987, L. Peña, 3 males and 1 female (INPA); 2.I.1987, Perez de Arce, 1 female (MNNC); Abanico, I.1948, 800 m, without collector, 3 males (CMNC, MNNC, NHMB); XI.1948, without collector, 1 male (MNNC); 10.I.1948, G. Kuschel, 1 male (MZUC); Los Barros, I.1948, 1800 m, G. Kuschel, 1 male. (MNNC); Concepción, 15.XII.1962, Fetes, 1 male (CNCI); Concepción. Hualqui, 23.XII.1944, C. Junge, 3 males (USNM).

Diagnosis. Body light brown, elongate, sides parallel in males, slightly wider on posterior third in females; pronotum slightly darker and shinier than elytra (Fig. 5A); elytra bearing inconspicuous bristles, more visible on the outer ridge and lateral margins; clypeal emargination deep, subangulate, and very wide; clypeal lateral margin straight in males, slightly convex in females; antenna with 10 antennomeres; posterior corners subangulate (Fig. 5B); males with two protibial teeth, sometimes with a vestigial basal tooth such as in females; mesotibia cylindrical in cross section and somewhat flattened, males with one transverse carina complete (Fig. 5D), females with two transverse carinae, the apical carina complete; pygidium slightly convex; subtrapezoidal, pygidial disc smooth and with sparse, random bristles (Fig. 5C); males with inner margin of metatibia weakly carinate present only on apical portion (Fig. 5E); parameres with apex lanceolate, forming and ear-like wing laterally (Fig. 5F).

Redescription. Length: 8.8–9.9 mm; width: 4.5–5.0 mm. Light brown. *Head*. distance between eyes slightly more than twice the width of one eye; frons swollen, equal in length to clypeus; clypeal emargination deep, wide and subangulate, in males almost as wide as the distance between eyes; outer sides of anterior teeth subparallel or following the lateral margin of clypeus, lateral margin straight in males, convex in females; in males teeth of clypeus longer and more defined (Fig. 11E) than in females (Fig. 11F); distal maxillary palpomere, maximum width less than two times the apical width; fovea deep, not reaching the transverse midline of the palpomere; antenna with 10 antennomeres, club lighter in color than funicle. *Thorax*: anterior margin of pronotum slightly produced medially; pronotum anteriorly slightly narrowed forming a depressed ring; pronotal disc with punctures coarse and sparse; posterior corners subangulate; hypomere with long and short bristles; mesepisternum, sides of metaventrite and metacoxae with bristles; distance between mesocoxae and metacoxae twice that of metacoxa width; scutellum rounded, smooth or with a few punctures. *Elytra*: shiny, with inconspicuous bristles disposed randomly; elytral suture and elytron unicolored, elevated; all four elytral ridges barely noticeable. *Legs*: procoxa barely scaly and punctate; males with two protibial teeth, sometimes with a weakly defined third basal tooth such as in females, middle and apical teeth equal in size, all three teeth equally spaced; mesotibia cylindrical and somewhat flattened in cross section, mesotibial surface finely sculptured; males with one mesotibial transverse carina only posteriorly, females with two transverse carinae, the apical carina complete; inner margin of metatibia not carinate in males or females; surface finely sculptured; metatibia with two transverse carinae, the apical carina complete, more defined in females; metatibial apical spurs of different lengths, the longer spur equal to the diameter of the tibial apex; metatarsomere I in males slightly shorter and equal in width to metatarsomere II, in females metatarsomere I and metatarsomere II approximately equal in length; in males protarsomeres and mesotarsomeres I–IV enlarged, protarsomere II elongate; mesotarsomeres less enlarged than the protarsomeres; claw bifid, symmetrical, superior tooth of claw longer and slightly wider than the inferior tooth; distance between teeth slightly longer than the length of inferior tooth. *Abdomen*: ventrites with a few bristles on the disc; propygidium with bristles; pygidium slightly con-

vex; subtrapezoidal, as long as it is wide; pygidial width not exceeding distance between spiracles of propygidium; pygidial disc smooth and with a few scattered bristles; pygidial apex subquadrate. *Parameres*: basal region as wide as both sections of the parameres at its maximum width, parameral split at 2/3 the length of the basal region; inner margins convex; apex lanceolate-like, base of apex with outer margin widely expanded, forming an ear-like flap; parameres in lateral view straight, not coplanar (Fig. 5G).

Type locality. CHILE.

Geographical distribution. CHILE (**Valparaiso**, Santiago, **Maule**, **Ñuble**, Biobío).

Remarks. *Liogenys kuntzeni* differs from the other *Liogenys* in the following combination of characters: clypeal emargination angulate (sometimes worn out and if so, subangulate); metatibia with one transverse carina complete in males and females (different from *L. flaveola* and *L. calcarata*, males with carina absent or incomplete, respectively); males with two protibial teeth instead of three (as in *L. flavida*), but in some specimens a vestigial third basal tooth was found; and inner margin of metatibia very weakly carinate, present on apical portion. *Liogenys kuntzeni* could be also misidentified with *L. lucialmeidae* **new species** and *L. martinezi* **new species** (see remarks of both new species). Frey (1969) mentioned Río Negro (Argentina) as a locality record, but this record was not verified. Evans (2003) and Evans & Smith (2009) excluded the Argentina record in their catalog, because it is not reliable and needs to be verified with voucher specimens. An Argentinian male specimen from Neuquén, Pilmatué [Laguna Pimatué], Co. [Cerro] Huayilon [-38.25, -70.3833333] 1500 m Gentili, I.1968) was found at the CMNC. Many features match with *L. kuntzeni*, including the protibia with two teeth, metatibia with one transverse carina complete; and the apex of the parameres with ear-shaped expansions. However, in this specimen these expansions are shorter than expected in *L. kuntzeni*, which is more similar to *L. martinezi* **new species**, but without the pruinose elytra. Due to the uncertainty we decided not to consider this specimen as a new record of *L. kuntzeni*. The eastern strip of the Andean Maule province is located along western Neuquén (Argentina), so it should not be surprising to find *L. kuntzeni* in this region. More collecting events are required to confirm if *L. kuntzeni* occurs there.

Liogenys lucialmeidae Cherman, new species

Figs. 6, 12A–B, 15

Type material. Holotype, male, labeled (CMNC): [white typeset] "ARGENTINA: Mendoza / Reserva La Payunia, Los Relinchos / S36º00'59''W68º48'39'' / Jan-6-2003, 1714 m / F.C. Ocampo, A.B.T. Smith", [red typeset and handwritten] "LIOGENYS / LUCIALMEIDAE / HOLOTYPE / Cherman M.A.", genitalia mounted. Paratypes (20) labeled [yellow typeset and handwritten] "LIOGENYS LUCIALMEIDAE / PARATYPE / Cherman M. A.": six females with the label (four at CMNC, two at DZUP (402743-44)): [white typeset] "ARGENTINA:Mendoza / 1 km Reserva Telteca / S32º 18'40'W67º54'08'' / Jan-04-2003, 540 m / F.C. Ocampo, A.B.T. Smith". One male (IADIZA): [white handwritten] "Malargüe: A 7 km de / Ranquil Norte, camino / a Barrancas [Neuquen Prov.] / 23-I-79 / Sergio Roig", [circle full blue, indicating C. Berg collection]. One male and one female paratypes (IADIZA): [white typeset] "ARGENTINA: Chubut Peninsula de / Valdés 8km S Punta norte / 42º12'20''S 63º52'5,9''W 42 m / 14-I-2010 Coll: G. Flores, G. Cheli, / R. Carrara". One male paratype (AMNH): [white typeset] "ARGENTINA / El Bolson, Rio / Negro / 19 [space] / A. Kovacs". Two males mounted on cards on the same pin (CMNC): [handwritten by A. Martínez] "ARGENTINA / RIO NEGRO / Cnel. Gómez / J. Grosso-leg. / Coll. Martínez / NOV-945", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029587". One male (CMNC): [typeset] "ARG: Nuequin / nr Zapala / 19–21.XII.1965 / A. Martinez", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / Ottawa, Canada", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029588". One male (CMNC): [typeset] "ARG: Nuequin / nr Zapala / 19–21.XII.1965 / A. Martinez", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / Ottawa, Canada", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029589". One male (CMNC): [typeset] "24-XI-1955 / Villa Regina / Pcia. Rio-Negro / Lg. E.Fleiss", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029590". One male (CMNC): [typeset] "SA. VACA MUERTA / (950 M.S.N.M.) / NEUQUEN-ARG.", [typeset] "14-XII-74 / LG.M.GENTILI", [typeset , outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.", [typeset with data matrix barcode] "Cana-

dian Museum of / Musée canadien de la / NATURE / CMNEN 00029591". One male and three females (NHMW): [typeset] "ARGENTINIEN / Neuquen Anelo / 26.10.1981 leg.KOVAC". The male with the voucher: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002724". The females with the sequence of vouchers: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002787-89".

Holotype and 10 paratypes deposited at CMNC. Two paratypes deposited at DZUP. Three paratypes deposited at IADIZA. One paratype deposited as AMNH. Four paratypes at NHMW.

Diagnosis. Body elongate; dull yellow, pronotum and elytra unicolored or pronotum slightly darker (Fig. 6A), frons swollen, mainly in females; in males clypeal emargination deep, subangulate to rounded and wide; in females clypeus short and weakly emarginate (Fig. 12A–B); antennae with 10 antennomeres; pronotum and head equal in length, posterior corners subangulate (Fig. 6B); in males pronotum with maximum length medially, in females pronotum with uniform length throughout (Fig. 12A–B); elytra semi-opaque, with bristles uniformly, in males sometimes somewhat not uniformly pruinose; pygidium elongate or as wide as it is long, disc smooth, with bristles throughout (Fig. 6C); males with two protibial teeth; metatibia with inner margin weakly carinate towards the apex and one transverse carina incomplete (Fig. 6D–E); parameres forming a concavity at the midline; slightly narrowed subapically; apex sagittate, curved upwards (Fig. 6F–H).

Holotype. **Male**. Length: 9.4 mm; width: 4.3 mm. Uniform dull yellow. *Head:* distance between eyes almost three times the width of one eye; frons equal in length to clypeus, swollen; clypeal emargination deep, subangulate, wide; outer sides of anterior teeth subparallel, apparently following the lateral margin of clypeus, lateral margin straight; distal maxillary palpomere, maximum width two times the apical width; fovea deep, reduced to a point at the widest part of the palpomere; antenna with 10 antennomeres, club lighter in color than funicle. *Thorax*: anterior margin of pronotum slightly produced medially; pronotal disc with punctures fine and sparse; posterior corners subangulate, angle obtuse; hypomere with short bristles and a few scales at the inner margen; mesepisternum, sides of metaventrite and metacoxae with sparse bristles; distance between mesocoxae and metacoxae twice the metacoxa length; scutellum ogival, with a few punctures. *Elytra*: semi-pruinose, bristles dispersed randomly; elytral suture and elytron unicolored, weakly elevated; all four elytral ridges weakly defined (Fig. 6A). *Legs*: procoxa weakly scaly; protibia with two teeth equal in size; mesotibia cylindrical and somewhat flattened in cross section, mesotibial surface finely sculptured; mesotibia with one transverse carina only demarked posteriorly; inner margin of male metatibia weakly carinate towards the apex; surface finely sculptured; metatibia with one transverse carina incomplete; metatibial apical spurs of different lengths and shape, the longer spur equal to the diameter of the tibial apex, the shorter spur wider, truncate, and slightly projected downwards; metatarsomere I slightly shorter and equal in width to tarsomere II; protarsomeres and mesotarsomeres I–IV enlarged, protarsomere II as wide as long; mesotarsomeres less enlarged than the protarsomeres; claw bifid, symmetrical, superior tooth of a claw longer and slightly wider than the inferior tooth; distance between teeth longer than the length of inferior tooth. *Abdomen*: ventrites with sparse bristles; propygidium with bristles; pygidium slightly convex; subtrapezoidal, as long as wide; pygidial width not exceeding distance between spiracles of propygidium; pygidial disc smooth and with bristles throughout; pygidial apex subquadrate. *Parameres*: basal region as wide as both sections of the parameres at maximum width, parameral split at 2/3 the length of the basal region; inner margins convex at the dorsal plane, forming a concavity at the ventral plane; slightly narrowed subapically; apex sagittate, curved upwards; parameres convex in lateral view. **Variation.** Male paratypes. Length: 10.0–11.4 mm; width: 4.4–5.0 mm. As the holotype except in the lateral margin of clypeus more concave. Female paratypes. Length: 9.6–10.9 mm; width: 4.8–5.5 mm. As the holotype except in the clypeus short and weakly emarginate; pronotum shorter; elytral ridges more marked; and three protibial teeth.

Etymology. Noun in the genitive case. The species is dedicated to Dr. Lúcia Massutti de Almeida, a renowned Brazilian Coleopterist and mentor of the first author.

Type locality. ARGENTINA, Mendoza, Reserva La Payunia, Los Relinchos, 36º00'59''S 68º48'39''S, 1714 m.

Geographical distribution. ARGENTINA (Mendoza, Neuquén, Río Negro, Chubut).

Remarks. *Liogenys lucialmeidae* **new species** resembles *L. flavida* in the body size and color; shape of the clypeus, especially in females (Fig. 11C–D); elytra with bristles; males with two protibial teeth and metatibia with one transverse carina incomplete. *Liogenys lucialmeidae* **new species** differs in the clypeal emargination deep in males (shallow); antennae with 10 antennomeres (9 antennomeres); pronotum shorter; males with inner margin of metatibia weakly carinate towards the apex (distinctly carinate); metatibia with the transverse carina more strongly

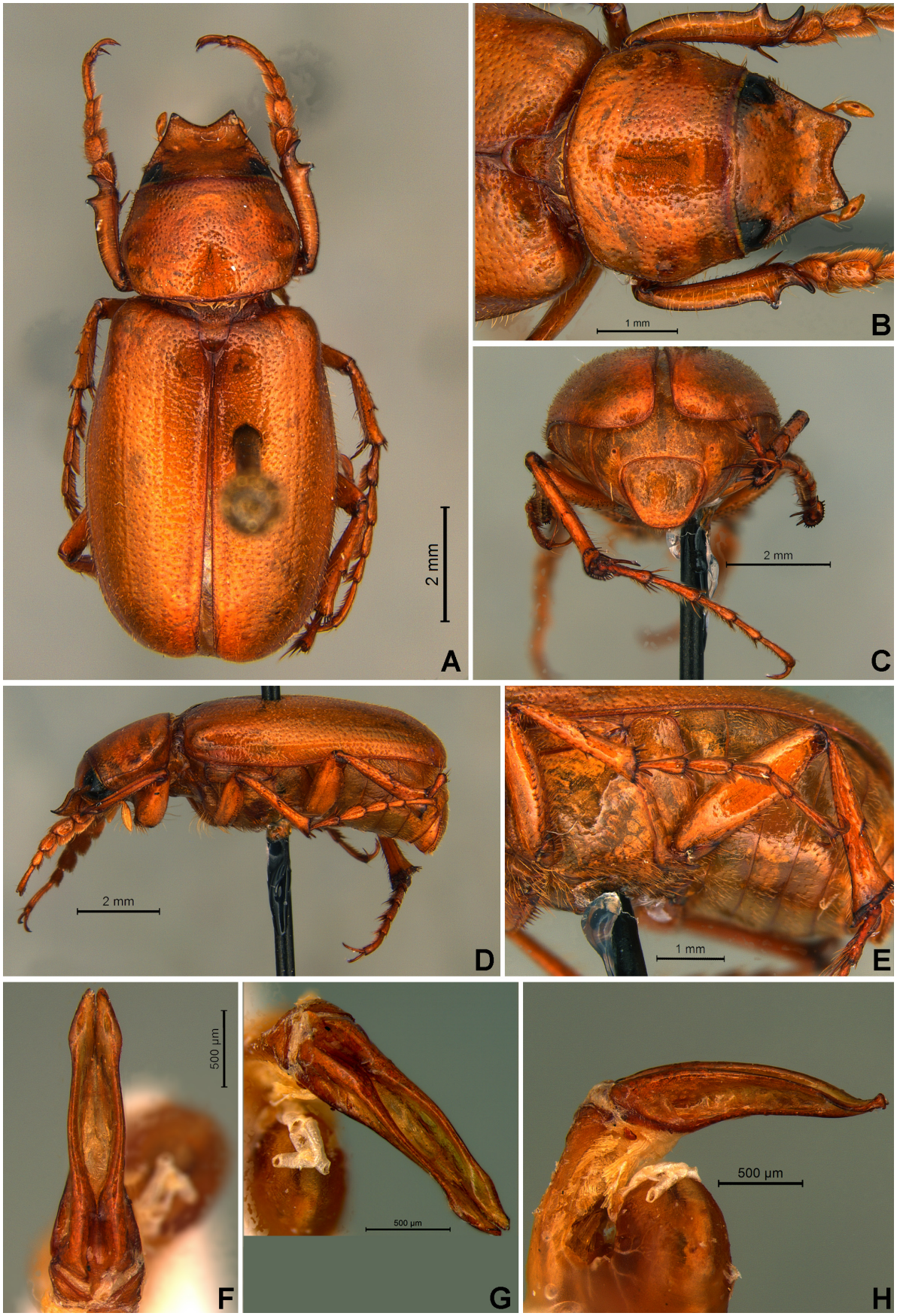

FIGURE 6. *Liogenys lucialmeidae* Cherman, **new species**, male holotype views: A) dorsal, B) clypeus and pronotum, C) pygidium, D) lateral, E) meso- and metatibiae, and parameres views: F) dorsal, G) dorsolateral, H) lateral.

defined; and the different shape of the parameres. The new species also resembles *L. kuntzeni*, especially the females in the shape of the clypeus (Fig. 11E–F), differing from this species (in parenthesis) in the clypeal emargination rounder in males (angulate); lateral margins of clypeus straight or slightly concave but teeth never parallel (slightly convex, teeth parallel); females with the clypeal teeth even less noticeable and pronotum shorter; pygidium longer; males with one metatibial transverse carina incomplete (complete); and the shape of the parameres are different.

***Liogenys martinezi* Cherman, new species**
Figs. 7, 12C–D, 15

Type material. Holotype, male, labeled (CEMT): [white typeset] "ARGENTINA: Neuquen, / Cobunco, XII.1989 / A. Martinez coll.", [white typeset] "CZMT-CEMT / 0000018075", [red typeset and handwritten] "LIOGENYS / MARTINEZI / HOLOTYPE / Cherman M.A.", genitalia mounted. Paratypes (100) labeled [yellow typeset and handwritten] "LIOGENYS MARTINEZI / PARATYPE Cherman M. A.": One female and two male paratypes (CEMT) with same data of the holotype, and labeled with the following sequence of vouchers: [white typeset] "CZMT-CEMT / 0000018076-78". One male paratype (CEMT): [white typeset] "ARGENTINA: Mendoza, 9.XI.1987, L. Peña coll.", [white typeset] "CZMT-CEMT / 0000018096". Three female paratypes (DZUP): [white typeset] "ARGENTINA: Mendoza / RP 180, 20 km S El Nihuil / S35º11'54" W68º43'09" / Jan-5-6-2003, 1311 m / F.C Ocampo, A.B.T. Smith", and labeled with the following sequence: [white typeset] "DZUP / 402744-46". One male (IADIZA): [white typeset] "RA. Neuquen / 5 km S de Lag. Blanca / 15/01/2007 / G. SanBlas col. / 39º06'56.1"S 70º00'10.1"W / 975 msnm". One male (DZUP): [white typeset] "ARGENTINA: Chubut / Península Valdez, Golfo Nuevo / Ea. San Pablo; 50m / 27 Nov. 2005", [white typeset] "DZUP / 40247". One male (IADIZA): [white typeset] "ARGENTINA: Chubut Biedma / Península de Valdes En San Pablo / 30 km SW Pto. Pirámides 42º 41' / 43.2"S 64º 10' 42,7"W 66 m / 06-I-2010 Coll: G. Flores, G. Cheli, / R. Carrara". One male (IADIZA): [white typeset] "ARGENTINA: Mendoza / Malargüe Adesmia Palauco / 2149m 36º8'8.541"S 69º26'45.168"W 31-I-2010 / Coll: R. Carara F. Campón / E. Scheibler". Five males (CMNC): [handwritten by A. Martínez] "ARGENTINA / NEUQUEN / Pilmatué / Shajovskoy-leg. / Coll. Martínez / 7-XI-64", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll". Each specimen bears a voucher number of the following sequence: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029595–99". One male (CMNC): [handwritten by A. Martínez] "ARGENTINA / NEUQUEN / Pilmatue / Co Huayolon 1500m / Gentili-leg. / Coll. Martínez / Ene.-965", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029600". One male and one female (CMNC): [handwritten by A. Martínez] "ARGENTINA / NEUQUEN / Ayo. Picún Leufú / y Ruta Nac. 40 / Coll. Martínez / Ene.-965", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.". The male with the voucher: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029601", the female with: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029636". Three males (CMNC): [handwritten by A. Martínez] "ARGENTINA / NEUQUEN / Lag. Blanca / Gentili-leg. / Coll. Martínez / Dic.965", [hardwritten and typeset, outlined black] "Liogenys / rufoflavus ♂ / Moser / A. MARTINEZ-DET. 1990", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.". The males with the following sequence of vouchers: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029603-05". One female (CMNC): [handwritten by A. Martínez] "ARGENTINA / NEUQUEN / Lag. Blanca / Gentili-leg. / Coll. Martínez / Dic.965", [hardwritten and typeset, outlined black] "Liogenys / rufoflavus ♀ / Moser / A. MARTINEZ-DET. 1990", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029625". One male (CMNC): [handwritten by A. Martínez] "ARGENTINA / NEUQUEN / ZAPALA / Coll. Martínez / Ene.-965", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029606". Three females (CMNC): [handwritten by A. Martínez] "ARGENTINA / NEUQUEN / ZAPALA / Coll. Martínez / Ene.-965", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.". The females with the following sequence of vouchers: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029621-23". One male and one female (CMNC): [handwritten] "NEUQUEN / Los Catutos / 10-III-64", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.". Male and female with the following vouchers, respectively: [typeset with data matrix barcode]

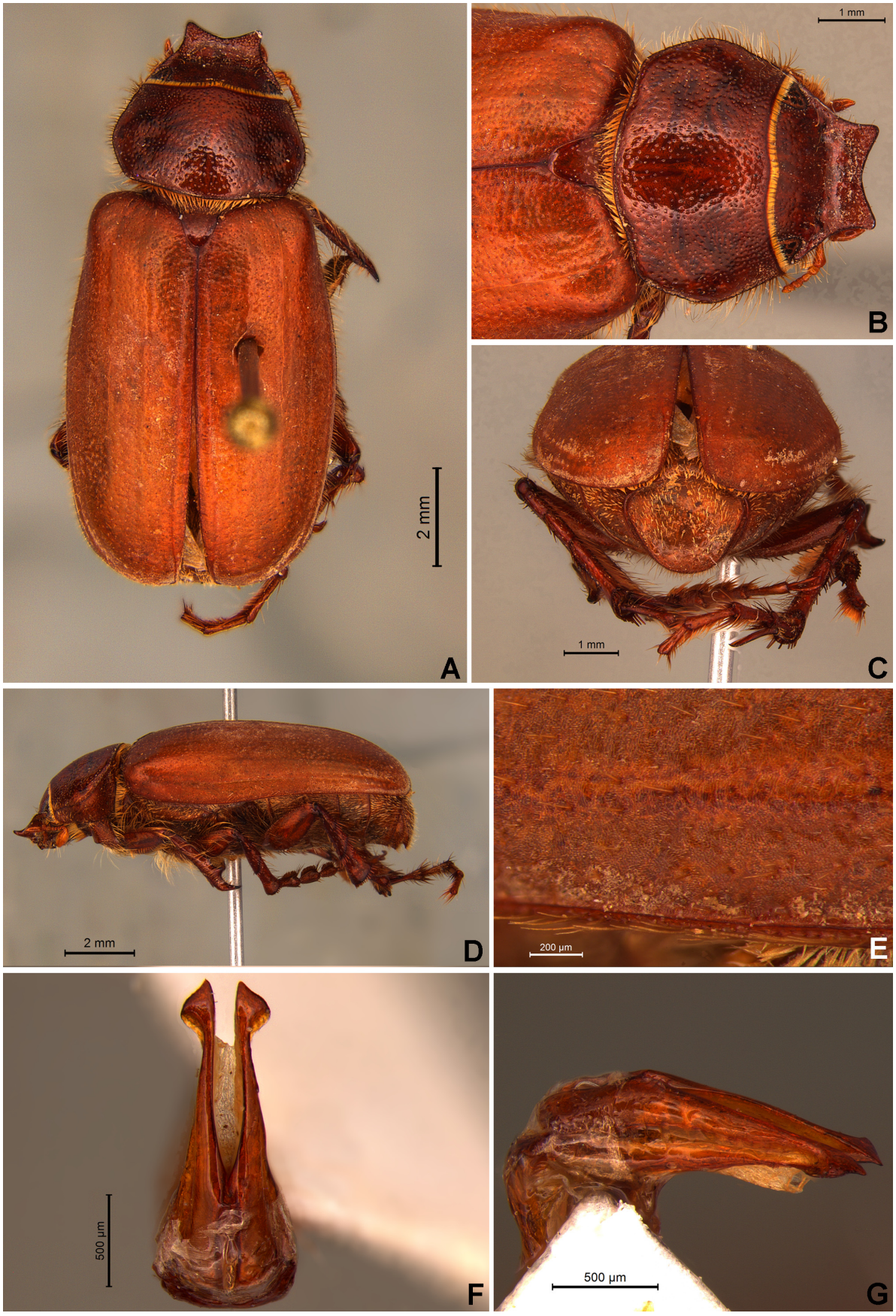

FIGURE 7. *Liogenys martinezi* Cherman, **new species**, male holotype views: A) dorsal, B) clypeus and pronotum, C) pygidium, D) lateral, E) detail of pruinose elytron, and parameres views: F) dorsal, G) lateral.

"Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029607", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029631". One male and two females (CMNC): [typeset] "SA. VACA MUERTA / (950 M.S.N.M.) / NEUQUEN-ARG.", [typeset] "14-XII-74 / LG.M.GENTILI", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll." The male with the voucher: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029609". Females with the following sequence of vouchers: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029639-40". One male and two females (CMNC): [typeset] "SA. CUCHILLO CURA / (975 M.S.N.M.) / NEUQUEN-ARG.", [typeset] "15-XII-74 / LG.M.GENTILI", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.". The male with the voucher: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029610". Females with the sequence of vouchers: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029642-43". One male and three females (CMNC): [typeset] "EA. LLAMUCO / (1100 M.S.N.M.) / NEUQUEN-ARG.", [typeset] "18-III-74 / LG.M.GENTILI", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.". The male with the voucher: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029611". The females with the sequence of vouchers: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029632-34". One male (VMDC): "Argentina Chubut / Trelew / 1 Septiembre1996 / Leg. D. Rojas Lanus", [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002723". One male (CMNC): [typeset] "ARGENTINA: Mendoza / RP 180, 20 km S El Nihuil / S35º11'54'' W68º43'09" / Jan-5-6-2003, 1311 m / F.C.Ocampo, A.B.T.Smith". Seven males and nine females with the data (CMNC): [typeset] "ARGENTINA: Chubut / Península Valdez, Golfo Nuevo / Ea. San Pablo; 50 m / 27 Nov. 2005". The males with the sequence of vouchers: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002716-22". The females with the sequence of vouchers: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002742-50". Six males and eight females with the data (DZUP): [typeset] "ARGENTINA: Chubut / Península Valdez, Golfo Nuevo / Ea. San Pablo; 50 m / 27 Nov. 2005". The males with the sequence of vouchers: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002710-15". The females with the sequence of vouchers: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002734-41". Six males and nine females with the data (IADIZA): [typeset] "ARGENTINA: Chubut / Península Valdez, Golfo Nuevo / Ea. San Pablo; 50 m / 27 Nov. 2005". The males with the sequence of vouchers: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002704-09". The females with the sequence of vouchers: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002725-33". One male (CMNC): [handwritten by A. Martínez] "ARGENTINA / NEUQUEN / Covunco / Gentili-leg. / Coll. Martínez / Dic.963", [typeset] "Howden coll. ex. / A.Martinez coll.", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029602". One female (CMNC): [typeset] "24-XI-1955 / Villa Regina / Pcia. Rio-Negro / Lg. E.Fleiss", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029620". One female (CMNC): [typeset] "ARGENTINA / Villa Regina / Rio Negro / 20.XI.63 leg. Pena", [handwritten and typeset] "Liogenys / kadleci / det.G.Frey,1970 / n sp", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029626". One female (CMNC): [handwritten by A. Martínez] "ARGENTINA / Rio Negro / Valcheta / Coll. Martínez / Dic.992", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029627". One female (CMNC): [handwritten by A. Martínez] "ARGENTINA / RIO NEGRO / Cnel. Gómez / J. Grasso-legit: / Coll. Martínez / NOV.-946", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029628". Two females (on cards on the same pin) (CMNC): [handwritten by A. Martínez] "ARGENTINA / RIO NEGRO / Cnel. Gómez / J. Grasso-leg. / Coll. Martínez / Dic.-94", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.", [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029629". One female (CMNC): [handwritten by A. Martínez] "ARGENTINA / RIO NEGRO / S. Antonio Oeste / Zunino-leg. / Coll. Martínez / Ene.976", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.", [typeset with data matrix barcode] "Canadian Museum

of / Musée canadien de la / NATURE / CMNEN 00029645". Two females (CMNC): [handwritten by A. Martínez] "ARGENTINA / RIO NEGRO / S. Antonio Oeste / P. Las Grutas / Bordon-legit / Coll. Martínez / Dic.-973", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / *ex*. A. Martinez coll.". The females with the following sequence of vouchers: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029646-47". One female (CASC): [typeset] "ARGENTINA, Río Negro / San Antonio Oeste / XII-15-1966, at light / E.I.Schlinger / M.E.Irwin", [typeset] "CASENT / 8426016". Three females (CMNC): [handwritten by A. Martínez] "ARGENTINA / NEUQUEN / Covunco / Gentili-leg. / Coll. Martínez / Dic.963", [typeset, outlined black] "H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.". The females with the following sequence of vouchers: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029614-16".

Holotype and 58 paratypes at CMNC. One paratype at CASC. Four paratypes deposited at CEMT. Eighteen paratypes deposited at DZUP. Eighteen paratypes deposited at IADIZA. One paratype at VMDC.

Diagnosis. Body elongate; yellowish brown or light brown, pronotum shiny, with few bristles, unicolored with elytra or darker (Fig. 7A); elytra pruinose and with bristles (Fig. 7E); frons with few bristles; longer than clypeus, females with frons swollen and clypeus shorter, weakly emarginate; clypeal lateral margin concave in males, straight in females (Fig. 12C–D); antenna with 10 antennomeres; pronotum with uniform length, posterior corners obtusely angulate (Fig. 7B); protibia with three equally spaced teeth or space shorter between basal and middle teeth; mesotibiae and metatibiae cylindrical in cross section; apical carinae complete (Fig. 7D); males with metatibial spurs equal in length and longer than the diameter of the metatibia; protarsomere II as wide as long; inner margin of male metatibia not or weakly carinate; pygidium slightly convex; subtrapezoidal, apex subquadrate; pygidial disc with bristles throughout (Fig. 7F); apex of parameres lanceolate-like, at the base expanded below the plane of the parameres.

Holotype. **Male**. Length: 10.7 mm; width: 5.0 mm. Light brown, elytra pruinose. *Head:* distance between eyes four times the width of one eye; frons longer than clypeus; clypeal emargination shallow, weakly angulate, wide; outer sides of anterior teeth parallel, lateral margin concave; distal maxillary palpomere, maximum width two times the apical width; fovea deep, not reaching the midline; antenna with 10 antennomeres, club lighter in color equal in width to the funicle. *Thorax*: anterior margin of pronotum slightly produced medially; pronotal disc shiny, with punctures fine and sparse; posterior corners sharp, obtusely angulate; hypomere with abundant long bristles; mesepisternum and sides of metaventrite with sparse scales; metacoxae with bristles; distance between mesocoxae and metacoxae twice the metacoxa length; scutellum ogival, wih sparse, fine punctures at the sides. *Elytra*: pruinose, inconspicuous bristles dispersed randomly; elytral suture and elytron unicolored, weakly elevated; all four elytral ridges weakly defined. *Legs*: procoxa with bristles; protibia with teeth, basal tooth vestigial, apical tooth the longest; distance between basal and middle teeth shorter than between middle and apical teeth; mesotibia cylindrical and somewhat flattened in cross section, mesotibial surface finely sculptured; mesotibia with two transverse carinae, the apical carina complete; inner margin of metatibia weakly carinate towards the apex, glabrous on inner surface; external surface finely sculptured; metatibia with two transverse carinae, the apical carina complete; metatibial apical spurs equal in shape and length, longer than the diameter of the tibial apex; metatarsomere I equal in size to metatarsomere II; protarsomeres and mesotarsomeres I–IV enlarged, protarsomere II as wide as long; mesotarsomeres less enlarged than the protarsomeres; claw bifid, symmetrical, superior tooth of claw longer and slightly wider than the inferior tooth; distance between teeth longer than the length of inferior tooth. *Abdomen*: band of scales visible beneath the outer margin of elytra; ventrites with bristles; propygidium scaly; pygidium slightly convex; subtrapezoidal, as long as wide; pygidial width not exceeding distance between spiracles of propygidium; pygidial disc with bristles throughout, bristles thick; pygidial apex subquadrate. *Parameres*: basal region wider than both sections of the parameres at maximum width, parameral split at 2/3 the length of the basal region; inner margins slightly convex, opened; apex lanceolate-like, inferior margin expanded below the plane of the parameres; parameres in lateral view straight, not coplanar (Fig. 7G).

Variation. Male paratypes. Length: 9.5–11.5 mm; width: 4.9–5.5 mm. As the holotype except in the head and pronotum unicolored with the elytra; in protibia the three teeth equally spaced or the basal and middle teeth closer. Female paratypes. Length: 9.4–10.4 mm; width: 4.8–5.2 mm. As the holotype except in the clypeal lateral margins straight, clypeus shorter; elytra less pruinose; and the same variation in the distance between basal and middle teeth on protibia that observed in males.

Etymology. Noun in the genitive case. The species is dedicated to Dr. Antonio Martínez, the collector of the

holotype and part of the paratypes. He was one of the most prolific workers on scarab beetles in South América, who produced a large body of work. His large particular collection was purchased by Henry and Anne Howden and transferred to the Canadian Museum of Nature in Ottawa.

Type locality. ARGENTINA, Neuquén, Cobunco (Covunco, 38°32'00.0''S 70°15'00.1''W).

Geographical distribution. ARGENTINA (Mendoza, Neuquén, Chubut).

Remarks. *Liogenys martinezi* **new species** strongly resembles *L. kuntzeni* in the body size and color, somewhat the shape of the clypeus and pygidium, elytra with bristles, and metatibia with apical transverse carina complete in males. *Liogenys martinezi* **new species** differs from this species (in parenthesis) in the clypeal emargination shallower, males with clypeus longer and lateral margins strongly concave (Fig. 12C) (clypeus slightly convex and teeth parallel (Fig. 11E)), females with clypeal lateral margins straight, teeth following the margin of clypeus (clypeal lateral margins slightly convex, teeth subparallel); pronotum shorter, posterior corners obtusely angulate (subangulate); males and females with three protibial teeth (males with two protibial teeth, for variations see remarks of *L. kuntzeni*); mesotibia with two transverse carinae strongly marked and with long setae in males (carinae less marked and setae shorter); metatibial spurs equal in length, longer than the diameter of the tibial apex (spurs with different length, the longer spur equal in length to the diameter of the tibial apex); males with protarsomere II as wide as it is long (protarsomere II longer than wide), and parameres with subtle differences in shape at the apex.

Liogenys maxillaricuspis Cherman, new species

Figs. 8 A-I; 12 E-F; 13 A, C, G; 15

Type material. Holotype, male, labeled (CMNC): [white typeset] "ARGENTINA: Rio Negro / Dto Gral Roca, Catriel / 37º52'30''S 67º5'10''W / 4 Jan. 2005, 311 m / F.C. Ocampo", [red typeset and handwritten] "LIOGENYS / MAXILLARICUSPIS / HOLOTYPE / Cherman M.A.", genitalia mounted. Paratypes (84) labeled [yellow typeset and handwritten] "LIOGENYS/MAXILLARICUSPIS / PARATYPE / Cherman M. A.": Seven males and six females with the same data of the holotype (DZUP). Three males and two females with the same data of the holotype (CEMT). Thirty one males and twenty eight females with the same data of the holotype (CMNC). The males with the following sequence of vouchers: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029648–81". The females with the following sequence of vouchers: [typeset with data matrix barcode] "Canadian Museum of / Musée canadien de la / NATURE / CMNEN 00029682–713". Eight specimens with the same data as the holotype, and DNA stored in alcohol at -80ºC and the following voucher numbers (CMNC): Four males with the sequence: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3003308–11". Two females with the sequence: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3003312–13". One female [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3003306", [typeset] "A.B.T. SMITH DNA / 28S/18S VOUCHER / SPECIMEN SMI-131". One female: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3003307", [typeset, outlined black]. "A.B.T. SMITH SCARAB / DNA VOUCHER / SPECIMEN / AS498 / JULY 2005". One male and one female paratype (IADIZA) labeled: [white typeset] "Arg. Rio Negro / Gral. Rocas / Cnia. Catriel 311 m / S. Roig / G. Flores / 04/I/05", [white typeset] "37º52.83'S / 67º56.16'W". One male (CMNC): [white typeset] "ARGENTINA, Pr. San Luis / 18 km S Arizona / 18-23.I.1982 [space] 250 m / H & A Howden". One male and three females (VMDC): [typeset] "Argentina Chubut / Gaiman, Bryn Gwyn / 4 Noviembre 2008 / Leg. Daniel Rojas L.". The male with the voucher: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002827". The females with the sequence of vouchers: [typeset with data matrix barcode] "SCARABS OF / SOUTHERN / SOUTH AMERICA / SSSA3002860–62".

Holotype and 68 paratypes at CMNC. Five paratypes deposited at DZUP. Five paratypes deposited at CEMT. Two paratypes deposited at IADIZA. Four paratypes deposited at VMDC.

Diagnosis. Body elongate, dull yellow (Fig. 8A); pronotum slightly darker and slightly wider than the humeral distance; margin of clypeus, pronotum and protibia darker; frons swollen, coarsely punctate; antennae with 9 antennomeres; clypeal emargination deep, narrowed, rounded; teeth subangulate (Fig. 12E–F); clypeal lateral margin convex; pronotal posterior corners rounded (Fig. 8B); elytra with sparse, random bristles; males and females with one metatibial transverse carina complete, inner margin not carinate; pygidium with sparse, long bristles; smooth, as

long as wide (Fig. 8E); inner margins of parameres straight, opened, apex spatulate, apically slightly divergent and curved downwards, lateral margins of apex below the plane of the parameres (Fig. 8F–H).

Holotype. **Male**. Length: 7.8 mm; width: 3.5 mm. Dull yellow. *Head:* distance between eyes slightly more than twice the width of one eye; frons swollen, equal in length to clypeus; frontoclypeal surface with few bristles; anterior margin of clypeus dark in color (Fig. 12E–F); clypeal emargination shallow, wide and rounded; outer sides of anterior teeth subparallel; clypeal lateral margin convex, not produced; distal maxillary palpomere, maximum width slightly wider than apex; fovea deep, extending up to the transverse midline of the palpomere; antenna with 9 antennomeres, club lighter in color and longer than the funicle. *Thorax*: anterior margin of pronotum slightly produced medially, pronotum anteriorly narrowed forming a depressed ring; pronotal disc with punctures coarse and very sparse; posterior corners rounded; hypomere with long bristles; mesepisternum, sides of metaventrite and metacoxae with sparse bristles; distance between mesocoxae and metacoxae less than twice the metacoxa length; scutellum ogival, finely punctate throughout and with bristles. *Elytra*: disc shiny; bristles on disc disposed randomly; elytral suture and elytron unicolored, not elevated; two inner elytral ridges more defined than the outer ridge, third ridge undistinguishable. *Legs*: procoxa with bristles and punctate; protibia with three teeth, almost equal in size and equally spaced; mesotibia cylindric, somewhat flattened in cross section; mesotibial surface finely sculptured; mesotibia with two transverse carinae, the apical carina complete; inner margin of metatibia not carinate; surface finely sculptured; metatibia with two transverse carinae, the apical carina complete; metatibial apical spurs with different lengths, the longer spur equal to the diameter of the tibial apex; metatarsomere I slightly shorter than tarsomere II; protarsomeres I–IV slightly enlarged, protarsomere II elongate; claw bifid, symmetrical, superior tooth of claw longer and equal in width to the inferior tooth; distance between teeth longer than the length of inferior tooth. *Abdomen*: ventrites with uniform and sparse bristles at the disc and sides; propygidium with bristles; pygidium slightly convex; subquadrate; as long as it is wide; pygidial width not exceeding distance between spiracles of propygidium; pygidial disc almost smooth, few punctures at the sides, sparse, long bristles throughout; pygidial apex rounded. *Parameres*: basal region as wide as both sections of the parameres at its maximum width, parameral split at 2/3 the length of the basal region; inner margins straight, opened, apex spatulate, apically slightly divergent and curved downwards; parameres in lateral view straight, coplanar (Fig. 8I).

Variation. Male paratypes. Length: 7.1–9.4 mm; width: 3.4–4.5 mm. As the holotype, except in the clypeal lateral margin produced (the most in male from San Luis) (Fig. 8C), and in the deepness of the pronotal punctures, some of them being shallower. Female paratypes. Length: 8.9–9.0 mm; width: 4.2–4.3 mm. As the holotype except in the size larger, the lateral margin of clypeus sometimes more convex (Fig. 12F) and the pronotal punctures deeper.

Etymology. Adjective in the nominative singular. Prefix from the Latin *maxillaris* ("related to the maxilla: set of paired mouthparts used to manipulate food") + from Latin *cuspis* ("sharp point"). *Liogenys maxillaricuspis* **new species** is characterized by having a maxilla furnished with only one, strongly sharp, curved teeth, which can be seen with lowest magnification (6x) in ventral view of the head (Fig. 13A, G). This feature is unique among *Liogenys* species.

Type locality. ARGENTINA, Río Negro, Departamento General Roca, Catriel, 37º52'30''S 67º5'10''W.

Geographical distribution. ARGENTINA (San Luis, Río Negro).

Remarks. *Liogenys maxillaricuspis* **new species** resembles *L. rufoflava* in the body size and color, elytra with bristles, and somewhat in the shape of the bristles on the pygidium, although the bristles are sparser and longer. *Liogenys maxillaricuspis* **new species** has unique characters for the genus, especially the mouthparts, but also the elytral ridges and the setae on tibial carinae. In addition to the already mentioned single morphology of the maxilla, the ligula of the labium is shorter than other species, with margin almost straight, without lobes (Fig. 13C–D). Since this new species has most of the synapomorphies of *Liogenys* (Cherman *et al.* 2016), we are describing it in this genus. New molecular phylogeny testing Diplotaxini relationships is being carried out and will bring light about the real position of this species among the *Liogenys* and other Diplotaxini lineages. The male paratype (CMNC) from San Luis province [18 km S Arizona / 18-23.I.1982 [space] 250 m / H & A Howden] shows slight variations in the shape of the clypeus and in the parameres when compared with the Patagonian specimens (Figs. 8C, G). However, we considered it to be *L. maxillaricuspis* **new species** because the maxilla has one tooth (Fig. 13 G), which is distinctive of this new species.

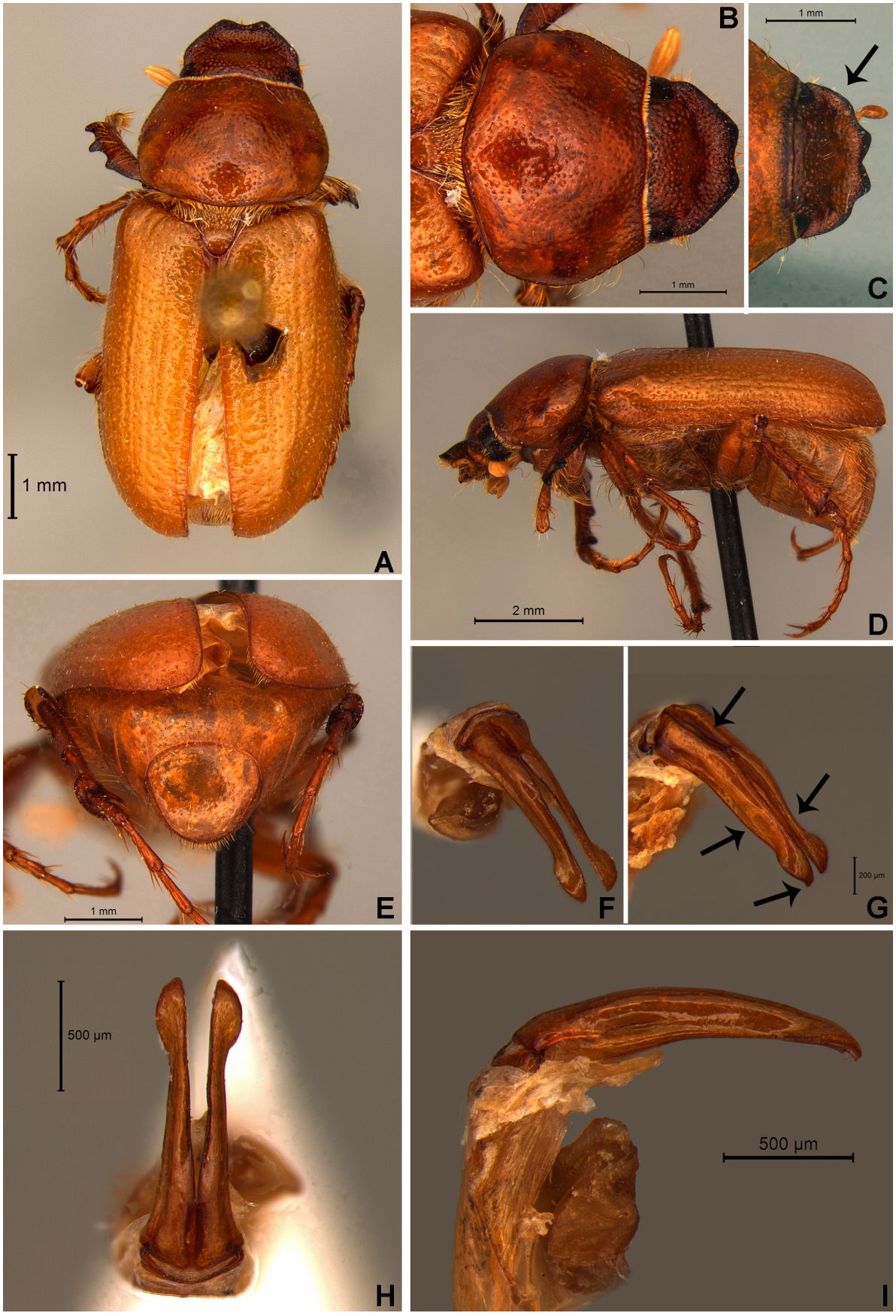

FIGURE 8. *Liogenys maxillaricuspis* Cherman, **new species**, male holotype views: A) dorsal, B) clypeus and pronotum, C) variation of clypeus, D) lateral, E) pygidium, and parameres views: F) dorsal, G) dorsolateral, H) arrows indicating variations in shape, I) lateral.

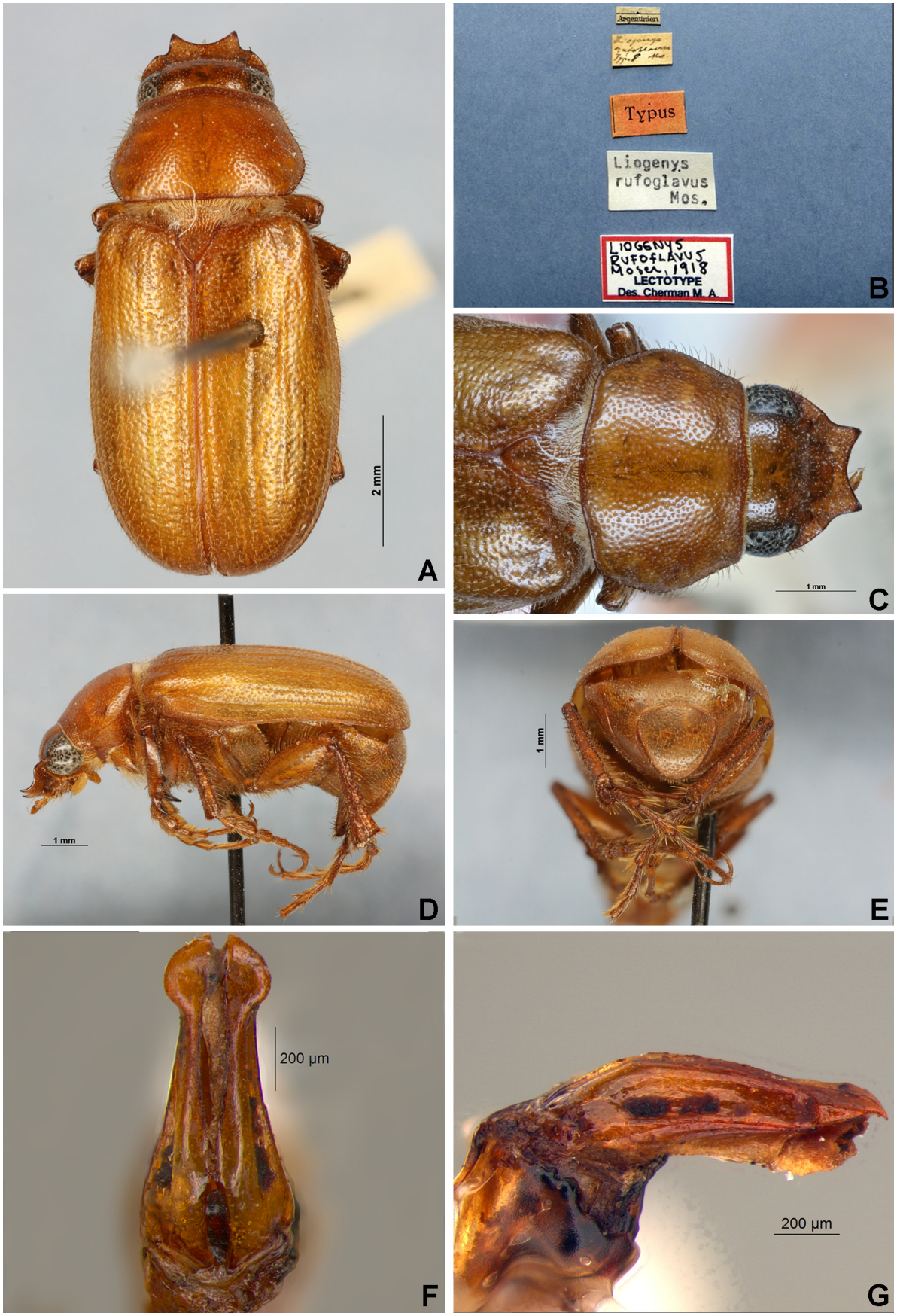

FIGURE 9. *Liogenys rufoflava* Moser, 1918, male lectotype views: A) dorsal, B) labels, C) clypeus and pronotum, D) lateral, E) pygidium, and parameres views: F) dorsal, G) lateral.

***Liogenys rufoflava* Moser, 1918**
Figs. 9; 11G, H; 14

Liogenys rufoflavus Moser, 1918: 105; Frey 1969: 48 (key); Krajčík 2012: 145 (checklist); Cherman *et al.* 2017: 4 (generic history).
Liogenys rufoflava: Blackwelder 1944: 228 (checklist); Evans 2003: 214 (checklist); Evans & Smith 2009: 182 (checklist); Cherman *et al.* 2017: 20 (natural history).

Type material. Male lectotype of *Liogenys rufoflava* here designated (ZMHB): [white typeset] "Argentinien", [white handwritten] "Liogenys / rufoflavus / Typen ♂ / Moser", [red typeset] "Typus", [white typeset] "Liogenys / rufoflavus / Mos.", [red, outlined, typeset and handwritten] "LIOGENYS / RUFOFLAVUS Mos / LECTOTYPE / Des. Cherman M. A.", genitalia mounted. Female paralectotype bearing the labels: [white typeset] "Argentinien", [white handwritten] "Liogenys / rufoflavus / Typen ♀ / Moser", [red typeset] "Typus", [white typeset] "Liogenys / rufoflavus / Mos.", [red, outlined, typeset and handwritten] "LIOGENYS / RUFOFLAVUS Moser, 1918 / PARA-LECTOTYPE / Des. Cherman M. A."

Non-type material (88). PARAGUAY. *Boquerón:* without locality, 12.XII.1947, Hunger, 1 male and 2 females (CMNC); Parque Nacional Teniente Inciso, administración, 21º12'S, 61º39'W, 18.IX.2003, 253 m, B. Garcete, 1 male and 1 female (DZUP). ARGENTINA. *Salta*: La Viña, 24.IX.1988, Peña, 1 female (INPA); *Santiago del Estero*: Tintina, XI.1946, without collector, 2 females (MZUC); Río Hondo, Termas, IX.1990, A. Martínez, 2 females (CMNC); Río Hondo, VIII.1956, 1 male (CMNC); Bords du Rio Salado, Icaño, Mistol Paso, XII.1908–III.1909, E.R. Wagner, 1 female (MNHN); Chuna Pampa [10 km from Lugones railway Rosario-Tucumán], XII.1908–III.1909, E.R. Wagner, 4 females (MNHN); *La Rioja*: 20 km N La Rioja, 25.IX.1968, 1 male (AMNH); Guayapa, Patquia [30º01'S 66º57'W], XII.1964, A. Martínez, 2 males (CMNC); Guayapa, Patquia, III.1955, without collector, 1 female (MZUC); Patquia, IX.1945, Breyer, 1 male and 1 female (CMNC); Patquia, III.1948, Breyer, 1 female (CMNC); Catinzaco, 18.XII.1970, Roig & Maury, 1 male and 1 female (IADIZA); Chepes (6 km E), 10.XII.1978, at light, Woodruff, Runnacles, Cordo, 1 male (CMNC); *San Juan*: El Baldecito, Valle Fertil, XII.1964, Martínez, 6 males and 1 female (CMNC); Marayes, 13.XII.1964, A. Martinez, 1 female (DZUP); 2 males and 1 female (NHMB); *Mendoza*: without locality, 9.XI.1987, L. Peña, 1 female (CEMT); without locality, 21.X.1982, L. Peña, 4 males and 1 female; without locality, 9. XI.1987, L. Peña, 1 male (INPA); Ñacuñan, 34º02'S, 67º55'W, 22.XI.1997, Lagos, 1 male and 1 female (IADIZA); Reserva Telteca, IX–XI.1996, Flores, Roig, 2 females (IADIZA); San Rafael, 6.XII.1988, L. Peña, 1 male and 6 females (INPA); Malvinas, 10.IX.1987, L. Peña, 3 females (INPA); Estación Pedregal, without date; Jensen-Haarup, 3 males and 2 females (ZMUC); *La Pampa*: Caleu Caleu (Río Colorado), II.1966, Martínez, 1 female (CMNC); *Neuquén*: Covunco, 19.XII.1963, 1 specimen (CMNC); Zapala (near), 19–21.XII.1965, A. Martínez, 1 male (CMNC); Pucará, 7.XII.1954, Pastrana, 1 female (CMNC); Parque Nacional Lanin, Cerro Malo, 19.XII.1954, Pastrana, 2 males and 1 female (CMNC); *Río Negro*: Catriel, 311 m, 4.I.2005, F.C. Ocampo, 5 females (CMNC); San Antonio Oeste, Los Grutas, XII.1973, C. Bordón, 1 male (CMNC); Villa Regina, 20.XI.1963, L. Peña, 1 male (CMNC); *Chubut*: Península de Valdés, Golfo Nuevo, Estancia San Pablo, 42°41'42''S, 64°10'46''W, 27.XI.2005, 50 m, 1 female (CMNC). CHILE: *Biobío*: Laguna del Laja, 16.I.1987, L. Peña, 3 males and 7 females (INPA).

Diagnosis. Body light brown, elongate, sides subparallel, shiny, head and pronotum slightly darker than elytra; frontoclypeal surface and pronotum with inconspicuous bristles, elytra uniformely with bristles (Fig. 9A); clypeal emargination shallow, wide, and rounded; clypeal lateral margin convex and barely produced in males, not produced in females (Fig. 11G–H); antennae with 10 antennomeres; pronotal posterior corners subangulate (Fig. 9C); protibial with three equally-spaced teeth; mesotibia quadrate or subquadrate in cross section (Fig. 9D), males with one mesotibial transverse carina only posteriorly, females with two transverse carinae, the apical carina complete; males with metatibial transverse carina present posteriorly, females with two transverse carinae, the apical carina complete; inner margin of male metatibia carinate straight towards apex; pygidium slightly convex; elongate, apex rounded; pygidial disc finely punctate and with bristles throughout (Fig. 9E); parameres very short, apex lanceolate in a single plane (Fig. 9F).

Redescription. Length: 7.4–8.9 mm; width: 3.7–3.9 mm. Light brown. *Head*. distance between eyes three times the width of one eye, wider in females; frons swollen, equal in length or slightly longer than clypeus; frontoclypeal surface sometimes with short bristles; clypeal emargination shallow, wide, and rounded, in males as wide as the distance between eyes; outer sides of anterior teeth parallel in males; subparallel in females (Fig. 11G–H);

clypeal lateral margin convex and barely produced in males, distance between clypeal lateral projection and anterior tooth as long as the basal width of anterior tooth, distance between clypeal lateral projection and anterior margin of eye shorter than one eye width, margin continuous, not forming a sharp angle between outer side of anterior teeth and clypeal lateral projection; distal maxillary palpomere, maximum width more than two times the apical width; fovea deep, very small, not reaching the transverse midline of the palpomere; antenna with 10 antennomeres, club lighter in color than funicle. *Thorax*: anterior margin of pronotum slightly produced medially; inconspicuous bristles throughout the pronotal surface, more visible at the sides; pronotal disc with punctures coarse and sparse; posterior corners subangulate, angle obtuse; hypomere with short and a few long bristles; mesepisternum, sides of metaventrite and metacoxae with bristles; distance between mesocoxae and metacoxae less than twice the metacoxa width; scutellum ogival, finely punctate throughout. *Elytra*: shiny on disc, weakly pruinose at the outer margins; bristles dispersed uniformly; elytral suture and elytron unicolored, weakly elevated; all four elytral ridges weakly defined. *Legs*: procoxa scaly and punctate; three protibial teeth, middle and apical equal in size, all three teeth equally spaced; mesotibia quadrate in cross section in males, subquadrate in females; mesotibial surface finely sculptured; mesotibia with two transverse carinae, the apical carina only demarked posteriorly in males, complete in females; inner margin of male metatibia carinate straight towards apex; surface coarsely sculptured; metatibia with two transverse carinae, in females the apical carina complete; metatibial apical spurs of different lengths and shape, the larger spur slightly longer than the diameter of the tibial apex, in males the smaller spur wider and truncate; metatarsomere I equal in size to metatarsomere II; males with protarsomeres and mesotarsomeres I–IV enlarged, protarsomere II wide; mesotarsomeres almost one-half width of protarsomeres; claw bifid, symmetrical, superior tooth of claw longer and narrower than the inferior tooth; distance between teeth equal to the length of inferior tooth. *Abdomen*: ventrites uniformly with bristles at the disc and sides; propygidium with bristles; pygidium flat or slightly convex; subquadrate; elongate; pygidial width almost equal to the distance between spiracles of propygidium, slightly narrower; pygidial disc finely punctate and with bristles throughout, bristles short and decumbent; pygidial apex subquadrate to rounded. *Parameres*: basal region wider than both sections of the parameres at maximum width, parameral split at 2/3 the length of the basal region; inner margins convex; parameres very short, length up to twice the length of the apex; apex lanceolate in a single plane; parameres in lateral view straight, not coplanar (Fig. 9G).

Type locality. ARGENTINA. Mendoza

Geographical distribution. **PARAGUAY (Boquerón);** ARGENTINA (**Salta, Santiago del Estero, La Rioja, San Juan,** Mendoza, **La Pampa, Neuquén, Río Negro, Chubut**); **CHILE (Biobío)**.

Remarks. *Liogenys rufoflava* resembles *L. flavida* in the body size, elytra with bristles, shape of pygidium elongate; and the frons swollen, comparing mainly the females. This species differs in the pronotum somewhat darker in color than the elytra; head, pronotum, and elytra with more abundant bristles; antenna with 10 antennomeres instead of 9; elytra approximately 2.5 times longer than the pronotum (in *L. flavida* the elytra are more than three times longer than the pronotum); in males the protibia has three teeth instead of two, protarsomere II is wider; and the parameres are different in shape. This species also resembles *L. brachyclypeata* **new species**, especially when comparing the females, although *L. rufoflava* can be distinguished mainly by the width of the head, narrower than the posterior margin of the pronotum. *Liogenys rufoflava* also have some features in common with *L. maxillaricuspis* **new species** (for more details see remarks of these new species).

The first record of *L. rufoflava* in Chile is noteworthy, as it is the only *Liogenys* occurring in Chile that is not endemic to this country. Further phylogeographical studies will bring light in order to discover if *L. rufoflava* is older than the Andes formation, as well as its ancestral relationship with the other species from the same region.

Liogenys xanthocera Harold, 1869

Figs. 10, 13F, 14

Liogenys pallidicornis Blanchard, 1851: 168; Lacordaire 1855: 269 (generic redescription); Frey 1969: 42 (key).

Liogenys xanthocerus Harold 1869a: 123 (new replacement name for *L. pallidicornis*); Harold 1869b: 1140 (checklist, synonymy); Kolbe 1907: 5 (checklist); Bruch 1911: 200 (checklist); Dalla Torre 1913: 318 (checklist); Frey 1969: 42 (key; junior synonym of *L. pallidicornis* [sic]); Krajčík 2012: 145 (checklist); Cherman *et al.* 2017: 4 (generic history).

Liogenys xanthoceris [sic]: Frey 1969: 57 (synonym of *L. pallidicornis* [sic]).

Liogenys xanthocera: Blackwelder 1944: 227 (checklist); Evans 2003: 215 (checklist); Evans & Smith 2009: 183 (checklist).

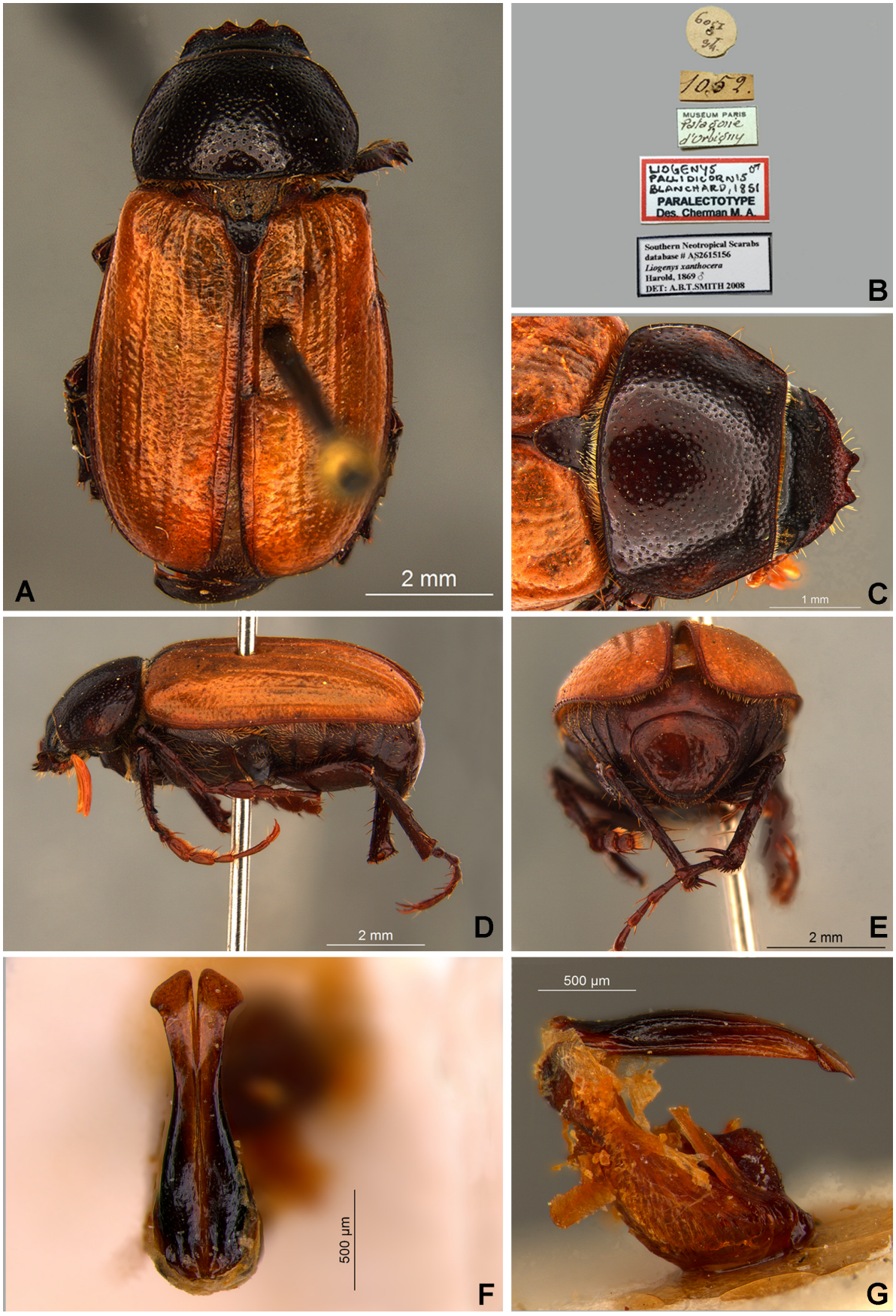

FIGURE 10. *Liogenys xanthocera* Harold, 1869, male lectotype views: A) dorsal, B) labels, C) clypeus and pronotum, D) lateral, E) pygidium, and parameres views: F) dorsal, G) lateral.

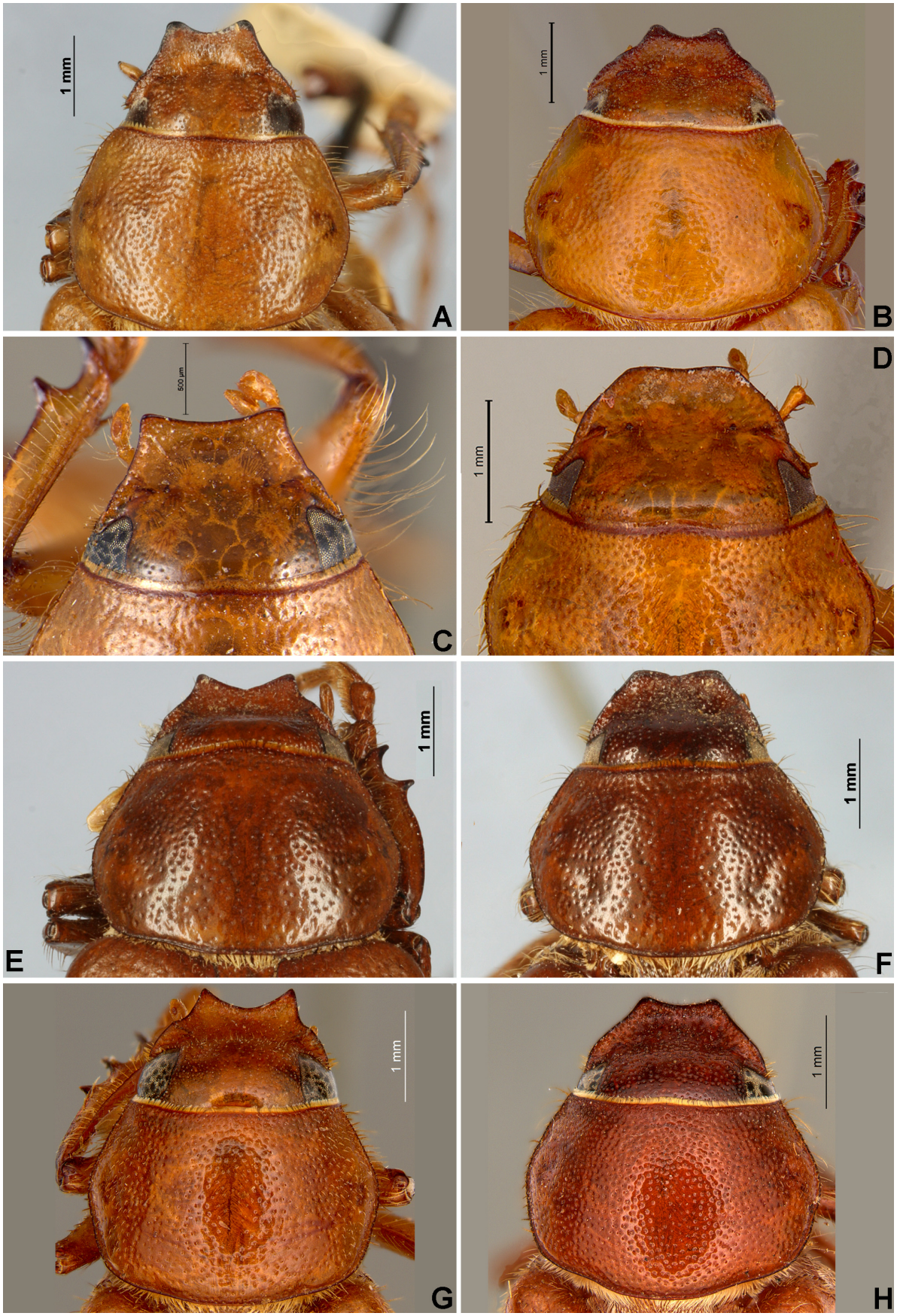

FIGURE 11. Dimorphism in clypeus. *Liogenys flaveola* Moser, 1924: A) male, B) female; *L. flavida* Moser, 1918: C) male, D) female; *L. kuntzeni* Moser, 1921: E) male, F) female; *L. rufoflava* Moser, 1918: G) male, H) female.

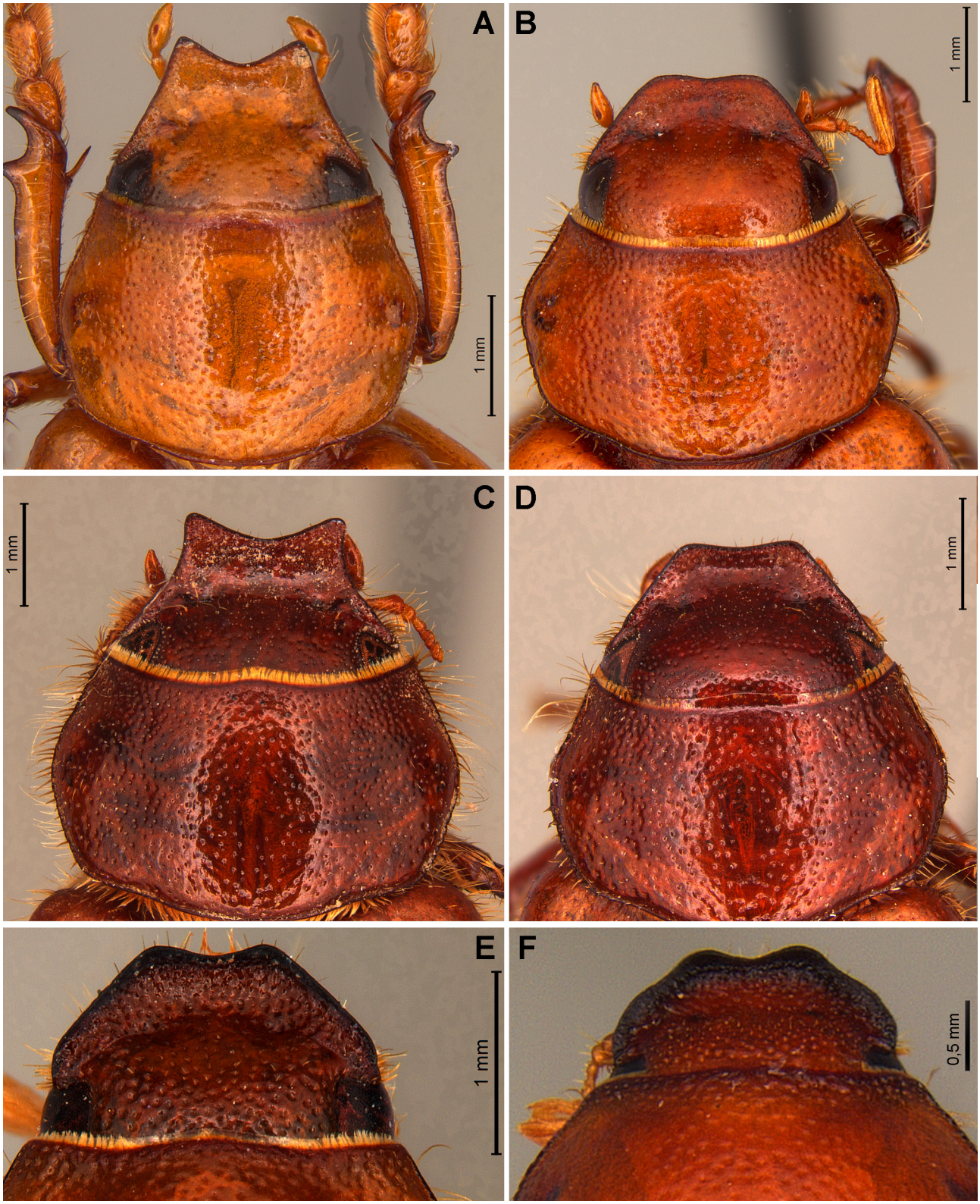

FIGURE 12. Dimorphism in clypeus. *Liogenys lucialmeidae* Cherman, **new species**: A) male, B) female; *L. martinezi* Cherman, **new species**: C) male, D) female; *L. maxillaricuspis* Cherman, **new species**: E) male, F) female.

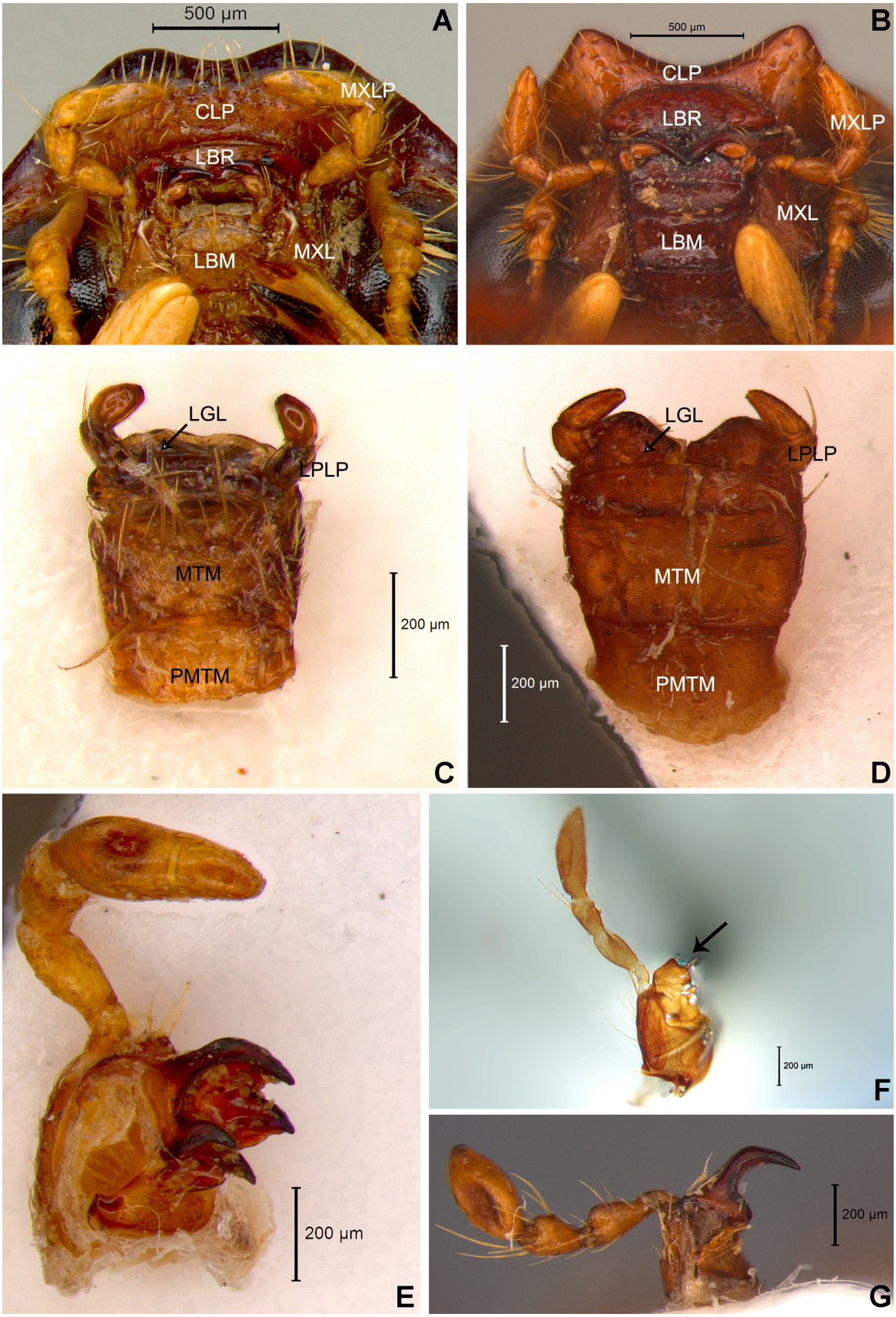

FIGURE 13. *Liogenys maxillaricuspis* Cherman, **new species**: A) head in ventral view, C) labium, G) right maxilla; *L. brachyclypeata* Cherman, **new species**: B) head in ventral view, D) labium; *L. calcarata* Frey, 1970: E) left maxilla; *L. xanthocera* Harold, 1869: F) right maxilla. Legends: A, B) CLP: clypeus, LBM: labium, LBR: labrum, MXL: maxilla, MXLP: maxillary palp. C, D) LGL: ligula, LPLP: labial palp, MTM: mentum, PMTM: postmentum.

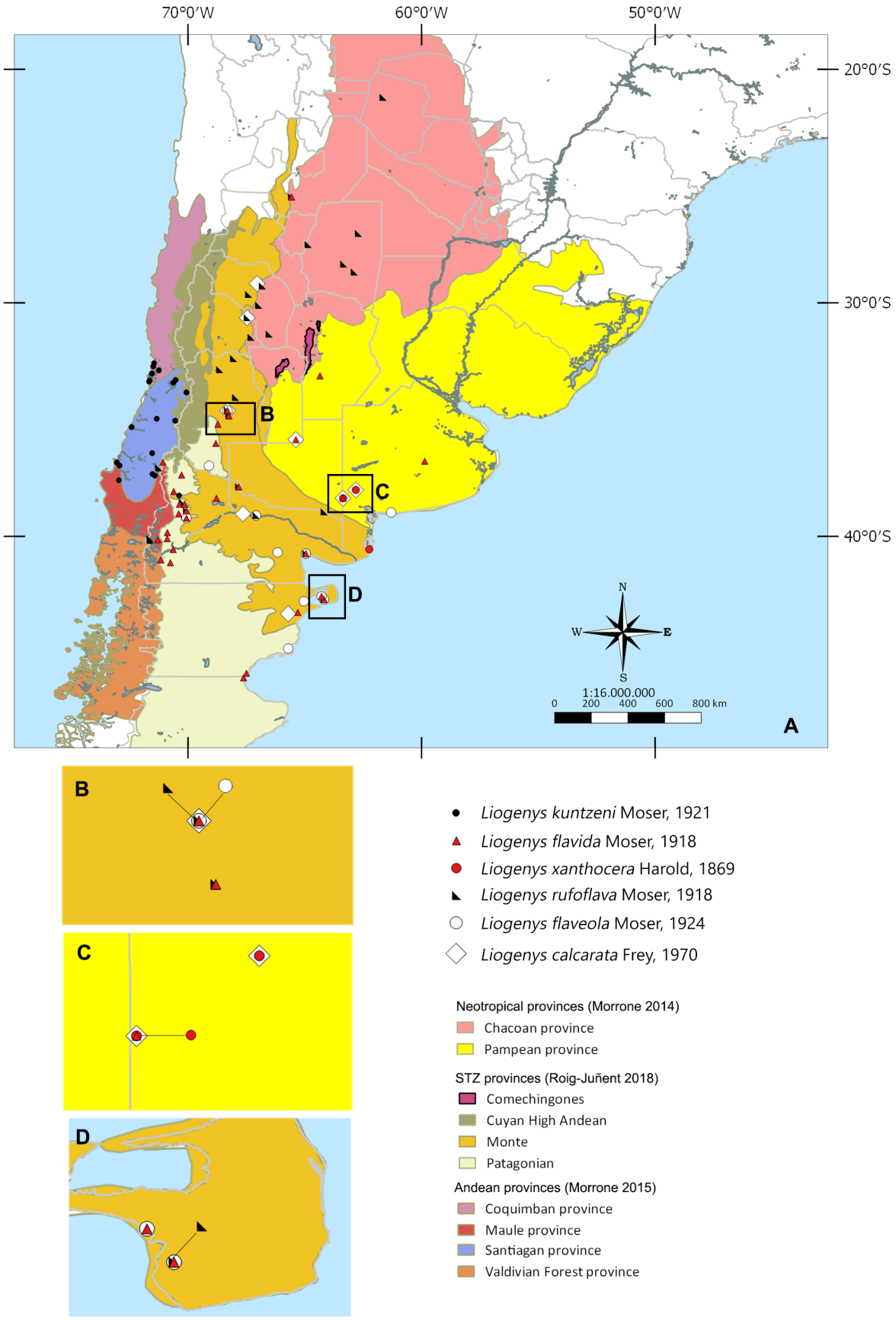

FIGURE 14. Geographical distribution of known *Liogenys* species occurring in the STZ and its boundaries: A) general, B, C, D) detail. Image legend: shaped points: already known species; colors: provinces of Neotropical, South American Transition Zone (STZ), and Andean regions.

Type material. Male lectotype of *Liogenys pallidicornis* here designated (MNHN): [white handwritten] "6051 / 34", [light green, typeset and handwritten] "Patagonie / d'Orbigny / MUSÉUM PARIS", [green handwritten] "L. pallidicornis. / Cat. Mus. / Baie de San Blas (Patagonie) / M. D'Orbigny", [white typeset] "Southern Neotropical Scarabs / database #AS2615155 / *Liogenys xanthocera* / Harold 1869 ♂ / DET: A.B.T.SMITH 2008", [red, outlined, typeset and handwritten] "LIOGENYS / PALLIDICORNIS / BLANCHARD, 1851 / LECTOTYPE / Des. Cherman M. A.". Male paralectotype (MNHN) bearing the labels: [white handwritten] "6051 / 34", [white handwritten] "1052", [light green typeset and handwritten] "Patagonie / d'Orbigny / MUSÉUM PARIS", [white typeset] "Southern Neotropical Scarabs / database #AS2615156 / *Liogenys xanthocera* / Harold 1869 ♂ / DET: A.B.T.SMITH 2008", [red, outlined, typeset and handwritten] "LIOGENYS / PALLIDICORNIS / ♂ / BLANCHARD, 1851 / PARALECTOTYPE / Des. Cherman M. A."

Non-type material (14). ARGENTINA. Patagonia: without locality, date, and collector, 1 female (ZMHB); *Buenos Aires:* Puán, Felipe Solá, XII.1944, A. Martínez, 2 males (CMNC); Puán, Felipe Solá, II.1946, A. Martínez, 4 males (CMNC); Puán, Felipe Solá, A. Martínez, XII.1951, 3 males (MZSP); Puán, Felipe Solá, XI.1959, A. Martínez, 1 male (MZSP); Puán, Felipe Solá, XII.1960, A. Martínez, 2 males (MZSP); Estancia Barraú, 30 km SW Villa Iris, XI.1946, A. Martínez, 1 male (CMNC).

Diagnosis. Body elongate; body, head, and pronotum in general dark purple; elytra glabrous, shiny yellow, sides subparallel (Fig. 10A); clypeal emargination deep, narrow and rounded; clypeal lateral margin convex and produced, obtuse angle between outer side of anterior teeth and clypeal lateral projection (Fig. 10C); antenna with 10 antennomeres, yellow, club nearly twice as long as the funicle; posterior corners subangulate, obtuse; mesotibia cylindrical in cross section (Fig. 10D); pygidium slightly convex; wide, subtrapezoidal; pygidial disc glabrous or with unconspicous bristles throughout (Fig. 10E); males with inner margin of metatibia not carinate; transverse carina weakly defined; protarsomere II elongate; parameres narrowed at the midline; splitted after the midline; inner margins straight; apex spatulate (Fig. 10F).

Redescription. Length: 7.3–7.6 mm; width: 3.8–3.9 mm. Dark purple in body, head, and pronotum, elytra dull yellow. *Head*. distance between eyes more than three times the width of one eye; clypeal emargination deep, narrow, and rounded; outer sides of anterior teeth parallel; clypeal lateral margin convex and produced, forming a rounded projection; distance between clypeal lateral projection and anterior tooth longer than the basal width of anterior tooth, distance between clypeal lateral projection and anterior margin of eye longer than one eye; obtuse angle between outer side of anterior teeth and clypeal lateral projection; antenna with 10 antennomeres, club nearly twice as long as and lighter in color than funicle. *Thorax*: anterior margin of pronotum straight; pronotal disc with punctures coarse, shallow and sparse; posterior corners subangulate, obtuse; hypomere, mesepisternum, sides of metaventrite, and metacoxae with sparse, long bristles; distance between mesocoxae and metacoxae less than twice the metacoxa width; scutellum ogival to rounded, punctate throughout. *Elytra*: shiny, glabrous; elytral suture and elytron unicolored, elevated; two inner pair of elytral ridges more defined than the other two ridges. *Legs*: procoxa with bristles; protibia with three teeth, middle and apical teeth equal in size, all three teeth equally spaced; mesotibia cylindrical in cross section, mesotibia dorsally smooth with two transverse carinae, the apical carina complete; inner margin of male metatibia not carinate; surface finely sculptured; metatibia with one transverse carina present posteriorly and weakly defined dorsally; metatibial apical spurs of equal lengths, equal to the diameter of the tibial apex; metatarsomere I shorter than metatarsomere II; in males protarsomeres and mesotarsomeres I–IV enlarged, protarsomere II long; protarsomeres and mesotarsomeres equally enlarged; claw bifid, symmetrical, superior tooth of claw almost three times longer and narrower than the inferior tooth; distance between teeth longer than the length of inferior tooth. *Abdomen*: ventrites with sparse bristles; propygidium glabrous; pygidium slightly convex; subtrapezoidal; pygidial width not exceeding distance between spiracles of propygidium; pygidial disc with inconspicuous bristles, finely and very sparsely punctate; pygidial apex subquadrate. *Parameres*: basal region wider than both sections of the parameres at its maximum width, parameres narrowed at the midline; parameral split after the midline; inner margins straight; apex spatulate, angulate; parameres straight or slightly convex in lateral view (Fig. 10G).

Type locality. ARGENTINA. Baie de San-Blas (Patagonie) [Buenos Aires, Bahia de San Blas, 40°33'8''S 62°14'4''W].

Geographical distribution. ARGENTINA (Buenos Aires).

Remarks. *Liogenys xanthocera* is easily recognized among the other *Liogenys* by its characteristic dark body, pronotum, and scutellum contrasting with the elytra dull yellow; and by the club nearly twice the length of the funicle. The teeth of the galea are reduced (Fig. 13F), as in *L. sinuaticeps* Moser (Cherman *et al.* 2016, 2017). The

specimen from 30 km SW Villa Iris, Puán, Buenos Aires [38°21’15.8’’S 63°20’37.4’’W] shows variations in the body color, entirely dull yellow, the lateral margin of clypeus more produced, and the parameres strongly convex. As we have only this specimen with these single features, we presume that those differences are only intraspecific variations, needing further material to determine if it is a different species.

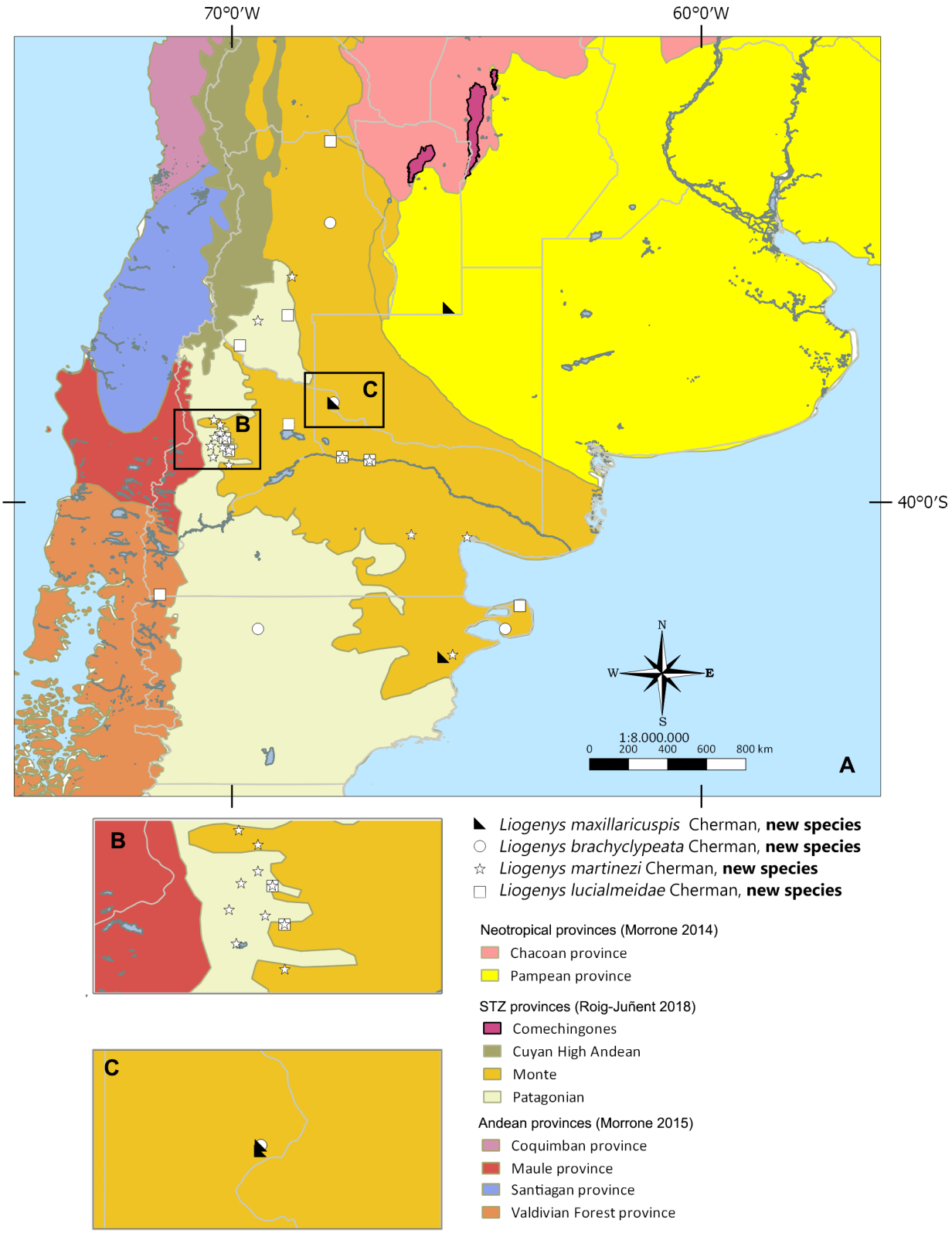

FIGURE 15. Geographical distribution of *Liogenys* new species occurring in the STZ and its boundaries: A) general, B, C) detail. Image legend: shaped points: new species; colors: provinces of Neotropical, South American Transition Zone (STZ), and Andean regions.

The lectotype (Fig. 10B) was collected Bahía San Blas, Buenos Aires, Argentina during the period from 14 January–18 February 1829 by A.D. d'Orbigny. The region around the nearby village of "Patagones" (now known as Viedma, Río Negro) was collectively called Patagonia (Patagonie) at the time (see Smith 2017). The "1052" code number on the paralectotype corresponds with an entry in the original field notes of d'Orbigny (available from the MNHN library). D'Orbigny made these observations (text transcribed and translated): "we found this species in great numbers in January and February. They emerged from the earth every day, in numbers. We never saw them during the day, when they were hiding underground".

Blanchard (1851) described two species in *Liogenys* with the epithet "*pallidicornis*", the first one in page 167 and the other in the next page. Harold (1869) corrected this homonym by replacing the name of the second one described, as *L. xanthocera*. The first one described, *Liogenys pallidicornis* Blanchard, 1851 is a valid name (Cherman *et al*. 2017).

Discussion

All the *Liogenys* revised here occur at the Monte STZ province, except *L. kunteni*, occurring only in the west of The Andes slope (Fig. 14). This species extends through Coquimban, Santiagan, and Maule Andean provinces, these also present along western Neuquen (Argentina). In the equal weighting hypothesis of *Liogenys* phylogeny (Cherman *et al.* 2016), *L. kuntzeni* is the sister group of the eastern Andes Slope species (*L. flavida* + (*L. kadleci* + *L. calcarata*)). The fact that *L. kuntzeni*, a species endemic to Chile, resembles much more the species present at the STZ rather than to any other Chilean species, rises attention and challenges to explain how speciation of this group occurred. The taxonomy of this group is the first step to assess its biogeographical pattern, especially because the knowledge of speciation models in transitional zones are still scarce.

Liogenys flavida and *L. rufoflava* have the broadest distribution among the species from the STZ. The former spans from the ecotone between Monte and Chacoan provinces in Salta (Argentina) to the southernmost point of the genus, at the Patagonian province in northeastern Santa Cruz (Argentina), and it also can be found at the Espinal ecorregion. *Liogenys rufoflava* represents the northernmost of this group of species, in the Chacoan Paraguay, extending to the south, penetrating through the Monte province and reaching the Patagonian steppe and Santiagan (Chile) provinces. This is the first species that occurs in Chile and is present in another country.

All the new species occurs in the Monte and Patagonian steppe provinces (Fig. 15), except *L. maxillaricuspis* **new species**, which occurs at the Monte and the ecotone between Monte and Espinal ecoregion. *Liogenys lucialmeidae* **new species** can be also found at the Argentinian part of the Valdivian Andean province. This species together with *L. martinezi* **new species** are quite common to be found in sympatry (Fig. 15B), as well as *L. brachyclypeata* **new species** together with *L. maxillaricuspis* **new species** (Fig. 15C). The diagnoses and identification key to these species presented in this work are tools especially useful in such cases.

The Patagonian Steppe has long been considered part of the Andean region, regarding the similarities in its geological history with Cental Chilean and Sub-antarctic provinces (Morrone 2015). Recently, Roig-Juñent *et al.* (2018), based on a regionalization analysis with many taxa, including species of Scarabaeoidea endemic of the Patagonia, proposed the inclusion of the Patagonian Steppe as the southernmost province of the STZ, as this province presents taxa of both Andean and Neotropical origins in similar proportions. The biota of the Patagonian Steppe, specially the insect fauna, has more in common with the Monte, than those of the Andean region or any other Neotropical region (Roig-Juñent *et al.* 2018).

Acknowledgments

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