

Taxonomy and systematics

Two new genera of Telegeusidae (Coleoptera) from Mexico

Dos géneros nuevos de Telegeusidae (Coleoptera) de México

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Received: 29 June 2020; accepted: 8 September 2020

<http://zoobank.org/urn:lsid:zoobank.org:pub:EDB9DCA1-0656-41F5-859A-5F9BB234D2C5>

Abstract

Stenodrilus gen. nov., *Stenodrilus rodolfoi* sp. nov., *Platydrilus* gen. nov., and *Platydrilus magaliae* sp. nov. from Chiapas, Mexico, are described and illustrated. A key for identification of the genera of Telegeusidae is presented.

Keywords: Neotropical beetles; Tacaná Volcano; New species; Male genitalia

Resumen

Se describen e ilustran *Stenodrilus* gen. nov., *Stenodrilus rodolfoi* sp. nov., *Platydrilus* gen. nov. y *Platydrilus magaliae* sp. nov. de Chiapas, México. Además, se incluye una clave taxonómica para la identificación de los géneros de Telegeusidae.

Palabras clave: Escarabajos neotropicales; Volcán Tacaná; Especies nuevas; Genitalia masculina

Introduction

The beetle family Telegeusidae consists of 21 species belonging to 3 genera: *Telegeusis* Horn (16 spp.) (Fig. 1a) distributed in southern United States, Mexico and Panama; *Pseudotelegeusis* Wittmer (4 spp.) (Fig. 1b) distributed

in Mexico, Venezuela, Ecuador, French Guiana, Trinidad and Peru; and *Pseudokarumia* Pic (1 sp.) (Fig. 1c) distributed in Costa Rica and Panama (Allen & Hutton, 1969; Barber, 1952; Constantin, 2010; Fleenor & Taber, 2001; Horn, 1895; Martin, 1931; Pic, 1931; Roza et al., 2019; Wittmer, 1976; Zaragoza-Caballero, 1975, 1990,

2008; 2015; Zaragoza-Caballero & Rodríguez-Velez, 2011). Mexico has the highest diversity of telegeusids, with 12 species of *Telegeusis* (Horn, 1895; Martin, 1931; Zaragoza-Caballero, 1975, 1990, 2015; Zaragoza-Caballero & Rodríguez-Velez, 2011) and 1 species of *Pseudotelegeusis* (Zaragoza-Caballero, 2008).

The family's position in Elateroidea is unclear. Horn (1895) included *Telegeusis debilis* Horn in Drilidae. Barber (1952) suggested a generic relationship with Lymexyloidea. Martin (1931) transferred *Telegeusis* to Cantharidae. Subsequently, Zaragoza-Caballero (1990) discussed the relationship of this family with Phengodidae. Moreover, different phylogenetic hypotheses have resulted from different analyses. Branham and Wenzel (2001, 2003) recovered a clade where *Telegeusis* and *Pseudotelegeusis* were related with several genera of Phengodidae, Cantharidae and Omethidae. Hunt et al. (2007), based on molecular evidence of 3 genes, found through a Bayesian statistical approach that Telegeusidae is related with Omethidae. Bocakova et al. (2007), Kunderata and Bocak (2011) and Kunderata et al. (2013), based on molecular evidence, related *Telegeusis* with Omethidae. Kunderata et al. (2014) proposed to synonymize Telegeusidae with Omethidae, giving telegeusids a subfamilial rank. Zaragoza-Caballero and Zurita-García (2015), based on morphological evidence, suggested a close relationship between Telegeusidae and Phengodidae; Telegeusidae was found to be nested within Phengodidae as the sister

group of Penicillophorinae. In a recent phylogenetic study focusing on Cydistinae, the only species of telegeusid sampled was nested within a clade with Artematopodidae and Omethidae (Kunderata et al., 2019). Telegeusidae's taxonomic position is unclear, so we treat it herein as a family.

Telegeusids, or long-lipped beetles, are recognized by their remarkably long labial and maxillary palpi with long terminal palpomeres; body distinctly flattened, narrow and elongate; elytra short, moderately densely clothed with erect or semierect setae; antennae 11-segmented, filiform to serrate; clypeus bi- or trilobate; pronotum quadrate, with margins beaded; abdomen with 8 or 7 (*Pseudotelegeusis*) ventrites; tibial spurs well developed; and tarsal formula 5-5-5 (Ivie, 2002; Lawrence, 2010; Miller, 2002). All known individuals are adult males, and no females have been described (Lawrence, 2010). Little is known about the natural history and immature stages of telegeusid beetles. Presumably, females are flightless or neotenic, given the repeated occurrence of neoteny in the elateriform lineage (Bocakova et al., 2007). According to various works (Allen & Huntton, 1969; Fleen & Taber, 2001; Roza et al., 2019; Wittmer, 1976; Zaragoza-Caballero, 2008, 2015; Zaragoza-Caballero & Rodríguez-Velez, 2011), specimens of Telegeusidae have been collected by using different types of traps (Malaise, flight intercept and light), from desert to humid areas, mainly during April, July and August.

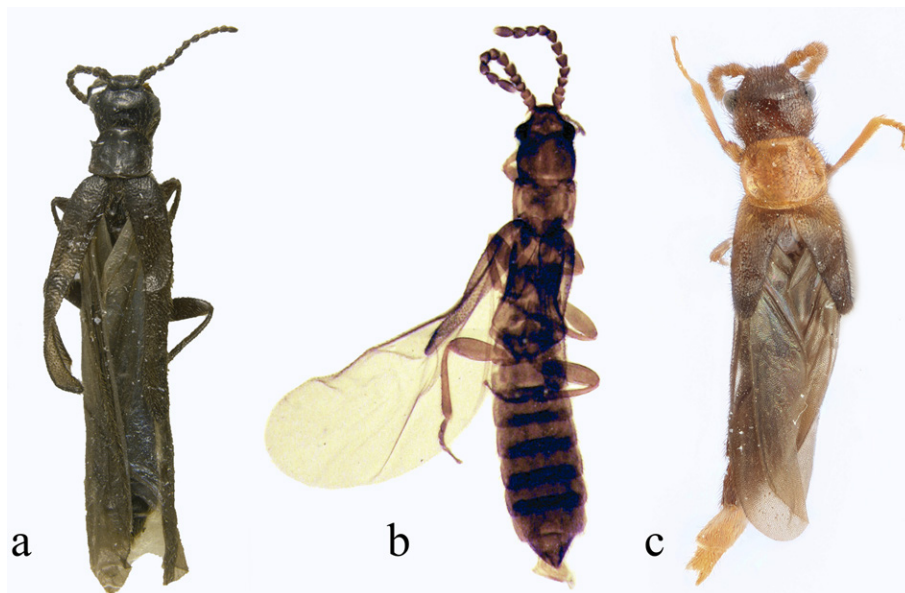


Figure 1. Genera of Telegeusidae. a) *Telegeusis moroni* Zaragoza-Caballero, 2015; b) *Pseudotelegeusis jiliotupaensis* Zaragoza-Caballero, 2008; c) *Pseudokarumia angustata* Pic, 1931 (Photograph by Jennifer Thomas, Division of Entomology, University of Kansas Biodiversity Institute©).

Telegeusid beetles are rarely collected; this is reflected in the number of the genera and species described. In this paper, we describe and illustrate *Stenodrilus* gen. nov., *Stenodrilus rodolfoi* sp. nov., *Platydrilus* gen. nov., and *Platydrilus magaliae* sp. nov. from Chiapas, Mexico. Also, a key to all genera of Telegeusidae is provided.

Material and methods

Specimens studied were collected with flight intercept, blacklight and Malaise traps in the vicinity of Tacaná volcano, Chiapas, Mexico. Specimens were examined and measured using a Carl Zeiss Discovery V8® stereomicroscope. Measurements are in millimeters. Genitalia were dissected and, after examination, were transferred to microvials which were then pinned beneath the specimens. Anatomical terms and characters used here are those of Horn (1895), Barber (1952), Sharp and Muir (1912), Zaragoza-Caballero (1975), and Zaragoza-Caballero and Rodríguez-Velez (2011). Photographs were obtained using a Zeiss Axio Zoom V-16® stereoscopic microscope equipped with an Axiocam MRC5® camera. Electron micrographs were obtained using a Hitachi® S-2460N (15KV) scanning electron microscope. All specimens are deposited in the National Collection of Entomology (CNIN), Instituto de Biología, UNAM.

Descriptions

Stenodrilus gen. nov. (Figs. 2a-g, 3a, b)
<http://zoobank.org/urn:lsid:zoobank.org:act:AF761705-F05E-4579-96DA59E70F80733A>

Type species: *Stenodrilus rodolfoi* sp. nov.

Diagnosis. This genus can be distinguished from *Telegeusis* by the last labial palpomere not greatly enlarged and elongated; from *Pseudotelegeusis* by the filiform antennae and the 2-segmented labial palpi; and from *Pseudokarumia* by the smooth tibial spines (see a complete comparison between genera in Table 1). This new genus is most similar, and probably closely related, to *Platydrilus* gen. nov., but is easily recognizable by the coarsely punctate surface close to eyes, gula with 2 sutures, clypeus with a very pronounced median tooth, aedeagus not robust and lateral lobes more than 3 times longer than wide.

Description. Color: head yellow with sides dark brown; pronotum yellow; antennae and elytra dark brown (except yellow last antennomere); body ventrally yellow to brown. Body: elongate, parallel-sided, dorsoventrally flattened, clothed with dense, erect yellow setae. Head: surface coarsely punctate close to eyes (Fig. 2a); width behind eyes greater than longitudinal diameter of eye. Antennal

tubercles slightly prominent. Antennae 11-segmented, filiform, inserted anterior to eyes in lateral margins of head. Eyes hemispherical, finely faceted, widely separated. Frons wider than long. Frontoclypeal suture complete. Clypeus wider than long, with a pronounced median tooth (Fig. 2b). Mandibles falciform. Galea dilated, with apex setose. Maxillary palpi 3-segmented, shorter than antennae; last palpomere spatulate, 6 times longer than palpomere 2 (Fig. 2c); labial palpi 2-segmented, last palpi shorter than the scape (Fig. 2d). Tentorium with 1 pit. Gula with 2 sutures (Fig. 2d). Thorax: pronotum quadrate, punctate, setose; edges margined, lateral margins subparallel to slightly sinuate; anterior and posterior angles pits; disc slightly convex, clothed with short, erect yellow setae. Scutellum hidden by pronotum, longer than wide, apex truncate, surface clothed with erect setae. Elytra with external margins parallel, apex rounded, dorsally clothed with erect setae. Epipleura present on elytral basal half, integument shiny, rugose. Metathoracic wings, revealing 2 abdominal ventrites when folded. Venation reduced; anterior radial vein (RA) somewhat sclerotized; radial cell (CR) obsolete; radial, posterior radial and median posterior veins fused; cubital 1 (C1), cubital 2 (C2) and anal posterior vein (AP) well defined (Fig. 2e). Prosternum reduced, wider than long. Mesosternum short. Metasternum rectangular. Legs: trochanters present on all 3 pairs of legs, elongate. Anterior and middle coxae conical; posterior coxae almost rectangular. Femora fusiform, flattened. Tibiae elongate, with 2 apical smooth spines. Tarsi 5-segmented; tarsomere 1 equal in length to 2–4 combined; claws simple. Abdomen: with 8 non-fused ventrites; pygidium triangular. Aedeagus (Fig. 2f, g) trilobate; basal piece nearly covering dorsally and laterally basal half of lateral lobes; in ventral view, basal piece longitudinal margins diverging strongly apically; lateral lobes symmetrical, more than 3 times longer than wide, oval, twisted near apex; apex rounded, granulate, with long semierect setae; median lobe projected ventrally, weakly arched, narrowed apically, covered by median strut.

Taxonomic summary

Etymology. The name of this genus is based on the form of the lateral lobes in male genitalia; *stenus* = slender; *drilus* = penis.

Distribution. Mexico (Chiapas).

Stenodrilus rodolfoi sp. nov. (Fig. 3a, b)
<http://zoobank.org/urn:lsid:zoobank.org:act:3E7AEFEA-369E-40A4-B29F-1A086CA07DC6>

Male. Size: length 4.7 to 5 mm; width 0.84 to 1 mm. Color: head and pronotum yellow, elytra dark brown; ventrally yellow to brown. Head: surface flat;

Table 1

Comparison of generic characters after Ivie (2002); Zaragoza-Caballero (1975, 1990, 2008); Zaragoza-Caballero and Rodríguez-Velez (2011).

Genera	Labial palpi	Maxillary palpi	Proportion p/ max-p/lab	Tentorial pits	Antennae	Head behind eyes	Tibial spines	Abdominal ventrites	Lateral lobes of aedeagus
<i>Telegeusis</i>	2-3	4	Last labial palpomere similar to maxillary palpi. As long as antennae	2	Filiform	More than twice longitudinal diameter of eye	Smooth	8	Wide
<i>Pseudotelegeusis</i>	1	4	Last maxillary palpomere as long as preceding 3 palpomeres	1-2	Strongly serrate	Shorter than or subequal to longitudinal diameter of eye	Smooth	7-8	Wide
<i>Pseudokarumia</i>	1-2	No information	Maxillary palpomeres long	No information	Filiform	1.5-3 times longer than longitudinal diameter of eye	Serrate	No information	No information
<i>Stenodrilus</i> gen. nov.	2	3	Last maxillary palpomere 3 times longer than labial palpi 1-2 combined	1	Filiform	2.5 times longer than longitudinal diameter of eye	Smooth	8	Slender
<i>Platydrilus</i> gen. nov.	2	3	Last palpomere twice as long as labial palpi 1-2 combined	1	Filiform	2.5 times longer than longitudinal diameter of eye	Smooth	8	Wide

area behind eyes 1.5 times wider than long and slightly wider than pronotum (0.5 mm). Integument shiny and chagreened, punctate; each puncture with a yellow, erect seta. Interocular area slightly convex. Interantennal area concave; distance 2.4 times greater than length of scape. Antennae longer (2 mm) than last maxillary palpomere (0.3 mm); scapes slightly prominent. Eyes slightly prominent, hemispherical; interocular distance slightly greater than twice eye width. Frons concave; anterior margin straight. Thorax: pronotum wider (0.7 mm) than long (0.6 mm), width less than length of head; anterior margin almost straight, anterior angles projected forward, posterior margin convex, sides constricted at middle; disc flat and glossy; integument with scattered setae, with fine punctures sparsely distributed. Posterior margin of scutellum truncate. Elytra twice as long as wide, external margins subparallel,

posterior margins rounded; integument coarsely punctate, especially at posterior third; each puncture with a yellow, erect seta. Metathoracic wings more than twice as long as wide. Abdomen: shiny, integument chagreened with fine punctures; each puncture with a yellow seta.

Female unknown.

Taxonomic summary

Etymology. This species is named after Rodolfo Cancino López, one of the collectors of the species.

Type material. Holotype male: Mexico. Chiapas, Cacahoatán, Ejido Benito Juárez, El Plan cerca de Estación Meteorológica, 7/IX/2018, 1,487 m asl, 15°05'27.66" N, 92°08'50.5" W, T. Luz negra, Cancino-López R.J. & Luna-Luna A.M. colls. Paratypes, 2 males: Chiapas, Cacahoatán, Ejido El Águila, 7/IX/2018, 1,209 m asl,

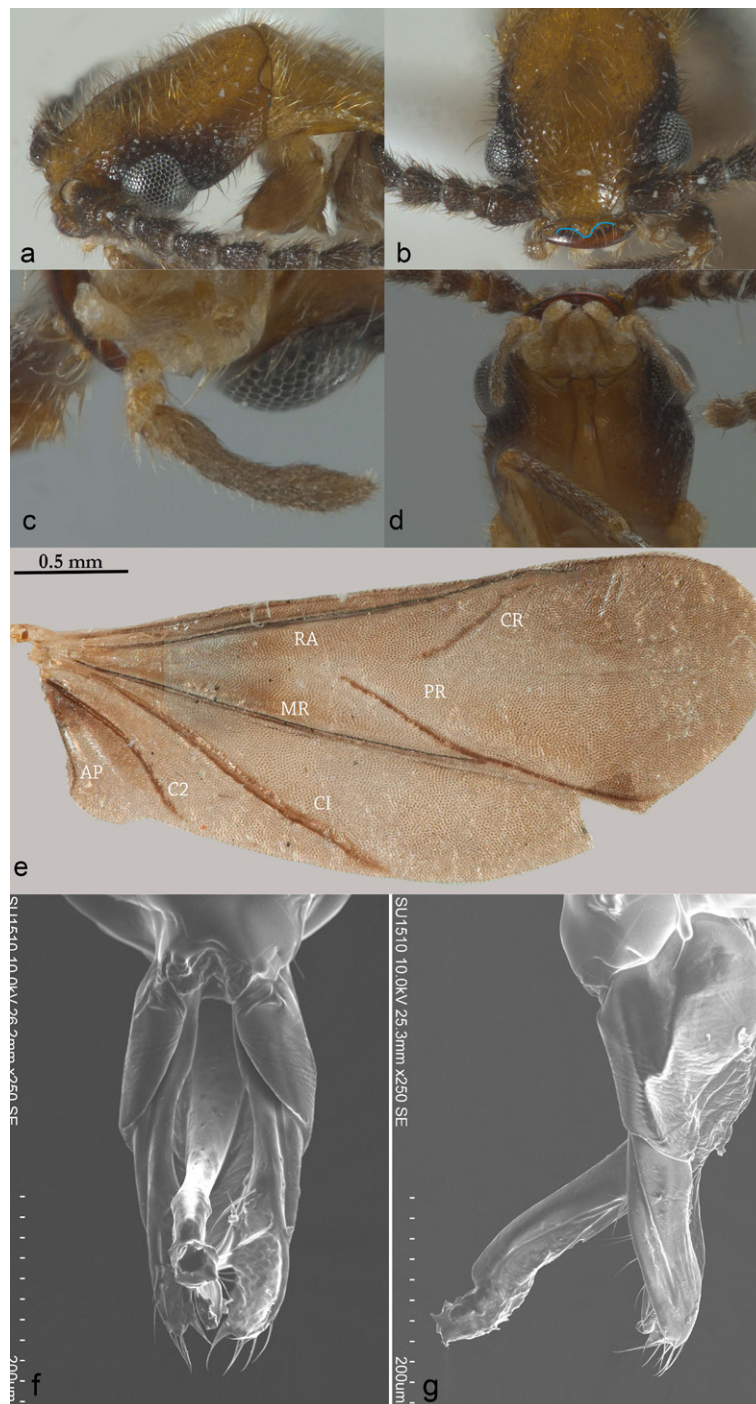


Figure 2. *Stenodrilus* gen. nov. a) Punctuation close to eyes; b) pronounced median tooth on clypeus; c) maxilar palpi; d) labial palpi; e) membranous wings; f) ventral view of aedeagus; g) lateral view of aedeagus.

15°05'33.78" N, 92°10'52.02" W, T. Luz negra, Cancino-López R.J. & Luna-Luna A.M. colls; Cacahoatán, Ejido El Aguila, 11–12/II/2018, 1,210 m asl, 15°05'36.96" N, 92°10'48.36" W, T. malaise 1, Cancino-López R.J. & Luna-Luna A.M. colls.

Platydrilus gen. nov. (Figs. 4a-g, 5a, b)
<http://zoobank.org/urn:lsid:zoobank.org:act:CCF6CA47-A586-4D4F-AE62-F7195DBD6FBE>
Type species: *Platydrilus magaliae* sp. nov.



Figure 3. *Stenodrilus rodolfoi* sp. nov. a) Dorsal view; b) ventral view.

Diagnosis. This genus is distinguished from *Telegeusis* by the lack of greatly enlarged and elongated last labial palpomere; from *Pseudotelegeusis* by the filiform antennae and the 2-segmented labial palpi; and from *Pseudokarumia* by the non-serrated mesotibial spines (see a complete comparison between genera in Table 1). *Platydrilus* gen. nov. is most similar, and probably closely related, to *Stenodrilus* gen. nov., but is easily recognizable by the head somewhat punctate, gula with 1 suture bifurcating at base, clypeus with a noticeably short median tooth and robust aedeagus with lateral lobes longer than wide.

Description. Color: head, pronotum, antennae and elytra brown; ventrally yellow to brown. **Body.** Form elongate, parallel-sided, dorsoventrally flattened, clothed with dense, decumbent yellow setae. Head: surface somewhat punctate (Fig. 4a), width behind eyes 2.5 times greater than longitudinal diameter of eye; mouthparts prognathous. Antennal tubercles prominent. Antennae 11-segmented, filiform, inserted anterior to eyes in lateral margins. Eyes situated on lateral margins, spherical, finely faceted, widely separated. Frons wider than long. Frontoclypeal suture complete. Clypeus wider than long, with a short median tooth (Fig. 4b). Mandibles falciform. Galea bullet-shaped, setose. Maxillary palpi 3-segmented,

shorter than antennae; last palpomere spatulate, more than 6 times longer than palpomere 2; labial palpi 2-segmented (Fig. 4c), last palpi as long as scape (Fig. 4d). Tentorium with 1 pit. Gula with 1 suture bifurcating at base (Fig. 4d). Thorax: pronotum quadrate; edges margined, lateral margins subparallel; anterior and posterior angle pits; disc flat, clothed with short, erect yellow hairs. Scutellum hidden by pronotum, wider than long, apex truncate, surface punctate, clothed with erect setae. Elytra with external margins parallel, apex rounded, dorsally and ventrally clothed with decumbent setae. Epipleura present on elytral basal half, integument shiny, rugose. Membranous wings, revealing 1 tergite when folded. Venation reduced; anterior radial vein (RA) sclerotized; radial cell (CR) and R3 fused, obsolete; posterior radial and median posterior veins fused; cubital 1 (C1), cubital 2 (C2) and anal posterior vein (AP) well defined (Fig. 4e). Prosternum reduced, wider than long. Mesosternum short. Metasternum as long as wide. Legs: trochanters present on all 3 pair of legs, elongate. Anterior, middle and posterior coxae conical. Femora fusiform, flattened. Tibiae elongate, with 2 smooth, apical spines. Tarsi 5-segmented; length of tarsomeres 1 about equal to 2-4 combined; claws simple. Abdomen: with 8 non-fused ventrites; pygidium

subtriangular. Aedeagus (Fig. 4f, g) trilobate, robust; basal piece covering dorsally basal half of lateral lobes; in ventral view, basal longitudinal margins of basal piece widely separated, moderately diverging apically; lateral lobes as long as wide, oval, slightly twisted near apex; apex rounded, granulate, with long, semierect setae; median lobe projected ventrally, erect, weakly widening apically, covered by medium strut.

Taxonomic summary

Etymology. The name of this genus is based on the form of the lateral lobes in male genitalia; *platys* = ancho; *drilus* = penis.

Distribution. Mexico (Chiapas).

Platydrilus magaliae sp. nov. (Fig. 5a, b)

<http://zoobank.org/urn:lsid:zoobank.org:act:4AD6A825-9EF7-4C31-B0A1-BA17613791F5>

Male. Size: length 4.2 to 4.5 mm; width 0.6 to 0.7 mm. Color: dorsally brown; ventrally yellow to brown. Head: surface flat; width behind eyes almost equal to head length and as wide as pronotum (0.6 mm). Integument shiny and chagreened, somewhat punctate; each puncture with an erect, yellow seta. Interocular area slightly convex. Scapes prominent. Interantennal area concave; distance equal to 1.16 times length of scapes. Antennae longer (6.0 mm) than last maxillary palpomere (0.2 mm). Eyes slightly prominent, globular; interocular distance more than twice eye width. Frons concave; anterior margin straight. Thorax: pronotum quadrate; anterior margin almost straight, posterior margin convex, sides slightly constrained at middle; disc flat and glossy; integument with scattered setae. Posterior margin of scutellum truncate. Elytra less than twice as long as wide; external margins subparallel, posterior margins rounded; integument coarsely punctate, especially on posterior third; each puncture with an erect, yellow seta. Membranous wings, more than twice as long as wide. Abdomen: integument shiny, chagreened, with fine punctures; each puncture with a yellow seta.

Female unknown.

Taxonomic summary

Etymology. This species is named after Magali Luna Luna, one of the collectors of the species.

Type material. Holotype male: Mexico. Chiapas, Cacahoatán, Ejido El Águila, 12-14/III/2018, 1,286 m asl, 15°05'36.54" N, 92°10'46.5" W, T. Intercepción 4, Cancino-López & Luna-Luna colls. Paratypes, 4 males: Chiapas, Cacahoatán, Finca Alianza, 6-8/VIII/2018, 780 m asl, 15°03'42.96" N, 92°10'34.2" W, T. Intercepción 2,

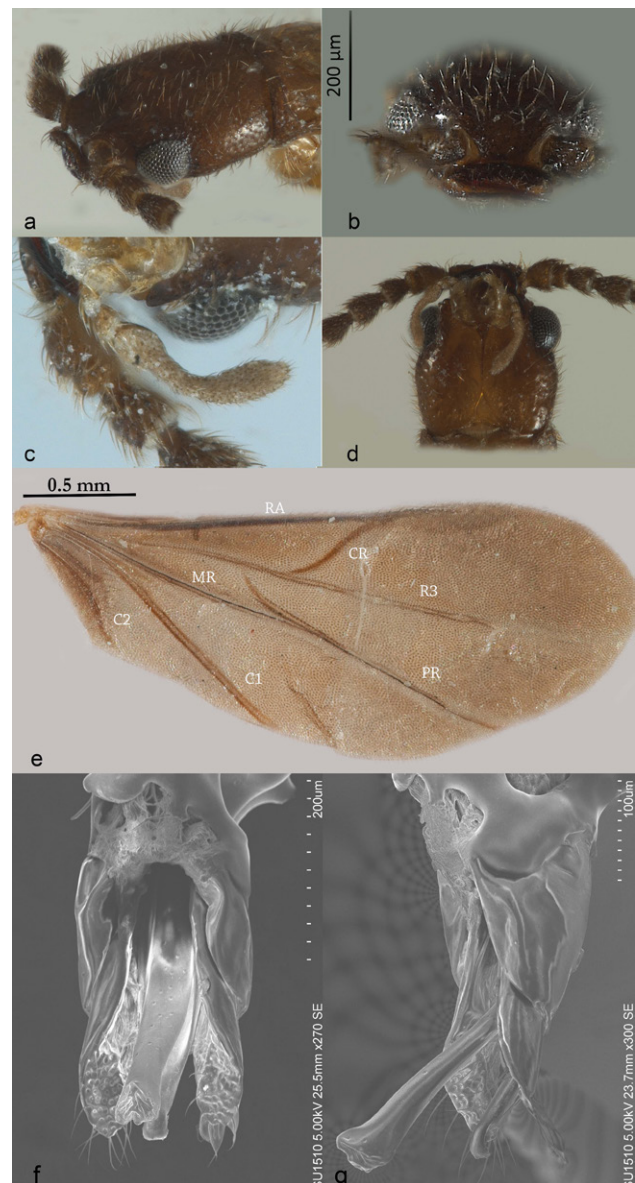


Figure 4. *Platydrilus* gen. nov. a) Punctation close to eyes; b) short median tooth on clypeus; c) maxillary palpi; d) labial palpi; e) membranous wings; f) ventral view of aedeagus; g) lateral view of aedeagus.

Cancino-López R.J & Luna-Luna A.M. colls; Cacahoatán, Ejido El Águila, 6-8/IX/2018, 1,304 m asl, 15°05'36.06" N, 92°10'45.72" W, T. Intercepción 4, Cancino-López & Luna-Luna colls; Cacahoatán, Ejido El Águila, 6-8/IX/2018, 1,260 m asl, 15°05'34.98" N, 92°10'47.76" W, T. Intercepción 2, Cancino-López & Luna-Luna colls.



Figure 5. *Platydrilus magaliae* sp. nov. a) Dorsal view; b) ventral view.

Key to genera of Telegeusidae (modified from Ivie [2002] and Miller [2002]).

1. Labial palpi 2 to 3-segmented, last palpomere greatly enlarged and elongated, similar to maxillary palpi; antennae filiform *Telegeusis* (Fig. 1a)
- 1' Labial palpi 1 to 2-segmented, last palpomere very short, much shorter than maxillary palpi; antennae variable 2
2. Antennae strongly serrate; head width behind eyes shorter than or subequal to longitudinal diameter of eye; labial palpi 1-segmented. *Pseudotelegeusis* (Fig. 1b)
- 2' Antennae filiform; head width behind eyes greater than longitudinal diameter of eye; labial palpi 1 to 2-segmented 3
3. Labial palpi 1 to 2-segmented; mesotibial spurs serrate *Pseudokarumia* (Fig. 1c)
- 3' Labial palpi 2-segmented; mesotibial spurs smooth 4
4. Head coarsely punctate; clypeus with a pronounced median tooth; last maxillary palpomere 3 times longer than labial palpomeres 1-2 combined; gula with 2 sutures; lateral lobes of aedeagus slender, twisted to apex in lateral view. *Stenodrillus* gen. nov. (Fig. 3)
- 4' Head somewhat punctate; clypeus with a very short median tooth; last maxillary palpomeres twice as long as labial palpomeres 1-2 combined; gula with 1 suture bifurcating at base; lateral lobes of aedeagus wide, not twisted to apex in lateral view *Platydrilus* gen. nov. (Fig. 5)

Discussion

Among Telegeusidae, the male genitalia have not been previously used to differentiate between genera or species. The study of the structure of the male genitalia

allowed us to recognize the 2 new genera presented in this study. According to descriptions and illustrations of male genitalia in the other genera of Telegeusidae (Allen & Hutton, 1969; Barber, 1952; Lawrence, 2010; Zaragoza-Caballero, 1975, 1990), lateral lobes are very wide and are

not twisted towards the apex; in the new genera, however, the lobes are twisted near apex and slenderer.

The new genera and species described here were collected in March, February and September in the Tacaná Volcano Biosphere Reserve, Chiapas, in shade-coffee plantations and cloud forest. The cloud forest is one of the most threatened vegetation types in Mexico. On the slopes of Tacaná volcano, the cloud forest area is highly reduced compared to other forests from the Sierra Madre de Chiapas (Challenger et al., 2010). On the other hand, shade-coffee plantations are important repositories of biological diversity and could be used as corridors between natural areas for some groups of animals (Moguel & Toledo, 1999; Perfecto et al., 1996). However, this change in the ecosystem may put pressure on the species and therefore a change in their composition. The new genera and species of these rare beetles from this type of vegetation show the need to search for efficient strategies to conserve the environment around this volcano in order to preserve its fauna and flora.

Acknowledgments

To Rodolfo Cancino López and Magali Luna Luna for providing the specimens from the Tacaná volcano; Martín L. Zurita and Geovanni Rodríguez for their comments on the manuscript, and Emmanuel Arriaga and Daniel Curoe for editing and comments about the manuscript. We also thank Jennifer Thomas and Zachary Falin (Kansas University entomological collection) for the photograph of *Pseudokarumia angustata*; Susana Guzman (IBUNAM) for help with the use of the Zeiss equipment; Berenit Mendoza (IBUNAM) for the electron micrographs; Ishwari Gutierrez Carranza for dissecting the specimens. We thank 2 anonymous reviewers for helping to improve the manuscript. We dedicate this work to our friend and colleague Martín L. Zurita, who recently passed away.

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