Two New Species of *Trochoideus* Buquet from Venezuela (Coleoptera, Endomychidae), with Comments on the Neotropical Species Groups

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**ABSTRACT**

Two new species of *Trochoideus*, *T. venezuelensis*, and *T. globulicornis* from Venezuela are described, and the previously recognized species *T. boliviensis* Strohecker, *T. americanus* Buquet, and *T. goudoti* Guérin are redescribed. Three species groups: *boliviensis*, *americanus*, and *coelo antennatus*, each with particular morphology and distribution, are defined and a key to the American species is presented.

**RESUMEN**

Se describen dos nuevas especies de *Trochoideus* proveientes de Venezuela, *T. venezuelensis* y *T. globulicornis* y se redescriben tres especie previamente conocidas: *T. boliviensis*, *T. americanus* y *T. goudoti*. Se definen tres grupos de especies: *boliviensis*, *americanus* y *coelo antennatus*, cada uno con morfología y distribución particular y se presenta una clave para la identificación de las especies americanas del género.

**INTRODUCTION**

According to Csiki (1910), the genus *Trochoideus* is distributed in all the tropics of the world. Strohecker (1978), in his revision of the American species, recognized seven species. During the curatorial work at the Museo del Instituto de Zoología Agrícola (MIZA),

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Facultad de Agronomía, Universidad Central de Venezuela, in Maracay, numerous specimens were found of an endomycid beetle that we identified as *Trochoideus americanus* Buquet. Since then, we have had the opportunity to study four additional species (*boliviensis, goudoti, venezuelensis*, n. sp., and *globulicornis*, n. sp.) belonging to the following collections: Carlos Bordón, Maracay (CCBM), Capt. A. R. Gillogly (CCGP), American Museum of Natural History, New York (AMNH), and National Museum of Natural History, Washington (NMNH). The original purpose of this paper was to describe the new species, but due to difficulties in the interpretation of the descriptions and figures by Strohecker (1978), we decided to redescribe all species available to us.

*Trochoideus* Westwood

**DIAGNOSIS:** Head broad, eyes protuberant. Pronotum convex, widest at or in front of middle, sides narrowed toward base; base with two transverse lateral and one longitudinal central impressions. Elytra elongate, humeral angles rounded. Front coxae contiguous; middle coxae well separated, cavity closed by epimeron; hind coxae widely separated. Antennae short and robust, 4 to 7-segmented; in males claviform (*boliviensis* group), with last segment enlarged and divided by suture into dorsal and ventral plates (*americanus* group), or globose (*coeloantennatus* group); in females claviform, subcylindrical in *T. americanus*.

**SPECIES GROUPS**

While studying the available specimens and literature it became evident to us that there were, at least for the American species, three different groups, defined mainly by the structure of the antennae, the shape of the pronotum and elytra, and the presence or absence of a tooth on the anterior femora of males.

*Boliviensis* Group

**DIAGNOSIS:** Antennae in both sexes claviform, segment 1 much longer than wide (figs. 2–4). Lateral borders of prothorax not or only very slightly sinuate along posteri or two-thirds. Anterior femora of males with tooth on inferoanterior border that corresponds with a narrowed portion of the tibiae. Elytra with parasutural stria distinct; apices convexly truncate.

**DISTRIBUTION:** The two species of this group are distributed in the periphery of the Amazon region in the very disjunct localities (fig. 1), at lower altitudes (200–700 m) than the species of the *americanus* group.

**SPECIES INCLUDED:** *Trochoideus boliviensis* Strohecker, 1978 (Bolivia, Perú), and *T. venezuelensis*, n. sp. (Venezuela).

**Americanus** Group

**DIAGNOSIS:** Antennae of males with segment 1 globose, not much longer than wide; segment 4 bulbous, elongated, divided by a suture into dorsal and ventral plates (figs. 5, 6, 8, 9). Antennae of females subcylindrical (*americanus*, fig. 10) or claviform (all other species, fig. 7). Lateral borders of prothorax sinuately narrowed toward base (except in *mexicanus*). Anterior femora of males without tooth on inferoanterior border. Elytra with parasutural stria distinct; apices conjointly rounded.

**DISTRIBUTION:** The five species of this group seem to be restricted to the Andean Cordillera in South America, from Peru to Sierra Nevada de Mérida, Venezuela, and from Panama to Mexico in Central America (fig. 1). Only one of the species (*T. goudoti*) has been found both in Central and South America. The known altitudinal range of the species is from 1300 to 2000 m.

**SPECIES INCLUDED:** *Trochoideus americanus* Buquet, 1840 (Colombia, Venezuela), *T. goudoti*, Guérin, 1857 (Colombia, Panama, Costa Rica), *T. masoni* Strohecker, 1978 (Colombia), *T. mexicanus* Strohecker, 1978 (México), and *T. peruvianus* Kirsch, 1876 (Perú, Colombia).

**Coeloantennatus** Group

**DIAGNOSIS:** Antennae of males with segments 3 and 4 forming a large hollow bulb with nipplelike apex (figs. 12, 13). Antennae of females of *coeloantennatus* claviform (unknown for *globulicornis*). First segment in both sexes globose. Lateral borders of prothorax not or only very weakly sinuate along
posterior two-thirds. Anterior femora of males without tooth on inferoanterior border. Elytra without parasutural stria; apices conjointly rounded.

DISTRIBUTION: The two species of this group are lowland dwellers with a very disjunct distribution (fig. 1).

SPECIES INCLUDED: Trochoideus coeloantennatus Strohecker, 1943 (Argentina), and T. globulicornis, n. sp. (Venezuela).
KEY FOR AMERICAN SPECIES
(modified from Strohecker, 1978)

Females of *T. mexicanus*, *venezuelensis*, and *globulicornis* are unknown and therefore not included.

1. Antennal segment 4 strongly thickened or anterior femora with a tooth on the inferoanterior border (males) .......................... 2
2. Pronotum with three longitudinal sulci, one central and two lateral from the middle of the laterobasal impression to anterior border .......................... *mexicanus*
3. Antennal segments 3 and 4 forming a large hollow bulb with a nipplelike apex (figs. 11, 13); parasutural stria of elytra absent 4
4. Antennal segments 3 and 4 shaped otherwise; parasutural stria present ........................................... 5
5. Antennal segments 3 and 4 together almost as long as wide (figs. 11, 12) *globulicornis*
6. Antennal segments 3 and 4 together 1.5 times as long as wide (fig. 13) *coeloantennatus*
7. Antenna claviform, segment 4 simple; segment 1 elongate, more than twice as long as wide (figs. 2, 4) .......................... 6
8. Antennae with segment 4 divided into dorsal and ventral plates; segment 1 globose, less than twice as long as wide (figs. 5, 8) .......................... 7
9. Femoral tooth on apical third of inferoanterior border (fig. 2); lateral borders of pronotum slightly sinuately narrowed from anterior third toward base; antennae thinner ........................................... *boliviensis*
10. Femoral tooth on middle of inferoanterior border (fig. 4); lateral borders of pronotum almost straight on posterior two-thirds; antennae thicker .......................... *venezuelensis*, n. sp.
11. Antennal segment 2 laterally acuminate; segment 3 laterally angulate; disk of pronotum feebly rugosely punctate at sides; apices of elytra conjointly rounded .......................... *masoni*
12. Antennal segments 2 and 3 neither acuminate nor angulate; disk of pronotum not rugosely punctate at sides; apices of elytra conjointly rounded or not ........................................... 8
13. Antennal segment 3 (dorsal view) elongate (fig. 9) ........................................... *americanus*
14. Antennal segment 3 (dorsal view) transverse (fig. 6) ........................................... 9
15. Antennal segment 4 distinctly longer than 3 ........................................... *masoni*
16. Antennal segment 4 distinctly longer than wide, longer than 4 (fig. 7) ..... *goudoti*
17. Antennal segment 3 not longer than wide, subequal in length to 4 .......................... *peruvianus*

*Trochoideus boliviensis* Strohecker, 1978
Figures 1–3, 14–16

Type locality: Bolivia: La Paz, Teopote.

**DIAGNOSIS:** *Boliviensis* group. Antennae (figs. 2, 3) 4-segmented and claviform in both sexes. Prothorax with lateral borders slightly sinuately converging from anterior third to square basal angles; midbasal impression of pronotum elongate, twice as long as wide. Tip of each elytron convexly truncated. Anterior femora of males with a robust tooth on apical third of inferoanterior border, inner margin of tooth with short bristles. Aedeagus asymmetrical (figs. 14–16).

**REDESCRIPTION:** Body reddish-brown, sometimes darker on head and prothorax, apex of legs and labial palpi lighter; antennae dark brown, except segment 4 which is completely (males) or only on apical half (females) yellowish. Teneral specimens completely and almost uniformly yellowish. Moderately short yellowish pubescence all over body and legs.

Antennae (figs. 2, 3) four-segmented in both sexes, widened toward apex; last segment evidently less sclerotized than other, with an

irregular surface, appearing membranous, especially on its distal half. Segments 1 and 2 in both sexes widened toward apex, the first longer and much more robust. Segment 3 widened from base to apex, as long as (males) or less than half (females) length of second; entire length of 4 in male as wide as apex of 3, its apex forming an obtuse angle with rounded tip, segment 4 in females gradually widening from base to near apex where sides converge forming a more or less square angle with rounded tip.

Prothorax transverse, 1.6 times wider than long, anterior third wider, which is 1.2 times wider than base. Anterior margin of pronotum concave when viewed perpendicular to vertex; lateral margins slightly sinuately narrowed from anterior third to square basal angles; basal margin straight; midbasal impression elongate, twice as long as its width at base, formed by two slightly anteriorly convergent and evanescent fine sulci, up to basal third of pronotum, separated by a slightly depressed area; basal lateral impressions narrow, fusiform, closer to midbasal impression which they almost reach, than to lateral pronotal margins. Mesosternum finely carinate longitudinally.

Elytra 1.42 (males), and 1.32 (females) times as long as their combined maximum width (at end of anterior third); 2.92 (males), and 2.70 (females) times as long as prothorax. Parasutural stria well defined, anteriorly prolonged along base of elytron where it defines a very fine carina that almost reaches humerus. Apices independently convexly truncated, with rounded sutural and external angles.

Anterior femora of males with robust tooth on apical third of anterior border; internal border of tooth with a series of very short bristles.

Aedeagus asymmetrical (figs. 14–16).

MEASUREMENTS (mm, mean values of 8 males and 8 females): Total length $\delta$ 3.50, $\varphi$ 3.20; length of prothorax $\delta$ 0.73, $\varphi$ 0.64; maximum prothoracic width $\delta$ 1.15, $\varphi$ 1.04; basal prothoracitic width $\delta$ 0.98, $\varphi$ 0.88; elytral length $\delta$ 1.94, $\varphi$ 1.72; maximum elytral width $\delta$ 1.35, $\varphi$ 1.31.

SPECIMENS STUDIED: PERU: Departamento Huanuco, Tingo María, Cueva Las Lechuzas, 700 m, 8-VII-1974, C. Bordón, (27 males, 34 females, (CCBM), 2 males, 2 females (MIZA), 1 male, 1 female (AMNH), 1 male, 1 female (NMNH); idem, Cueva de La Ventana, 14-VII-1974, C. Bordón, 10 males, 3 females (CCBM). [New country record]

In both caves (Cueva de Las Lechuzas and Cueva de La Ventana) the specimens were found on fungi, in areas of partial or total darkness. The fungi are related to the great abundance of guano from oil-bird colonies (Steatornis caripensis), locally known as “lechuzas” that live in these caves.

We first thought that our specimens belonged to a new species close to T. boliviensis Strohecker, from which it differed only in the number of segments of the female antennae, our specimens having four instead of five as stated by Strohecker (1978). To discard any doubts, we made cleared microscopic preparations of the female antennae and checked all the pinned female specimens, finding no traces of a suture indicative of a fifth segment. However, Dr. Ottó Merkl, from the Hungarian Natural History Museum, where the female allotype of T. boliviensis is deposited, studied the structure of the antennae, and informed us that “the female allotype of Trochoideus boliviensis has in my opinion, only four antennomeres, the fourth segment is large and elongate ovoid; its basal part is blackish (similar to antennomeres 1–3), the apical part is yellowish, so this segment appears as if it was two-segmented. However, I cannot recognize any kind of distinct cutting between the two, differently colored parts, so it must be one segment” (Merkl, 1993, personal commun.). Upon this evidence we concluded that our specimens belong to the species boliviensis.”

**Trochoideus venezuelensis**, new species (Figs. 1, 4, 17–19)

DIAGNOSIS: Similar to T. boliviensis, but prothorax with lateral borders almost straight along posterior two-thirds. Males with stouter antennae, 4-segmented (fig. 4), and anterior femora with tooth in the middle of inferoanterior border, without bristles. Aedeagus symmetrical (figs. 17–19).

DESCRIPTION: Male. Very similar to T. boliviensis from which it can be separated by
the following characters: Body brown; head and antennae darker; legs nad palpi lighter. Prothorax transverse, 1.6 times wider than long; anterior third 1.1 times wider than base; pronotal anterior margin concave, when viewed perpendicular to vertex; lateral borders almost straight, and slightly converging to base on posterior two-thirds. Elytra 1.3 times as long as their combined maximum width (at the end of anterior third); 3.0 times longer than prothorax. Anterior femora of males with tooth in the middle of inferoanterior border, lacking bristles on its internal border.

Aedeagus symmetrical (figs. 17–19).

**FEMALE:** Unknown.

**MEASUREMENTS** (mm, male): Total length 4.00; length of prothorax 0.72; maximum prothoracic width 1.14; basal prothoracic width 1.07; elytral length 2.14; maximum elytral width 1.72.

**TYPE LOCALITY:** VENEZUELA, Estado Bolivar, Carret. El Dorado-Sta. Elena, km 88.

**ETYMOLOGY:** The name of the species refers to the country from which it was described, Venezuela.

**SPECIMENS STUDIED:** VENEZUELA: Estado Bolivar, Carret. El Dorado-Sta. Elena, km 88, 200 m, 21-3-1977, J. and B. Bechyné, 1 male (holotype, MIZA).

**Trochoideus americanus** Buquet, 1840

Figures 1, 8–10, 26–28

**Trochoideus americanus** Buquet, 1840; 174; Gerstaecker 1858: 387, pl. 3 figs. 33–35; Strohecker 1978: 351, figs. 3, 4.

**DIAGNOSIS:** *Americanus* group. Antennae of males (figs. 8, 9) 4-segmented, with segment 1 globose, segment 2 short, widest and almost discoidal on its distal half; segment 4 almost twice as long as wide; ventral plate longer and wider basally than dorsal plate, apex rounded. Antennae of female (fig. 10) with segments 3 and 4 almost cylindrical, the latter somewhat dorsoventrally flattened and longer than combined lengths of segments 1 to 3. Prothorax with lateral borders sinuately narrowed toward base. Median longitudinal sulcus inconspicuous. Laterobasal impressions large. Apex of each elytron more or less rounded, not evidently truncated.

**Aedeagus:** As in figs. 26–28.

**REDESCRIPTION:** Body mostly reddish-brown, darker on head, pronotum, and antennae, except last segment which is very dark reddish brown, almost blackish; mandibles, palpi, humeral region, apex of femora, tibiae and tarsi yellowish. Body covered by short golden-yellow pubescence, which on the antennae is shorter, less dense, and mixed with a few dispersed, erect longer hairs.

Antennae of males (figs. 8, 9) with scapus subglobose, slightly arcuate, about 1.2 times longer than wide; segment 2 strongly transverse, and almost discoidal on distal half; segment 3, in dorsal view, widened toward apex, as long as width at base, not completely covering ventral plate of segment 4; segment 4 almost twice as long as wide, rounded at apex, divided into dorsal and ventral plates, the latter wider than the former at the base, but narrower from the basal fourth and apically exceeding the dorsal plate. Antennae of females (fig. 10) with scapus shorter than in males; segment 2 shorter than 1; segment 3 much shorter than 4; segment 4 almost cylindrical, weakly flattened dorsoventrally and longer than combined length of first three segments.

Prothorax transverse, about 1.5 times as wide as long, anterior third 1.3 times as wide as base. Pronotum without evident longitudinal medial sulcus; anterior margin almost straight, slightly concave when viewed perpendicular to vertex; lateral margins strongly sinuately narrowed from anterior third toward basal angles which are acute and externally prominent; basal margin almost straight, slightly concave at middle. Marginal bead narrow. Centrobasal impression very sharp, with rounded anterior border, about as long as wide; basal lateral impressions large, almost touching midbasal impression and marginal bead of pronotum.

Elytra about 1.5 (1.53 in males, 1.45 in females) times wider than thier combined maximum width; 3.0 (males), 2.8 (females) times longer than prothorax. Parasutural stria well defined, anteriorly prolonged along base of elytron where it defines a very fine carina that almost reaches the humera. Apices independently rounded. Anterior femora of males similar to that of females, without inferoanterior tooth.
Aedeagus symmetrical (figs. 26–28).

MEASUREMENTS (mm, mean values of 5 males and 5 females): Total length $\bar{x}$ 4.19, $\sigma$ 3.96; length of prothorax $\bar{x}$ 0.93, $\sigma$ 0.95; maximum prothoracic width $\bar{x}$ 1.41, $\sigma$ 1.39; basal prothoracic width $\bar{x}$ 1.14, $\sigma$ 1.15; elytral length $\bar{x}$ 2.84, $\sigma$ 2.64; maximum elytral width $\bar{x}$ 1.86, $\sigma$ 1.82.

SPECIMENS STUDIED: VENEZUELA: Estado Mérida, La Azulita, 5-X-1969, J. & B. Bechyne, 15 males, 8 females (MIZA), 1 male, 1 female (AMNH), 1 male, 1 female (NMNH); 2 males, 2 females (cleared) (MIZA, CCBM).

Trochoideus goudoti
Guérin, 1857
Figures 1, 5–7, 23–25

Trochoideus goudoti Guérin-Meneville 1857: 191, Type locality: Colombia, Tolima; Gorstaecker 1858: 387, 415.

Trochoideus goudoti Csiki 1910: 15; Strohecker 1978: 352, figs. 2, 10, 11.

Trochoideus americanus: Gorham 1899: 258 (not Buquet).

Trochoideus americanus: Strohecker 1953, pl. 2

DIAGNOSIS: Americanus group. Antennae of male 4-segmented, segment 2 not discoidal at apex, segment 4 with ventral plate covered by dorsal plate except at apex (fig. 6). Antennae of females 7-segmented, suture between segments 5 and 6 almost obliterated, only partially visible anteriorly (fig. 7). Prothorax with lateral borders strongly sinuately narrowed to base. Apex of elytra almost conjointly rounded.

Compared with americanus, goudoti can be differentiated by:

1. Male antennae with scapus less globose; pedicel transverse, narrower on base, but not discoidal on apical half; segment 3 transverse (twice as wide as long), wider than base of ventral plate of segment 4; segment 4 relatively wider.

2. Female antennae claviform, 7-segmented, suture between segments 5 and 6 obliterated.

3. Prothorax with anterior border of pronotum distinctly concave when viewed perpendicular to vertex; marginal bead wider, and basal angles not externally projecting.

4. Aedeagus symmetrical (figs. 23, 24), with median lobe in lateral view uniformly tapering to apex (strongly narrowed in Tia-mericanus); basal part wider, bulbous (narrower and parallel-sided in Tiamericus).

REDESCRIPTION: Body reddish brown; mandibles, palpi, humeral region, apex of femora, tibiae, and tarsi yellowish. Body covered by short golden-yellow pubescence, which on antennae is shorter, less dense, and mixed with few dispersed, erect longer hairs.

Antennae of males (figs. 5, 6) 4-segmented, scapus subglobose, slightly arcuate, 1.8 times longer than wide; segment 2 transverse, widest at apex, distal half not discoidal; in dorsal view segment 3 widened toward apex, about twice as wide as long, almost completely covering ventral plate of segment 4 below it; segment 4 almost twice as long as wide, rounded at apex, made up by a dorsal and a ventral plate, the latter completely covered by dorsal plate except at apex. Antennae of females (fig. 7) 7-segmented with scapus shorter than in males; segment 2 slightly transverse, shorter than 3; segment 3 widened from base to apex, longer than wide; segment 4 slightly transverse, shorter than 3; segments 5–7 almost twice as long as wide; suture between 5 and 6 almost obliterated, only visible anteriorly (antennae directed outwardly), suture between 6 and 7 evident but less marked than those between basal segments.

Prothorax transverse, about 1.5 times wider than long, anterior third wider, 1.2 times wider than base. Pronotum without distinct longitudinal medial sulcus; anterior margin distinctly concave when viewed perpendicular to vertex; lateral margins strongly sinuately narrowed from anterior third to square basal angles; basal border straight. Marginal bead wide. Centrobasal impression subquadrate, very sharp, with rounded anterior border, subquadrate; basal lateral impressions
large, almost touching the midbasal impression and marginal head.

Elytra about 1.3–1.4 times wider than their combined maximum width; 3.0 (males), 2.6 (females) times longer than prothorax. Parasutural stria well defined, anteriorly prolonged along base of elytron where it defines a very fine carina that almost reaches humerus. Apices almost conjointly rounded.

Anterior femora of males similar to that of females, without inferanterior tooth.

Aedeagus symmetrical (figs. 23–25).

MEASUREMENTS (mm, based on 1 male and 1 female): Total length δ 4.25, ϕ 3.76; length of prothorax δ 0.96, ϕ 0.96; maximum prothoracic width δ 1.50, ϕ 1.52; basal prothoracic width δ 1.22, ϕ 1.20; elytral length δ 2.85, ϕ 2.53; maximum elytral width δ 2.13, ϕ 1.88.

SPECIMENS STUDIED: PANAMA: Prov. Chiriqui, Calograma, 1280 m, 3 km N Boquete, 27 Sept 92, A. R. Gillogly, 1 male, 4 females (Panama National Museum); 1 male, 2 females (MIZA), 2 males and 2 females from a series intercepted in Puerto Rico, Hoboken, and San Francisco on orchids shipped from Colombia (NMNH).

Trochoideus globulicornis, new species
(Figs. 1, 11, 12, 20–22)

DIAGNOSIS: Coeloantennatus group. Antennae of male (figs. 11, 12) with segments 3 and 4 strongly globose, sub spherical, almost as wide as long. Prothorax with lateral borders straight along posterior two-thirds. Tip of each elytron conjointly rounded. Aedeagus: figs. 20–22.

DESCRIPTION: Male. Body brown; sutural border of elytra, clypeus and antennae yellowish brown, mouth parts and legs more yellowish. Antennae (figs. 11, 12) 4-segmented; segment 1 globose, 1.5 times as long as wide; 2 very short, strongly widened toward apex; 3–4 sub spherical, almost as wide as long.

Prothorax transverse, 1.7 times as wide as long, wider on its anterior third, which is 1.1 times as wide as base. Pronotum convex, without longitudinal medial sulcus, finely punctate, rugose toward the sides; anterior border concave when viewed perpendicular to vertex; lateral borders almost straight diverging from apex to end of anterior third where they are rounded; posterior two thirds almost straightly narrowing to a square and slightly posteriorly projecting basal angle; midbasal impression subquadrate, its anterior border faint; laterobasal impressions narrowly fusiform.

Scutellum strongly transverse, almost twice as wide as long. Elytra 1.8 times as long as thier combined maximum width, which is at the end of the anterior third; 3.3 times as long as prothorax. Parasutural stria absent. Apex conjointly rounded.

Anterior femora of males without tooth on inferoanterior border. Aedeagus (figs. 20–22).

FEMALE: Unknown.

MEASUREMENTS (mm, male): Total length 3.20, length of prothorax 0.66, maximum prothoracic width 1.13, basal prothoracic width 1.00, elytral length 2.14, maximum elytral width 1.15.

TYPE LOCALITY: Venezuela, Estado Bolivar, Area Experimental Caura, 45 m, 7°15'00"N, 64°57'00"W.

ETYMOLOGY: The name of the species, globulicornis, is from the Latin globulus, for small ball, and cornu, for antenna, referring to the shape of the male antenna.

SPECIMENS STUDIED: 1 male (holotype, MIZA), 9-X-1990, M. Alemán (intercept trap), from type locality, 250 m, in gallery forest.

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