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The First Record of *Orthocis* Casey (Coleoptera: Ciidae) from the Andean Region, with the Description of a Distinctive New Species

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Orthocis Casey is recorded for the first time from the Andean Region, with the description of *O. elguetai* sp. nov., for which diagnostic characters and details on the male genitalia and other external morphological structures are provided. One record of the new species, from Punta Espora (Chile, higher latitude than 52°S), constitutes the southernmost record of the family Ciidae in the world, and the first in the Subantarctic subregion. A brief discussion on morphological similarities to other species in the genus is also provided.

Key words: Tenebrionoidea, beetle, Central Chile, Subantarctic, subpolar, taxonomy

INTRODUCTION

Orthocis Casey (Coleoptera: Ciidae) comprises 43 described species and dozens of undescribed forms known from museum collections (Lawrence, 1971; Lopes-Andrade pers. obs.). *Orthocis* species occur in the following biogeographic regions (sensu Morrone, 2002), with the number of species in parentheses: Neotropical (8), Afrotropical (6), Afrotropical (6), Nearctic (5), Palearctic (15), Oriental (4), and Neozelandic (2). Blackburn (1888, 1907) has not provided detailed locality data for the two described Australian species, *O. aequalis* Blackburn and *O. leanus* Blackburn. It is therefore not possible to state whether these species belong to the Australotropical or to the Australotemperate region, or both. No *Orthocis* species has been previously recorded from the Andean, Antarctic, or Neoguinian regions.

The aim of the present work is to provide the description of *O. elguetai* sp. nov., which constitutes the first record of the genus *Orthocis* from the Andean Region and the southernmost record of the family Ciidae in the world.

MATERIALS AND METHODS

The slide preparation of the male genitalia and pregenital segments followed the protocol described by Lopes-Andrade et al. (2009). The equipment used for examination, measurement and photography of specimens and slide preparation are listed by Lopes-Andrade (2008b). The holotype (Fig. 1) was not dissected for genitalia examination. A male paratype from the type locality was dissected for slide preparation and photographing (Fig. 2, after dissection); it is cited in the description of the holotype for the purpose of illustration. Final images of the holotype (Fig. 1) were generated by combining 20 to 40 photographs in different focus using the image stacking freeware CombineZM (Hadley, 2006). Terms for

external morphology, male genitalia and pregenital segments of ciids are explained and discussed by Lopes-Andrade and Lawrence (2005) and Lopes-Andrade (2008a).

All the available specimens were measured, and the range, mean and standard deviation are given for measurements and ratios (including the holotype). Measurements of antennomeres were taken from the holotype. The following abbreviations are used for measurements and ratios: CL, length of the antennal club; EL, elytral length (median length from base of scutellum to elytral apex);

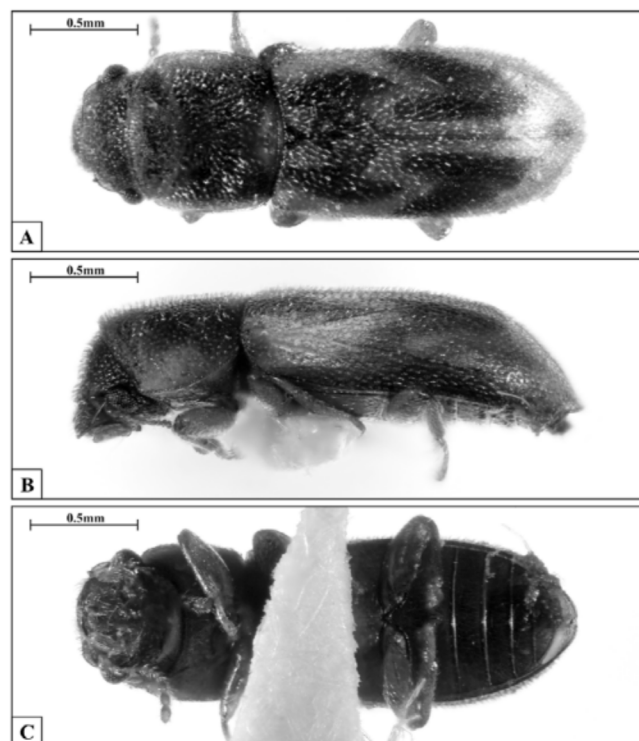


Fig. 1. Habitus of *Orthocis elguetai* sp. nov., male holotype. (A) Dorsal view. (B) Lateral view. (C) Ventral view.

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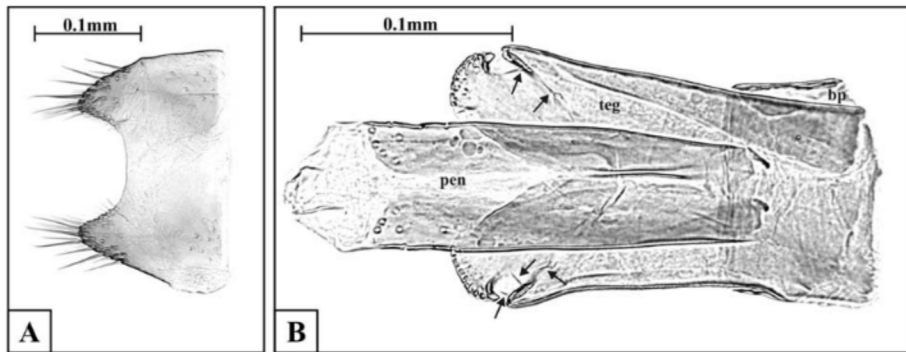


Fig. 2. Male genitalia and pregenital segment of *Orthocis elguetai* sp. nov., paratype from the type locality (Reserva Nacional Los Queules, Cauquenes, Chile). (A) Eighth sternite. (B) Genitalia showing the basal piece (bp), penis (pen) and tegmen (teg). Note the conspicuous setae at the apical portion of the tegmen (arrows).

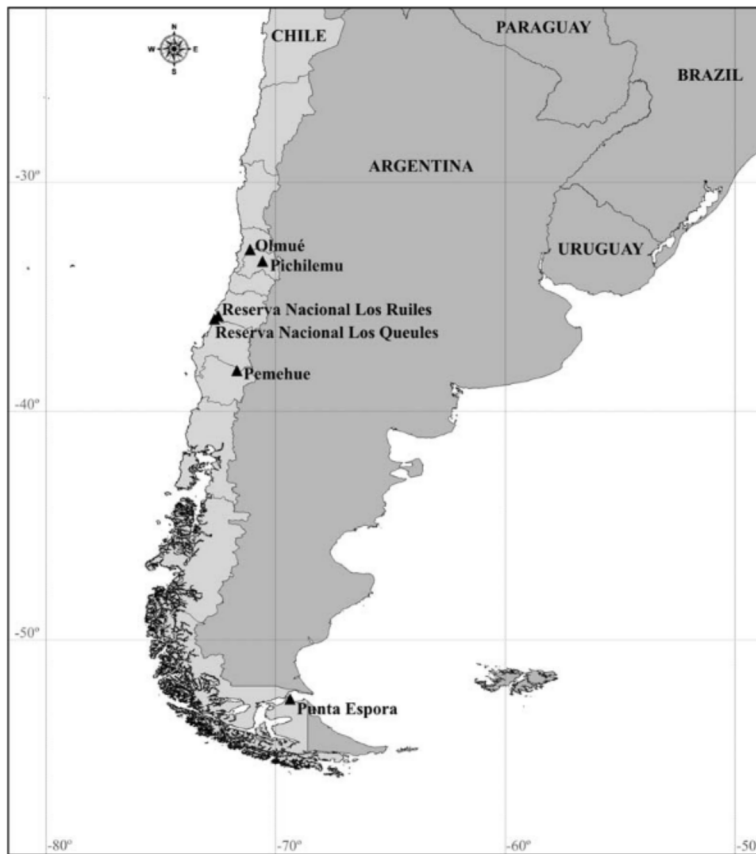


Fig. 3. Distribution map of *Orthocis elguetai* sp. nov., in which Chile is marked in light gray and subdivided into administrative regions. The remaining areas of southern South America are marked in dark gray and divided into countries. The type locality is Reserva Nacional Los Queules (Cauquenes), the unique locality where two specimens were collected. Only one specimen is known from each of the other localities. Quillota was plotted as Olmué.

EW, greatest elytral width; FL, length of the antennal funicle; GD, greatest depth of the body; PL, pronotal length along midline; PW, greatest pronotal width; TL, total length (including head measured from above). The ratio GD/EW was taken as an indication of degree of convexity; TL/EW indicates degree of body elongation. The description is based on the holotype, which is a fully pigmented male. Differences among paratypes are given in the section on

"Variation", together with standard measurements and ratios of the type series.

The distribution map (Fig. 3) was created using latitude and longitude coordinates estimated by tracking the localities in the freeware Google Earth 5.1 (Google Earth, 2009) and plotting them in a map using the freeware DIVA-GIS 7.1.6 (Hijmans et al., 2001).

The following acronyms are used in this paper:

LAPC	Cristiano Lopes-Andrade Private Collection (Viçosa, MG, Brazil)
MNNC	Museo Nacional de Historia Natural (Santiago, Chile)

Orthocis elguetai sp. nov. (Figs. 1–3)

Etymology

The specific epithet is in honor of Mario Elgueta, curator of Coleoptera of the MNNC. All the known specimens of this new species were found among the ciids loaned by MNNC.

Diagnosis

Orthocis elguetai sp. nov. can be distinguished from the other species of the genus by its elongate body with subparallel lateral margins, dense vestiture of short stout bristles, the coloration pattern of the dorsal surface, and the morphology of the male genitalia as described below.

Description

Holotype. Male, measurements in mm: TL 2.37; PL 0.74; PW 0.79; EL 1.47; EW 0.84; GD 0.63. Ratios: PL/PW 0.93; EL/EW 1.75; EL/PL 2.00; GD/EW 0.75; TL/EW 2.81. Body (Fig. 1) elongate, somewhat explanate; dorsal surface bicolored, from dark brown to yellowish pale; antennae, mouthparts, legs, and other ventral sclerites mostly dark to yellowish brown; dorsal vestiture consisting mostly of short stout bristles that can be seen even at low magnification (16X); ventral vestiture consisting mostly of slender setae. Head with vertex brown, simple, slightly convex; punctures course, shallow, usually separated from each other by a distance of one puncture width or so; interstice between punctures smooth, shiny; vestiture single, each puncture bearing an yellowish short stout suberect bristle, frontoclypeal region yellowish brown, with corners rounded and weakly raised, covered with suberect bristles, slightly more robust than those on vertex. Each eye with a diameter of 0.134 mm. Each

antenna bearing ten antennomeres; left antenna (FL 0.268 mm; CL 0.207 mm; CL/FL 0.773) with lengths of antennomeres (in mm) as follows: 0.098; 0.049; 0.098; 0.061; 0.037; 0.037; 0.061; 0.061; 0.085. Pronotum subquadrate, with the anterior portion bearing a conspicuous yellowish pale stripe bordering the margin and extending to two-thirds

of each lateral border; posterior margin bordered by a narrow yellowish pale stripe that does not reach the postero-lateral corners; anterior margin weakly rounded; lateral margins narrow, slightly explanate, finely crenulate, visible for their entire lengths from above; each anterior corner sub-acute and slightly produced forwards; punctation coarse, each puncture separated by a distance about one-puncture width from each other and bearing a stout yellowish sub-erect bristle; interstice between punctures smooth, shiny. Scutellum small, rugose, subpentagonal, glabrous; basal width 0.085 mm. Elytra bicolored, with lateral margins sub-parallel at basal three-fourths, then converging and forming a moderately acute apex; sutural flange diverging near apex; anterior portion with a robust and somewhat M-shaped dark mark, consisting of three dark stripes extending from the base to near the middle of the elytra, the outer stripes being longer than the median stripe; median-posterior portion with two somewhat V-shaped dark marks, one at each side; narrow dark stripe bordering each lateral margin; punctation, interstice between punctures and vestiture similar to those on pronotum. Prosternum slightly convex, finely granulate. Metaventricle finely granulate, unpunctate and glabrous; discrimen conspicuous, extending from the posterior margin to the middle of the metaventricle. Abdominal ventrites sparsely punctate, each puncture bearing a slender yellowish decumbent seta; interstice finely granulate; first abdominal ventrite bearing a longitudinally suboval sex patch, densely setose, its greatest diameter one-third the length of the ventrite at midline. Male genitalia and pregenital segment (in a paratype). Posterior portion of the eighth sternite (Fig. 2A) with a deep U-shaped emargination. Tegmen (Fig. 2B) subquadrate, as long as penis; apical portion with a V-shaped median emargination, reaching the apical one-third of the structure and forming two lateral lobes; outer side of each lateral lobe bearing a small excavation with conspicuous setae inside (Fig. 2B, arrows). Penis elongate, subcylindrical; apical one-fifth membranous, subtriangular. Females. Similar to males, but devoid of the abdominal sex patch.

Type series

Holotype. (MNNC), Chile:/CHILE Cauquenes Reserva Nacional Los Queules, 26 Dic. 2000 Leg. M. Guerrero/Sobre Olivillo/Orthocis elguetai Lopes-Andrade HOLOTYPUS [printed on red paper]. Paratypes. Chile: 1 (LAPC, dissected), same data as holotype; 1 (MNNC)/Pemehue Ene - 1896; 1 (MNNC)/MAGALHANES PTO. ESPORA D. LANFRANCO [handwritten] 19 [printed]/PTO. ESPORA XII MUESTR[A?] [sic; handwritten]; 1 (LAPC)/Cauquenes Res. Nac. Los Ruiles 21 Ene. 2003 M Guerrero Colección M Guerrero; 1 (MNNC)/CHILE, CARDENAL CARO Tanumé (N Pichilemu) 1-Noviembre-1991 leg. M. Elgueta; 1 (MNNC)/VALPARAISO Co La Campana 12-3-1979 [handwritten] J. Solervicens [printed] EX BOSQUE HIGROFILO 1000 m [handwritten]/Cisidae [handwritten]. All paratypes distinguished labeled/Orthocis elguetai Lopes-Andrade PARATYPUS [printed on yellow paper].

Variation

Measurements in mm (n = 7, including the holotype): TL 2.21–2.53 (2.38 ± 0.12); PL 0.63–0.74 (0.68 ± 0.04); PW

0.58–0.79 (0.68 ± 0.10); EL 1.42–1.79 (1.55 ± 0.12); EW 0.63–0.84 (0.74 ± 0.10); GD 0.58–0.68 (0.64 ± 0.04). Ratios: PL/PW 0.86–1.27 (1.02 ± 0.18); EL/EW 1.75–2.83 (2.15 ± 0.45); EL/PL 2.00–2.62 (2.27 ± 2.20); GD/EW 0.73–1.08 (0.89 ± 0.16); TL/EW 2.80–4.00 (3.30 ± 0.60).

Besides these variation in measurements, the lightest colors of the dorsal surface vary from light brown to yellowish pale. The paratype from Valparaíso (Fig. 3, Olmué) has a brown pronotum without conspicuous stripe bordering the anterior margin; the elytra is mostly yellow, with the basal M-shaped mark almost indiscernible, consisting of one small black spot on each side and narrow black stripes; the median V-shaped mark on each side barely visible, consisting of one dark stripe in the inner side of each "V", near the elytral suture, and one indiscernible dark stripe on each outer side. In the paratype from Cardenal Caro (Fig. 3, Pichilemu) the M-shaped elytral mark is almost indiscernible. In the paratype from Pemehue, the lightest dorsum areas are yellowish brown. In the paratype from Magallanes (Fig. 3, Punta Espora) the darkest areas of the dorsum surface are almost black, rather than brown; the lightest areas are yellowish brown; the stripes forming the M and both V-shaped marks of the elytra are larger than those in the other paratypes.

DISCUSSION

The description of *O. elguetai* sp. nov. constitutes the first record of *Orthocis* from the Andean region. The available records for this new species are from the Central Chilean (Santiago province) and Subantarctic (Maule and Magellanic provinces) subregions, suggesting a distribution throughout the western Andean region (Fig. 3). Currently, there is no record from the Patagonian subregion. The new species also constitutes the southernmost record of the family Ciidae, since the sole specimen from the Magellanic province was collected at a higher latitude than 52°S. The previous southernmost records of Ciidae were from New Zealand, at latitude 45°S, and consisted of three species described from Taieri: *Cis piciceps* Broun, *C. picturatus* Broun and *Xylographus fultoni* (Broun). This present finding shows that ciids may survive in extremely cold areas under subpolar climate.

Most of the information on the *Orthocis*, mainly the ones from the South Hemisphere, is from incomplete original descriptions. Therefore, the only conspicuous features that allow a comparison of the species currently included in the genus are the pronotal and elytral coloration pattern, and the body shape, dorsal vestiture and punctation. There are eight *Orthocis* species described as possessing each antenna with ten antennomeres, and bicolored elytra with pale or yellowish areas alternated with black spots or stripes: *O. auriculariae* Lawrence, *O. guamae* (Zimmerman), *O. huesanus* Kraus, *O. mnigrum* (Champion), *O. ornatus* (Reitter), *O. pulcher* Kraus, *O. sagittiferus* Israelson, and *O. wollastonii* (Mellié). However, in *O. mnigrum*, *O. ornatus* and *O. wollastonii*, the body is oblong-ovate and the dorsal surface glabrous or subglabrous. In *O. guamae*, the body is slightly ovate and the dorsal surface subglabrous. In *O. auriculariae*, the elytral sides are relatively straight, as in *O. elguetai* sp. nov., but the dorsal vestiture is barely visible. Both *O. huesanus* and *O. pulcher* have completely glabrous dorsal surface. Therefore, the species which most resembles

O. elguetai sp. nov. in external features is *O. sagittiferus*, from the Canary Islands. The male genitalia of the latter species is structurally very similar to the one of *O. elguetai* sp. nov., as can be observed in the figure provided in the original description (Israelson, 1979). However, *O. sagittiferus* has the dorsal surface mostly yellow to yellowish pale, with three longitudinal black stripes in the pronotum and small, interconnected black spots in the elytra, comparatively denser dorsal vestiture and finer punctation.

A recent examination of a large series of Chilean Ciidae indicates that there is no species shared between the Neotropical and Andean Ciidae faunas (Lopes-Andrade pers. obs.). At least three genera regarded as possessing a Neotropical distribution, *Falsocis* Pic, *Phellinocis* Lopes-Andrade and Lawrence and *Porculus* Lawrence, are not found in the Subandean and Andean regions (Lawrence, 1987; Lopes-Andrade and Lawrence, 2005; Lopes-Andrade, 2007b). Other genera with broader distributions also occurring in the neotropics, such as *Malacocis* Gorham, *Scolytocis* Blair and *Xylographus* Mellié, are also absent from the Andean region (Lopes-Andrade, 2007b, 2008b). Recently, I described two species in the genus *Neoapterocis* Lopes-Andrade, one from Chile and the other from Mexico. However, a recent examination of additional *Neoapterocis* specimens from Chile, including undescribed species, shed doubts on the limits of the genus, which would possibly be split in two taxa: one Neotropical, with one known species from Mexico; and the other Andean, with one described and a few undescribed forms from Chile (Lopes-Andrade pers. obs.).

Species of *Orthocis* are known to feed and breed almost exclusively in *Auricularia* and *Exidia* basidioms, and they are the only members of the *Auricularia* host-use group (sensu Orledge and Reynolds, 2005). There is no data on host fungi for *O. elguetai* sp. nov. However, the two specimens of the type locality were collected over "Olivillo", which possibly refers to *Aextoxicon punctatum*, a large evergreen tree endemic to the Valdivian temperate rain forests and Magellanic subpolar forests in Chile. *Orthocis punctatus* (Mellié), although most frequently found in basidioms of *Auricularia auricula*, is also collected by beating branches and beneath tree bark (Lawrence, 1971). However, it is still not clear whether *O. elguetai* sp. nov., *O. punctatus* and other ciid species breed outside a fungus body or are sometimes collected while dispersing between basidioms (Lopes-Andrade, 2007a).

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