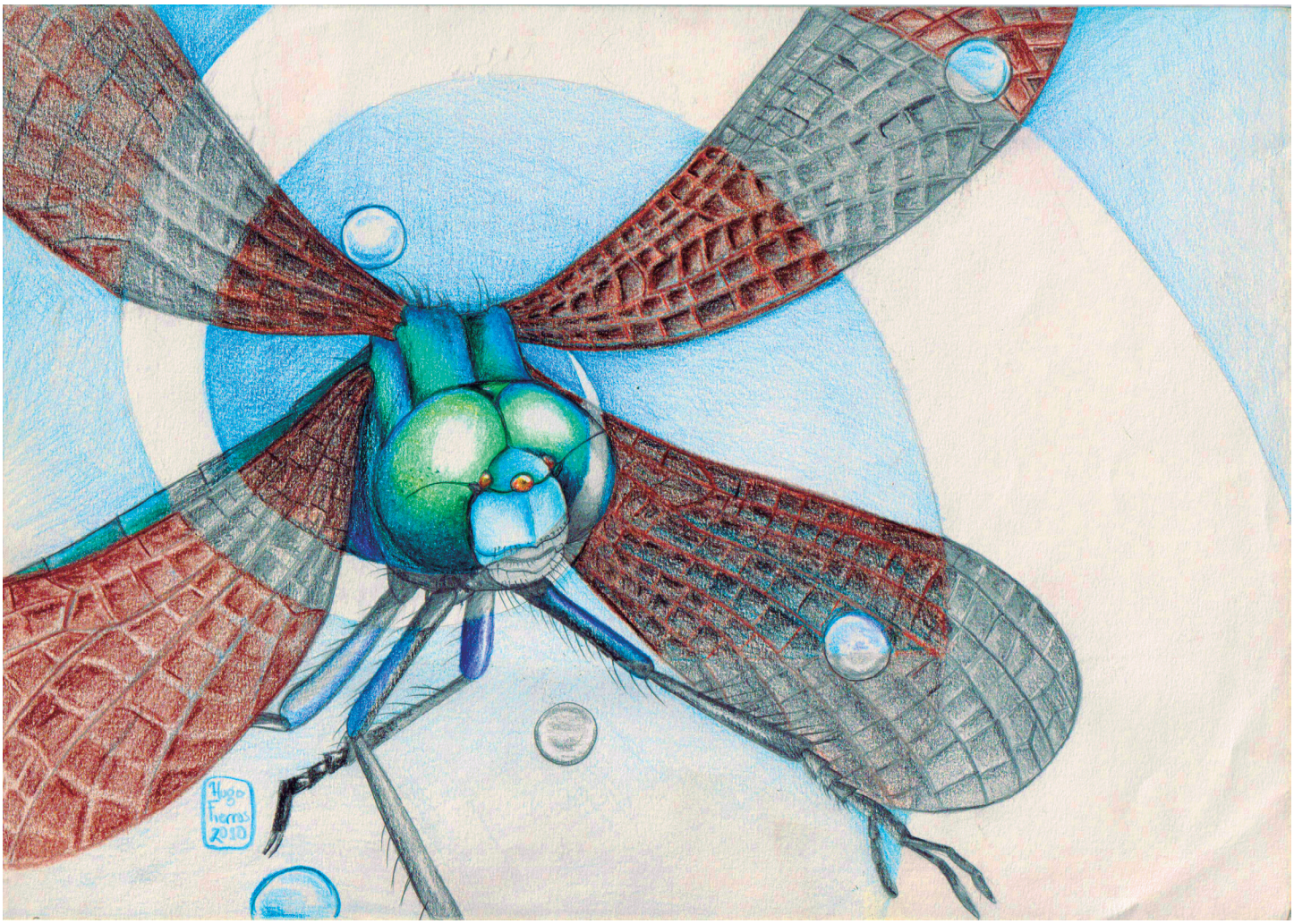

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Description of the male of *Parathyridium sulcatum* (Ohaus, 1905) (Coleoptera: Scarabaeidae: Rutelinae)

Descripción del macho de *Parathyridium sulcatum* (Ohaus, 1905) (Coleoptera: Scarabaeidae: Rutelinae)

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ABSTRACT

The male of *Parathyridium sulcatum* is described for the first time, and its first precise distributional record is presented. A map pretending to clarify the distribution of the species in the genus *Parathyridium* is also presented.

Keywords: Andean forest, Distribution, Neotropics, Scarab.

RESUMEN

El macho de *Parathyridium sulcatum* es descrito por primera vez y su primer registro de distribución preciso es presentado. Un mapa pretendiendo clarificar la distribución de las especies en el género *Parathyridium* también es presentado.

Palabras clave: Bosque andino, Distribución, Neotrópico, Escarabajo.

Though to being recognized as not monophyletic based on internal and external morphological characters of adults (Jameson 1997), the anticheirine scarabs were posteriorly still considered as a subtribe of Rutelini (Scarabaeidae: Rutelinae) (Soula 1998). This Neotropical group currently comprises more than 500 species and 40 genera, most of which were poorly described by Soula (1998, 2002a, 2002b, 2003, 2005). In this way, many genera are apparently not monophyletic, but there is no phylogenetic approach on this group of scarabs and those are suppositions until a correct assessment takes place. Nevertheless, Soula's works represent almost the only available tool to study the group (Moore et al. 2014), and plus the rarity of specimens in collections, is difficult to develop taxonomic treatments in the anticheirine genera.

The genus *Parathyridium* Ohaus, 1915 was described to place two species previously classified by himself, Ohaus, in the genus *Dorysthetus* Blanchard, 1851, *Parathyridium microcephaloides* (Ohaus, 1905) and *Parathyridium sulcatum* (Ohaus, 1905), and then himself also described *Parathyridium collare* Ohaus, 1938 in the genus. These three species are known exclusively from Colombia (Soula 2002a,b), but their precise distributions are unknown and the male of one species remains unknown (Soula 2002a,b). A description of the male, precise distributional record, and notes on the biology of *P. sulcatum* are provided, along with a map intended to show the distribution of the species in the genus.

MATERIALS AND METHODS

The male of *Parathyridium sulcatum* was compared with specimens of *Thyriochlorota* sp. and *Parathyridium* sp. Examined specimens are deposited at the Sección de Entomología, Colecciones Biológicas, Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, at Villa de Leyva, Boyacá, Colombia (**IAvH-E**). Photographs of the specimen were taken with a camera Canon EOS 5d Mark III in conjunction with a macro lens Canon EF 100 mm f/2.8, while those of aedeagus using a stereomicroscope Leica S8 APO with a camera Leica MC190HD. Distributional records were obtained from literature and the map was elaborated in ArcMap 10.0. Images were cleaned and arranged into plates using Photoshop v.21.2.0.

RESULTS

Scarabaeidae: Rutelinae: Rutelini: *Parathyridium* Ohaus, 1915

Parathyridium collare Ohaus, 1938

Records from literature: [Colombia], Tolima (Soula, 2002a,b).

Distributional remarks: the department of Tolima comprises areas of the Magdalena valley and the central Andes of Colombia, the species is probably distributed in the later (Figure 1A).

***Parathyridium microcephaloides* (Ohaus, 1905)**

Records from literature: **[**Colombia], Bogotá (type); [Colombia], Cauca (neoallotype?); [Colombia, Caldas], Manizales; Colombia occidentale (Soula 2002a,b).

Distributional remarks: there are a lot of examples of older specimens collected in Colombia attributed to the capital city of the country, Bogotá D.C. However, other precise localities in literature suggest a distribution of the species in the central and western Andes of Colombia, as the department of Cauca and the municipality of Manizales (in the department of Caldas) (Figure 1A).

***Parathyridium sulcatum* (Ohaus, 1905)**

Examined material: 1♂ Colombia, Santander, Tona, El Carajo; Andean forest; 07°8'48.89"N 73°1›49.87»W, 2325 m., Manual collect, 2018/06/18 - 06:45hrs, D. F. Silva Tavera. (IAvH-E-219238).

Male description (Figures 2, 3B,E**)**: *Body shape*: length 19.39 mm; width 10.15 mm. Oval, stout. Elytral disc convex. *Coloration* (Figures 2A-C): head, pronotum and scutellum greenish brown. Pronotum strongly convex, with greenish yellow margins, surface with punctures slightly dense. Elytra metallic green. Pygidium dark brown with metallic green sheen. Abdominal sternites dark brown with green metallic sheen. Sternum dark brown with metallic green sheen. Legs yellow, with metallic green. *Head* (Figure 3B): mandibles with two teeth on the external face separated by a notch, inner tooth truncated apically; labrum apically truncate with a central projection. Clypeus trapezoidal, ratio width/length 2. Clypeus bordered at anterior margin, surface densely punctated. Frons punctate, with similar punctures as in clypeus and with secondary small punctuation; sometimes slightly concave on disc. Vertex with same punctuation as frons, but less densely distributed. Ocular canthus short and narrow, apex rounded. Eyes rounded, interocular ratio (interocular width/width of eye) 2.26. Antennae with ten segments, the last three segments modified as a lamella. *Pronotum*: anterior margin bordered laterally, widely interrupted at middle. Lateral margins rounded, bordered. Anterior angles acute and rounded; posterior angles obtuse and rounded. Posterior margin not bordered, sinuated, slightly projected posteriorly at middle forming a nearly convex line above the scutellum. Surface with dense punctures and densely covered with short blonde setae (not evident to the naked eye). *Scutellum*: shape subtriangular, slightly blunt apex; with sparse punctures, slightly denser at sides. *Elytra*: surface with 12 slightly dense punctured longitudinal costae (excluding lateral margin), defined by sulcate rows of scattered punctures. Second and third striae (defining third costa) somewhat irregular at the base of the elytra. Apex of the elytral suture rounded. Lateral margin convex, tapering gradually from base to apical third, disappearing at the apex. Marginal membrane absent. Whole surface covered with microsetae (not evident to the naked eye). *Pygidium*: strigate-imbricate. Setae on disc absent, but longer on margins. Triangular shape, with rounded apex; in lateral view, the apex slightly globose. *Metasternum*: disc slightly concave, with long tawny setae, scattered medially, very dense on sides. Mesosternal process very long, projecting up to the protochanter, apex rounded; in lateral view, reflexed, widening apically, but blunt at very apex (Figure 3E). Mesometasternal suture present, metasternal sulcus projecting beyond to mesotrochanters. *Abdominal sternites*: with dense punctures, medially with a single row of long tawny setae (except the eighth sternite), laterally with densely distributed setae; length of all sternites similar. Eighth abdominal sternite with the apex notched at the middle. *Protibia*: with 3 teeth, slender; apical tooth short, curved, and acute. Apical and middle teeth contiguous, the third tooth more separated to the second than the distance between the previous two. *Metatibia*: slender, fusiform, edge with row short, stout setae. *Claws of legs*: all external claws slightly curved, bifurcated; internal claw complete, not bifurcated, with acute apex. *Male genitalia*: Aedeagus (Figures 2D,E): parameres short, fused, nearly rectangular in lateral view; the very apex divergent. Phallobase 1.5 times longer than parameres, apodeme of phallobase with two tubercles near to base of phallobase slightly separated (Figure 2D).

Variation and sexual dimorphism: Based on the female's redescription (Soula 2002a) and available images (Soula 2002b), we were unable to detect notorious differences related to sexual dimorphism. However, the male described here is slightly longer and wider than previous reports for female specimens (16-18 mm and 9-10 mm, respectively).

Bionomics: The specimen was collected after it hit an object in the morning (06:45), which suggests a daytime activity. The area where this species was recorded is part of a heterogeneous landscape partially used for crops, the remaining area is constituted by remnants of forest that are subject to conservation (Figure 1B). The locality is in the Andean forest below the Santurban paramo (Figure 1A)**.**

Records from literature: [Colombia], Caucathal (type); [Colombia, department of Cundinamarca or Cauca], La Vega (Soula 2002a,b).

Distributional remarks: the locality 'cuacathal' is probably to refer to the department of Cauca. La Vega matches with the name of two municipalities in Colombia at the departments of Cauca and Cundinamarca, and both could be probably right. La Vega, Cundinamarca, is on the same slope of the locality where the male here described was collected in the eastern Andes of Colombia (Figure 1A); but also, La Vega is a municipality in the Cauca department, which is probably the locality to what Caucathal refers to (Figure 1A).

Taxonomic remarks: the fused parameres are dorsally raised over the midline from base to almost the apex. This elevated area is delimited medially on each side by an oval more translucent area, which is similar to the aedeagus of *Thyriochlorota castanipennis* (Ohaus, 1905),

Thyriochlorota jordani (Ohaus, 1905), *Thyriochlorota lassalei* Soula, 2002, and *Thyriochlorota villosa* (Ohaus, 1908).

Also, the shape of the labrum, mandibles, and the mesosternal projection is more related with the examined specimen of *Thyriochlorota*, than the specimen of *Parathyridium* (Figure 3). The labrum is apically truncate with a central projection (Figure 3B) (similar to the head draw of *T. villosa* presented in Soula 2002a), not emarginated over the anterior edge as occur in the *Parathyridium* specimen (Figure 3C). The mesosternal process is more thick before the apex than in the Parathyridium examined specimen (Figure 3E, F), in which is continuously narrowed (Figure 3D).

Parathyridium sp.

Examined material: 1♀ Colombia, Nariño, Pasto, Vereda Santa Teresita; Forest; 01°04'58.4"N 77°06›51.2»W, 2880 m., Manual collect, 2012/03/31, D. Martínez. (IAvH-E-219230).

Taxonomic remarks: the species is apparently closely related to *P. collare* given the pale yellow lateral portions of pronotum (Figure 3A), however, just one female was available to the study and we were unable to compare it with the type specimen of the mentioned species.

DISCUSSION

The morphological pattern of aedeagus of *P. sulcatum*, as well as the shape of the mouthparts (mandibles and labrum) and the mesosternal projection (Figure 3), seems to be more related to some species of the genus *Thyriochlorota* than to its congeners. However, future studies dealing with these aspects in these beetles are necessary to confirm the position of *P. sulcatum* in the genus *Parathyridium* or its transference to the genus *Thyriochlorota*. Moreover, Ohaus distinguishes *Parathyridium* from *Thyriochlorota* based only in the deep elytral striae in the former, without a detailed exploration of the mouthparts (Ohaus, 1915); posteriorly, Soula (2002a) mentioned the probably synonymy of both genera, however, we suggest based on a superficially exploration of few morphological features, that at least *Parathyridium* is valid but probably not monophyletic as is defined nowadays.

Species of the genus *Parathyridium* are rare and scarce in Colombian entomological collections, which is a common feature for most of the Anticheirine beetles in the country. The known few localities for the three species are imprecise, some probably even wrong, but main conclusion based on the precise records given here is that species of the genus are distributed in forest of Andean localities, as was previously commented by Soula (2002a) and also have been reported for other Rutelini species in Colombia (López-García et al. 2015).

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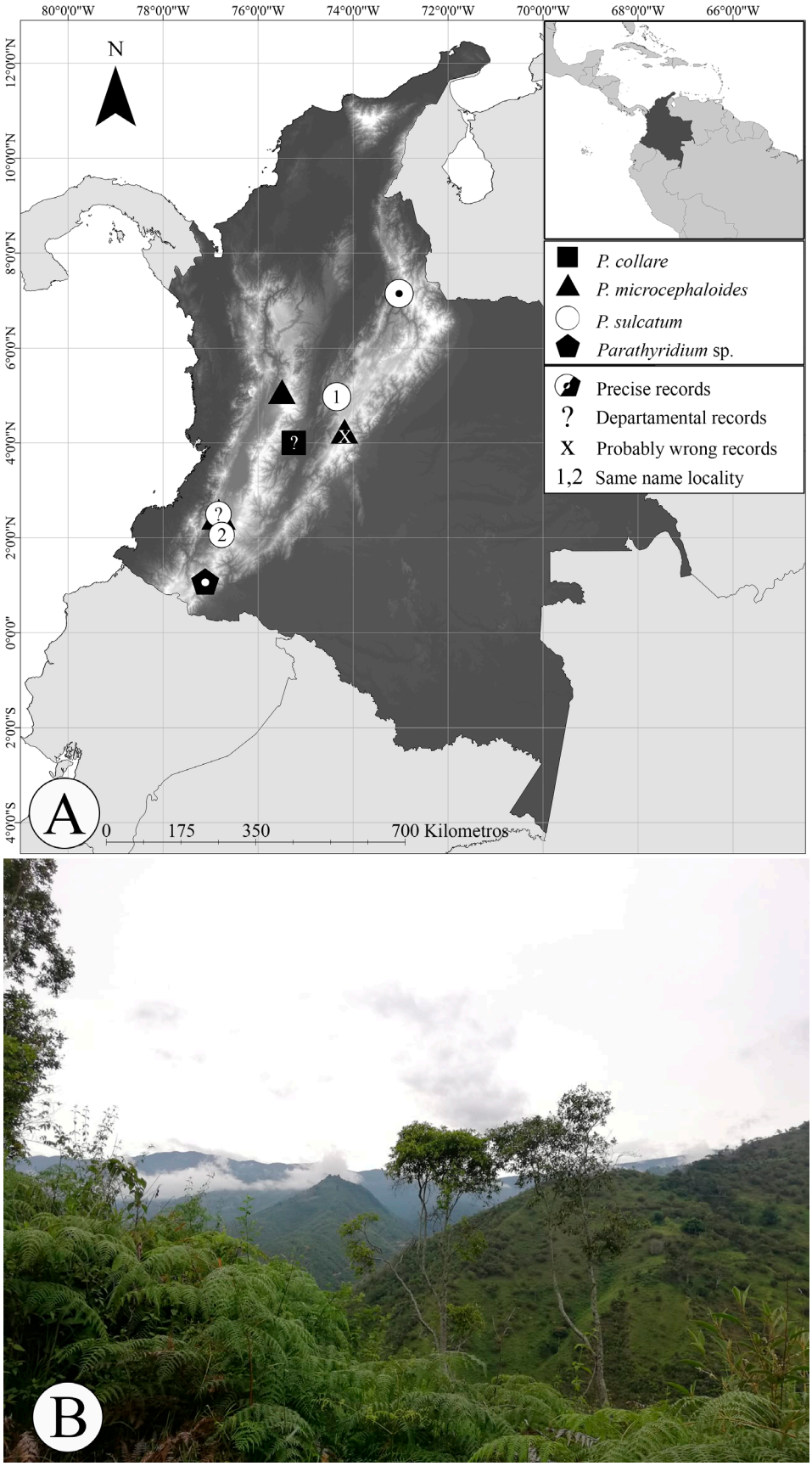

Figure 1. A. Distribution of *Parathyridium* species. B. Habitat of *Parathyridium sulcatum* (Ohaus, 1905) at Tona, Santander, Colombia (Photo by Daniel F. Silva-Tavera).

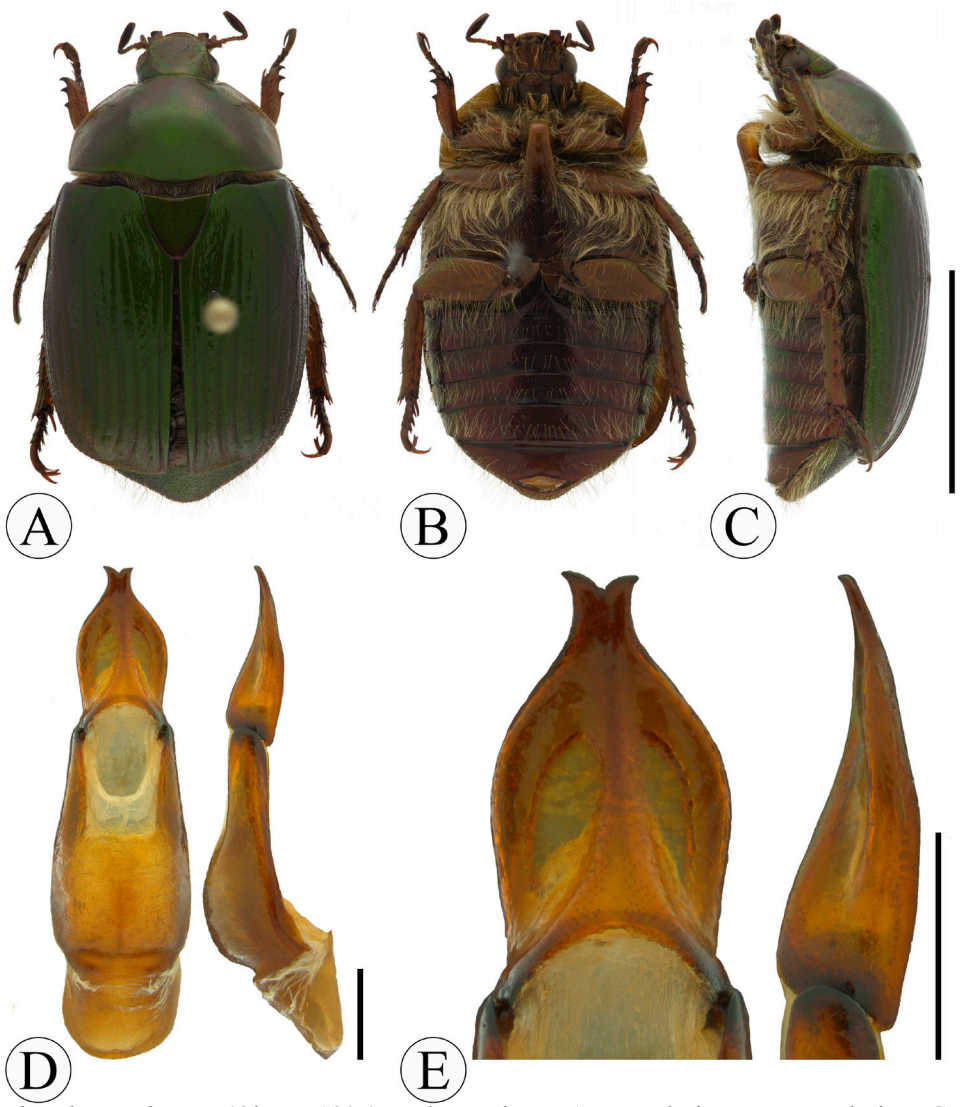

Figure 2. *Parathyridium sulcatum* (Ohaus, 1905), male specimen. A. Dorsal view. B. Ventral view. C. Lateral view. D. Aedeagus. Scale bar A, B, C: 1 cm; D, E: 0,5 cm.

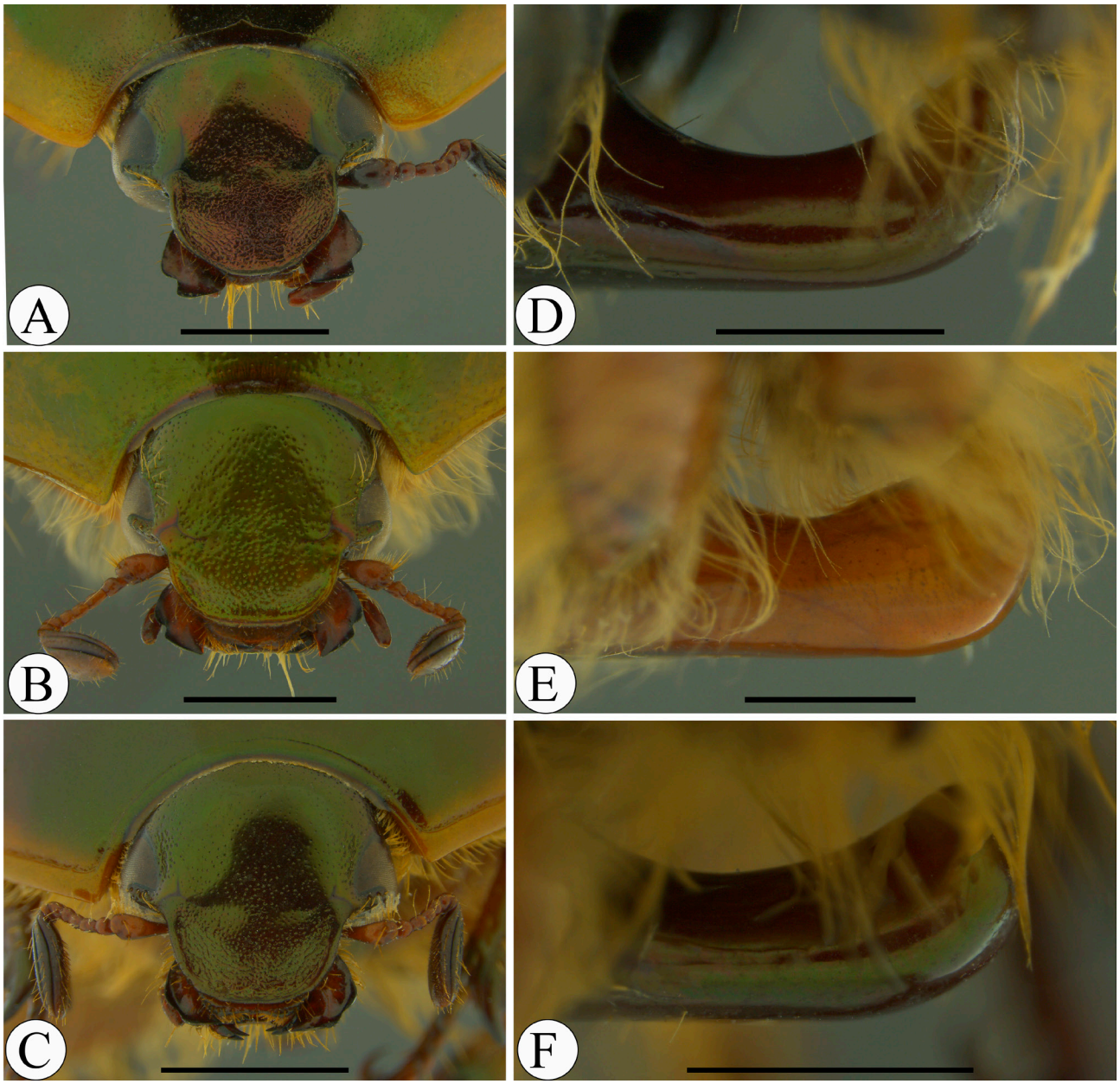

Figure 3. Morphological comparison. A. Head in dorsal view of *Parathyridium* sp. (Nariño, Colombia). B. Head in dorsal view of *Parathyridium sulcatum* (Ohaus, 1905). C. Head in dorsal view of *Thyriochlorota* sp. (Risaralda, Colombia). D. Mesosternal projection in lateral view of *Parathyridium* sp. (Nariño, Colombia). E. Mesosternal projection in lateral view of *Parathyridium sulcatum* (Ohaus, 1905). F. Mesosternal projection in lateral view of *Thyriochlorota* sp. (Valle del Cauca, Colombia). Scale bar A, B, C: 2 mm; D, E, F: 1 mm.

