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Description of the female of *Phileurus bucculentus* Ohaus, with new country records and remarks for *Phileurus carinatus* Prell (Coleoptera, Scarabaeoidea, Dynastinae)

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Abstract. The female of *Phileurus bucculentus* Ohaus, 1911 is described for the first time. It is compared with the male and also with the females of *Phileurus carinatus* Prell, 1914, with which it can be confused. Additional data for *Phileurus carinatus* are provided with four **new country records** for Guyana, Colombia, Peru and Argentina, and its taxonomic status is reviewed.

Key Words. Insecta, Melolonthidae, new records, Phileurini, Pleurosticti.

Introduction

The genus *Phileurus* Latreille, 1807 comprises 31 species distributed from the central United States south to southern South America. The last treatments of the genus were made by Endrödi (1978, 1985), and after this 11 species were described by subsequent authors (Ratcliffe 1988; Lamant-Voirin 1995; Dechambre 1996, 1998; Dupuis 2004; Ratcliffe 2011). The genus is traditionally divided into two species groups, those with tridentate protibiae and those with quadridentate protibiae. This last group was recently reviewed by Ratcliffe (2011) and comprises only five species. The group containing the species with three teeth is in need of revision, as some species are clearly misidentified in collections because they lack distinctive characters with which to correctly name the specimens, especially for females. The only revision within this group was provided by Dupuis (2004) for the "*angustatus* group".

The purpose of this paper is to give more information about two Neotropical species, *Phileurus carinatus* Prell, 1914 from Central and South America, and *Phileurus bucculentus* Ohaus, 1911 from South America. The unknown female of *P. bucculentus* is described, and new country records are reported for *P. carinatus*. *Phileurus bucculentus* is known only from Argentina, and recent collections are only from local collectors and with poor data. *Phileurus carinatus* has a variation in some countries of northern South America, that Endrödi (1978) called *P. carinatus declivis* Prell. Here we present further taxonomic remarks about these populations.

Material and methods

We were able to examine several specimens, including the type specimens of *Phileurus carinatus* Prell and *P. declivis* Prell, from the following institutional and private collections:

DZUP — Coleção Pe. Jesús Santiago Moure, Universidade Federal do Paraná, Curitiba, Brazil;
EPGC — Everardo and Paschoal Grossi Collection, Rio de Janeiro, Brazil;

FDC — Fabien Dupuis Collection, Saint-Chamond, France;
HNHM — Hungary Natural History Museum, Budapest, Hungary;
IRSNB — Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium;
JPSC — Jochen-Peter Saltin Collection, Niedernhausen, Germany;
MNHN — Muséum National d'Histoire Naturelle, Paris, France;
UNSM — University of Nebraska State Museum, Lincoln, NE, U.S.A.;
ZMHB — Museum für Naturkunde, Humboldt Universität, Berlin, Germany.

***Phileurus bucculentus* Ohaus, 1911**
(Figures 1–2)

Phileurus bucculentus Ohaus, 1911: 171

Female description. Length: 32 mm, width: 16 mm (Fig. 2A–H). Color dark brown, pronotum darker. Head: Surface wrinkled, except horns; hollow of vertex deep and wide, almost as wide as interocular width. Lateral horns subconical and moderately developed; clypeus triangular, laterally slightly impressed, apex acute, sharply reflexed. Frontal carina weakly marked between frons and vertex. Interocular width equals 5.5 transverse eye diameters; antennae 10 segmented, club as long as segments 2–7. Mandibles slender and narrow, arcuate on external edge, apex slightly bifurcated on internal view, acute; in ventral view just before apex with a small incision and tooth just before apex. Pronotum: Form narrower than elytra width; median, longitudinal furrow narrow, extending from near base to past middle joining to a deep and somewhat wide fovea. Furrow with fine, C-shaped punctures from base to apex, punctures becoming coalescent and then wrinkled in fovea and laterally. Sides punctate posteriorly; punctures decreasing in size and density from apex to base. Strong tubercle projecting forward just above anterior margin. Surface on anterior angles wrinkled, all margins complete. Elytra: Surface finely punctate with 11–12 rows of moderately sized, ocellate-umbilicate punctures, not equidistant from one another. Rows separated from each other by 3–4 puncture diameters. Intervals almost impunctate, surface flat. Pygidium: Surface finely punctate, punctures becoming denser near anterior margin; punctures fine; surface weakly convex on disc and slightly concave laterally. Legs: Protibiae tridentate, teeth acute, basal tooth wider, smaller, and laterally directed. Meso- and metatibiae with distal tooth obliquely truncate. Venter: Prosternal process large, subtriangle with a rounded apex, and with a transverse carina just before middle. Metasternum covered with long, dense setae.

Males (Fig. 1A–I). The males differ from females especially in the stronger development of the frontal horns that are at least twice the size of those of the female. Also, the pronotal fovea and tubercle are deeper and larger. The pygidium is distinctly more convex, and the sixth sternite narrower and sinuate distally (Fig. 1E), whereas the sixth sternite is subtriangular in females (Fig. 2E).

Remarks. *Phileurus bucculentus* seems to be an uncommon species, since it is not frequently encountered in collections, and until now is known only from Argentina. This species could be confused with *P. carinatus* Prell, but the pronotal tubercle is clearly more developed in both sexes of *P. bucculentus*, whereas this does not happen in *P. carinatus*, where the tubercle is usually more developed in males. Also, the pronotal furrow is clearly deeper anteriorly, just behind the tubercle, and the male genitalia have differences in the shape of the parameres.

Material examined. Three males and two females were studied from Argentina (Chaco, Charata and Castelli), and collected in January 2008 by local collectors (EPGC and JPSC). No other data were provided.

Remarks on *Phileurus carinatus* Prell

We were able to directly study 28 specimens of *P. carinatus* from several countries in Central and South America. We also provide data for specimens not directly examined, for which the diagnostic characters were checked for us, and for specimens examined only through photographs, including the holotypes of *Phileurus carinatus* and *P. declivis*.

Figure 1. *Phileurus bucculentus* Ohaus, male. **A)** Dorsal view. **B)** Lateral view. **C)** Ventral view. **D)** Head and pronotum, detail. **E)** Abdominal sternum, detail. **F)** Parameres in lateral and caudal views. **G)** Scutellum. **H)** Elytral disc, detail. **I)** Head and pronotum, in perspective view.

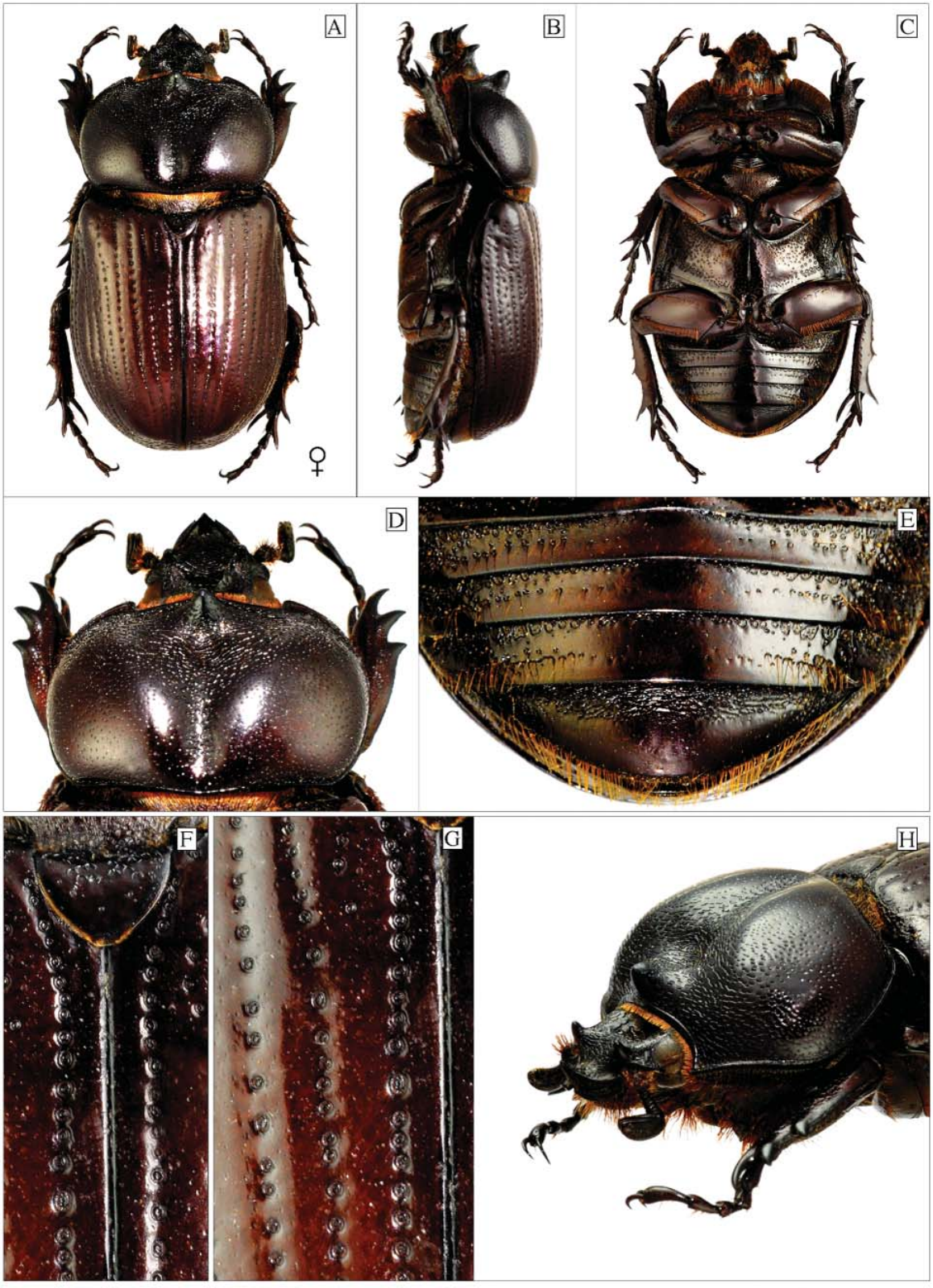

Figure 2. *Phileurus bucculentus* Ohaus, female. **A)** Dorsal view. **B)** Lateral view. **C)** Ventral view. **D)** Head and pronotum, detail. **E)** Abdominal sternum, detail. **F)** Scutellum. **G)** Elytral disc, detail. **H)** Head and pronotum, in perspective view.

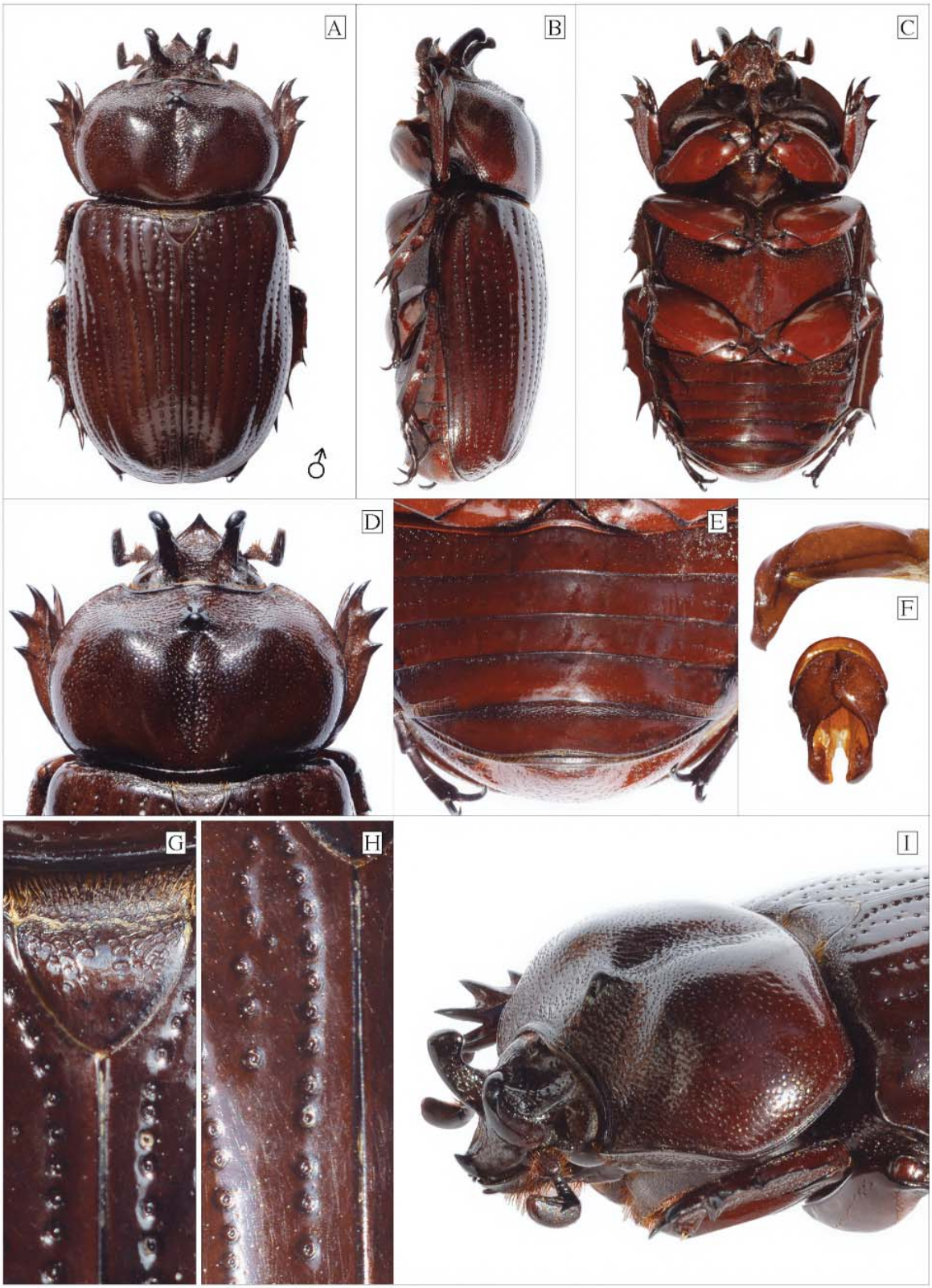

Figure 3. *Phileurus carinatus carinatus* Prell, large male. **A)** Dorsal view. **B)** Lateral view. **C)** Ventral view. **D)** Head and pronotum, detail. **E)** Abdominal sternum, detail. **F)** Parameres in lateral and caudal views. **G)** Scutellum. **H)** Elytral disc, detail. **I)** Head and pronotum, in perspective view.

This species has previously been recorded in Honduras, Nicaragua, Costa Rica, Panama, Venezuela, Suriname, French Guiana, Brazil and Paraguay (Kolbe 1910; Prell 1912; Endrödi 1954; Maes 1994; Dupuis and Dechambre 2000; Ratcliffe 2002; INBio 2006; Rittner 2006; Dechambre 2006, 2008; Abadie *et al.* 2008; Catalogue of Life 2010; Iabin 2010; ZipcodeZoo 2010; Duranton 2011;). New country records presented here are for Argentina, Colombia, Peru and Guyana (see below).

***Phileurus carinatus carinatus* Prell, 1914**
(Figures 3–6)

Phileurus carinatus Prell, 1914: 223
Phileurus carinatus carinatus Prell. Endrödi (1978: 106).

This species was originally described as a separate taxon from *Phileurus declivis* Prell, and was based on a single male. Prell (1914) distinguished *Phileurus declivis* by its pronotal declivity reaching the middle of the pronotum and by the absence of a postapical tubercle on the pronotum. *Phileurus carinatus* has, in contrast, the declivity taking up the anterior half of the pronotum and the presence of a postapical pronotal tubercle in males. Endrödi (1978) mentioned that the postapical tubercle is usually small, the pygidium is more finely punctate, and downgraded *P. declivis* to a subspecies of *P. carinatus* (Endrödi 1978).

Distribution. Type material examined. Holotype male (ZMHB), labeled as follows (Fig. 6C, F, I, J): a) handwritten label, "Nicaragua", b) white with red bordered handwritten label, "Lectotypus/ *Phileurus*/ *carinatus*/ Endrödi Prell"; c) red handwritten label, "*Phileurus*/ *carinatus*/ Prell male symbol-Type."

Additional material examined. Among the material we were able to study, there were three NEW COUNTRY RECORDS for *Phileurus carinatus* as follows, all male specimens having a well-developed pronotal tubercle: ARGENTINA (4 specimens): Chaco, Charata (1 male and 1 female) (EPCG); Castelli (1 female) (EPCG); Misiones, San Vicente (1 female) (EPCG). COLOMBIA (1 specimen): Bogota (1 male) (FDC). PERU (7 specimens): Loreto, Contaya, near Contamana, Serra el Divisor, S of Contamana (1 male) (EPGC); Loreto (1 male and 1 female) (JPSC); Iquitos (3 males and 1 female) (JPSC). Additional male specimens with pronotal tubercle were studied from the following localities, and the females from these places were considered by us to be conspecific: BRAZIL (7 specimens): Brazil (1 female) (IRSNB); Amazonas, Manaus, Faz. Dimona (02°19'28"S/60°05'11"W) (1 female) (EPCG); Espírito Santo, Linhares, Reserva Vale do Rio Doce (1 male and 1 female) (EPCG); Santa Teresa (1 female) (DZUP); Pará, Óbidos (1 male) (MNHN); Santa Catarina, São Bento do sul (1 female) (JPSC). PANAMA (1 specimen): Coclé, La Mesa (1 female) (EPCG).

***Phileurus carinatus declivis* Prell, 1914 revised status**
(Figures 7–9)

Phileurus declivis Prell, 1914: 222.
Phileurus carinatus declivis Prell. Endrödi (1978: 106).

Since its description, no additional Venezuelan specimens of *P. declivis* have been recorded in the literature. Endrödi (1978) downgraded *P. declivis* to a subspecies of *P. carinatus*. In his Phileurini revision, Endrödi (1978) separated the subspecies based only in the distribution, size of the pronotal tubercle and pygidial punctures. The distribution, as presented by Endrödi, was not enough to distinguish these two forms, and this was the basis for Ratcliffe (2003), Ratcliffe and Cave (2006) and Krajcik (2005) to consider *P. c. declivis* as a synonym of *P. carinatus*. After revising many specimens, including the types of both *P. carinatus* and *P. declivis*, we concluded that *P. c. declivis* is a good subspecies and retain the use of Endrödi's classification.

Based on our observations, we make some remarks on the variation we found within the material we studied of *P. carinatus carinatus* and *P. carinatus declivis*. Endrödi (1978, 1985) pointed out that *P. c. carinatus* was the Central America population that had a more developed pronotal tubercle on males,

Figure 4. *Phileurus carinatus carinatus* Prell, small male. **A)** Dorsal view. **B)** Lateral view. **C)** Ventral view. **D)** Head and pronotum, detail. **E)** Abdominal sternum, detail. **F)** Parameres in lateral and caudal views. **G)** Scutellum. **H)** Elytral disc detail. **I)** Head and pronotum, in perspective view.

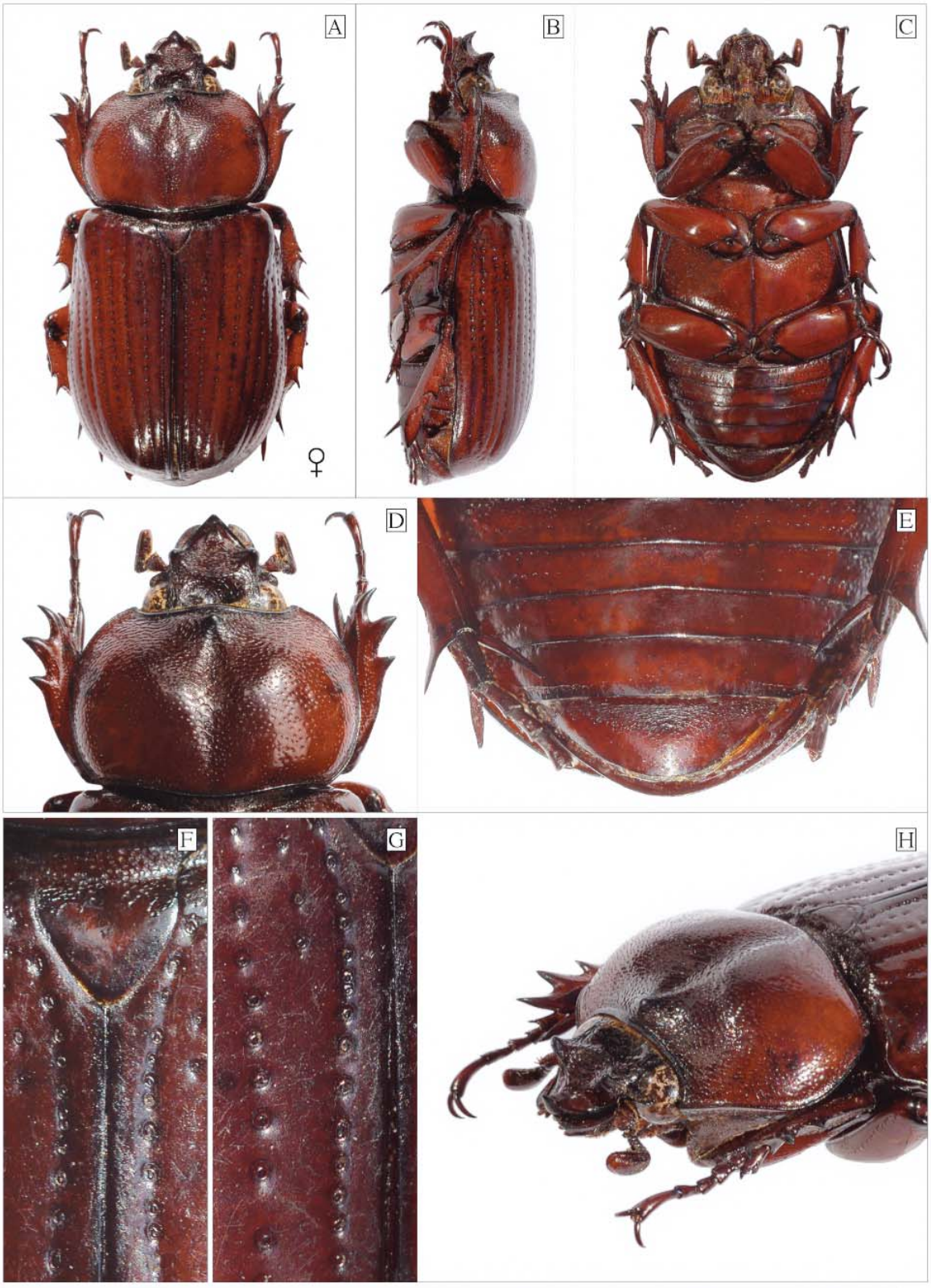

Figure 5. *Phileurus carinatus carinatus* Prell, female. **A)** Dorsal view. **B)** Lateral view. **C)** Ventral view. **D)** Head and pronotum, detail. **E)** Abdominal sternum, detail. **F)** Scutellum. **G)** Elytral disc, detail. **H)** Head and pronotum, in perspective view.

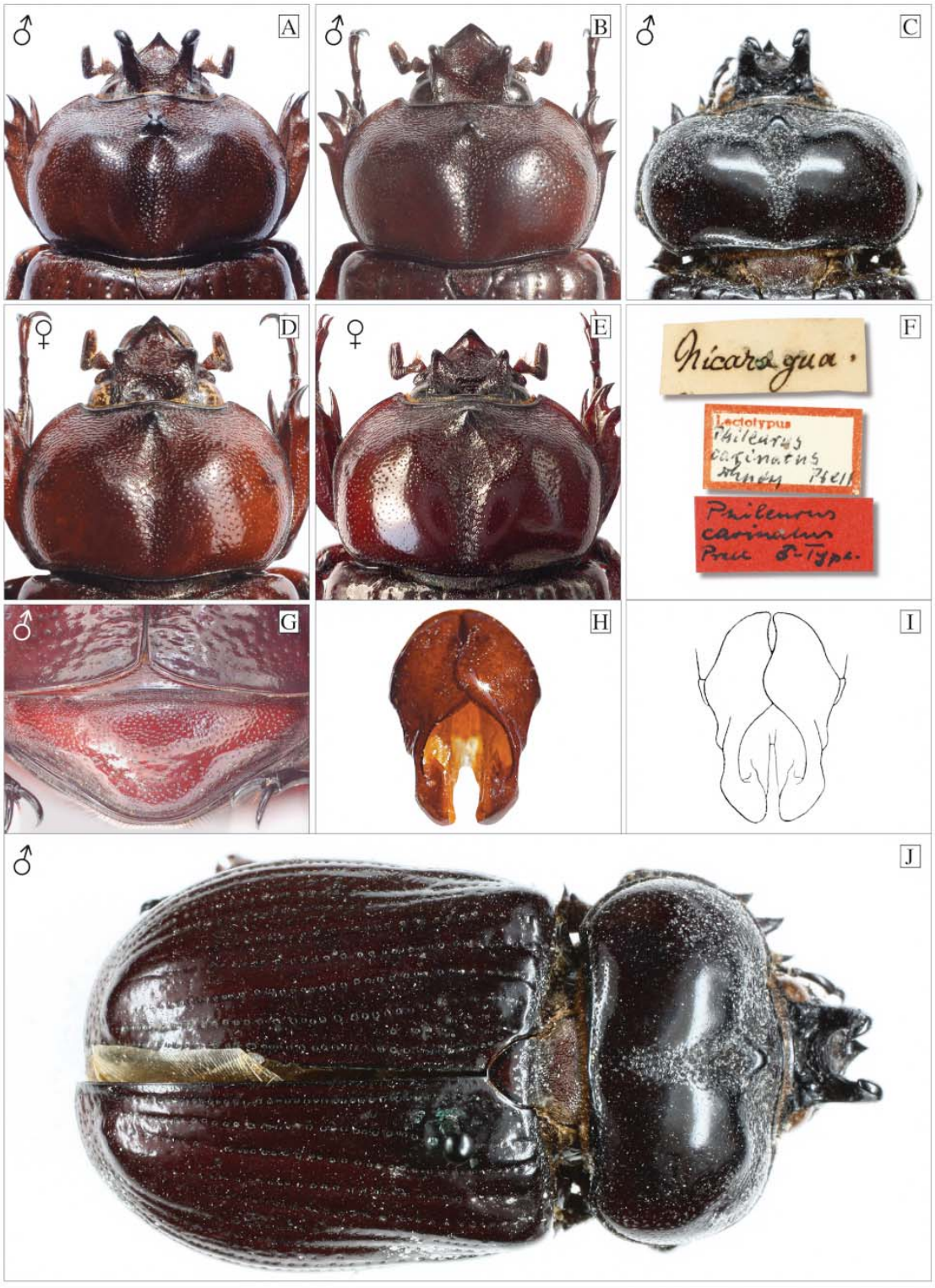

Figure 6. *Phileurus carinatus carinatus* Prell. **A)** Large male from Peru, detail of head and pronotum. **B)** Small male from Peru, detail of head and pronotum. **C)** Holotype male (ZMHB) detail of head and pronotum. **D)** Small female from Peru, detail of head and pronotum. **E)** Large female from Argentina, detail of head and pronotum. **F)** Holotype labels. **G)** Pygidium of a male from Peru. **H)** Parameres in caudal view, specimen from Peru. **I)** Original drawing from Prell (1914). **J)** Holotype male in dorsal view (ZMHB).

while *P. c. declivis* was the South American population with a less developed pronotal tubercle, as in the holotype. What we have found is that in South America, from north to south, there are also male specimens with a well developed pronotal tubercle (this character is only comparable between males, as all females have it clearly developed). More surprisingly, there are male specimens with no pronotal tubercle, which can be used as a dimorphic character easily diagnosable. The 16 males examined are all from French Guiana and neighboring regions Guyana and Suriname. Also, these specimens have a deep and sloping pronotal furrow, and this probably influenced Prell (1914) to describe *P. declivis* as a separate species. However, Prell's specimen has a minute pronotal tubercle, removed from the anterior margin (Fig. 9B, J), whereas the pronotum is high and the furrow corresponds to the ones from French Guiana, except for the small tubercle, also present in the only male we examined from Suriname (Fig. 9C, F).

Phileurus carinatus declivis does not have the pronotal tubercle, or has it obsolete in a few specimens from Venezuela and Suriname (Fig. 9B, J, C). The females in these cases always have the pronotal tubercle both slightly removed from or near the anterior pronotal margin, and this character seems to vary independently among the material we studied (11 females).

In specimens from both Suriname and Venezuela, the pronotum is high laterally, making the furrow deep, and the anterior declivity more sloping than in males where the pronotal tubercle is present. Those males lacking a tubercle also have the condition of a high pronotum as opposed to the remaining males. We also found that the parameres (Fig. 3F, 4F, Fig. 6H, I and 7F, 9G, H) are slightly variable among the specimens and range from almost parallel to widely dilated in the apical third, and with apex somewhat truncate to elongate. All the females have the pronotal tubercle well developed, and this feature is not diagnosable among them. What we noticed is that the punctures can be used to separate the population from French Guiana and neighboring countries from the remaining ones. In particular, the pronotal punctures are stronger and more evident in *P. c. carinatus* females than in *P. c. declivis* (Fig. 5A, B, D, H and 8A, B, D, H); the ocular canthus is subquadrate in *P. c. declivis*, and rounded in *P. c. carinatus* (Fig. 5 and 6A, D); the elytra are more punctate in *P. c. declivis* than in *P. c. carinatus*, and is more conspicuous between the first and second striae from elytral suture (Fig. 5F, 5G, and 8F, 8G); lastly, the last abdominal sternite is more punctate in *P. c. carinatus* and more rounded distally (Fig. 5C, E), as opposed to a somewhat more elongated and less punctate sternite in *P. c. declivis* females (Fig. 8C, E).

Distribution. Type material examined. Holotype male, ZMHB, labeled (Fig. 9B, E, G, H, J): a) typed label, "Venezuela/ San Fernando de Apure/ L. Laglaize 5-10 1897"; b) red handwritten label, "*Phileurus*/ *declivis*/ Prell male symbol-Type"; c) white red bordered typed and handwritten label, "Holotypus/ *Phileurus*/ *declivis* Prell".

Additional material examined. Among the material we were able to study there was one NEW COUNTRY RECORD for *Phileurus carinatus declivis* as follows, and all the male specimens have no pronotal tubercle: GUYANA (3 specimens): Rio Demerara (2 males) (MNHN); Georgetown, Demerara, (1 female) (MNHN). Other male specimens with an unarmed pronotum were examined, and the females from the same localities were considered to be conspecific, as follows: FRENCH GUIANA (22 specimens): Montsinéry, Piste de S. Elie, PK 16, PL (1 male) (EPGC); Patawa (1 male) (EPGC); Route de Petit Saut, PK9 (1 male and 1 female) (FDC), (1 male) (JPSC); Rivière Lunier (1 male) (MNHN); Cayenne (1 male and 2 females) (MNHN); Route de Regina, PK62 (1 male) (MNHN); PK 29 PL, Route de Kaw, (1 male) (JPSC); Wayabo, (1 male and 1 female) (JPSC); Piste Bélizon, PK15 (1 female) (FDC); Piste de Kaw, PK47 (1 female) (FDC); Route de Kaw PK37 + 3 PL (1 male) (JPSC); Cacao (1 female) (FDC); Saint-Jean-du-Maroni (1 female) (MNHN); Piste Bélizon, PK23 (1 female) (MNHN); Piste Coralie, PK2 (1 female) (MNHN); French Guiana (1 male) (IRSNB); Saint-Laurent du Maroni (1 male) (IRSNB). SURINAME (1 specimen): Paramaribo, (1 male) (HNHM) (Fig. 9C, F).

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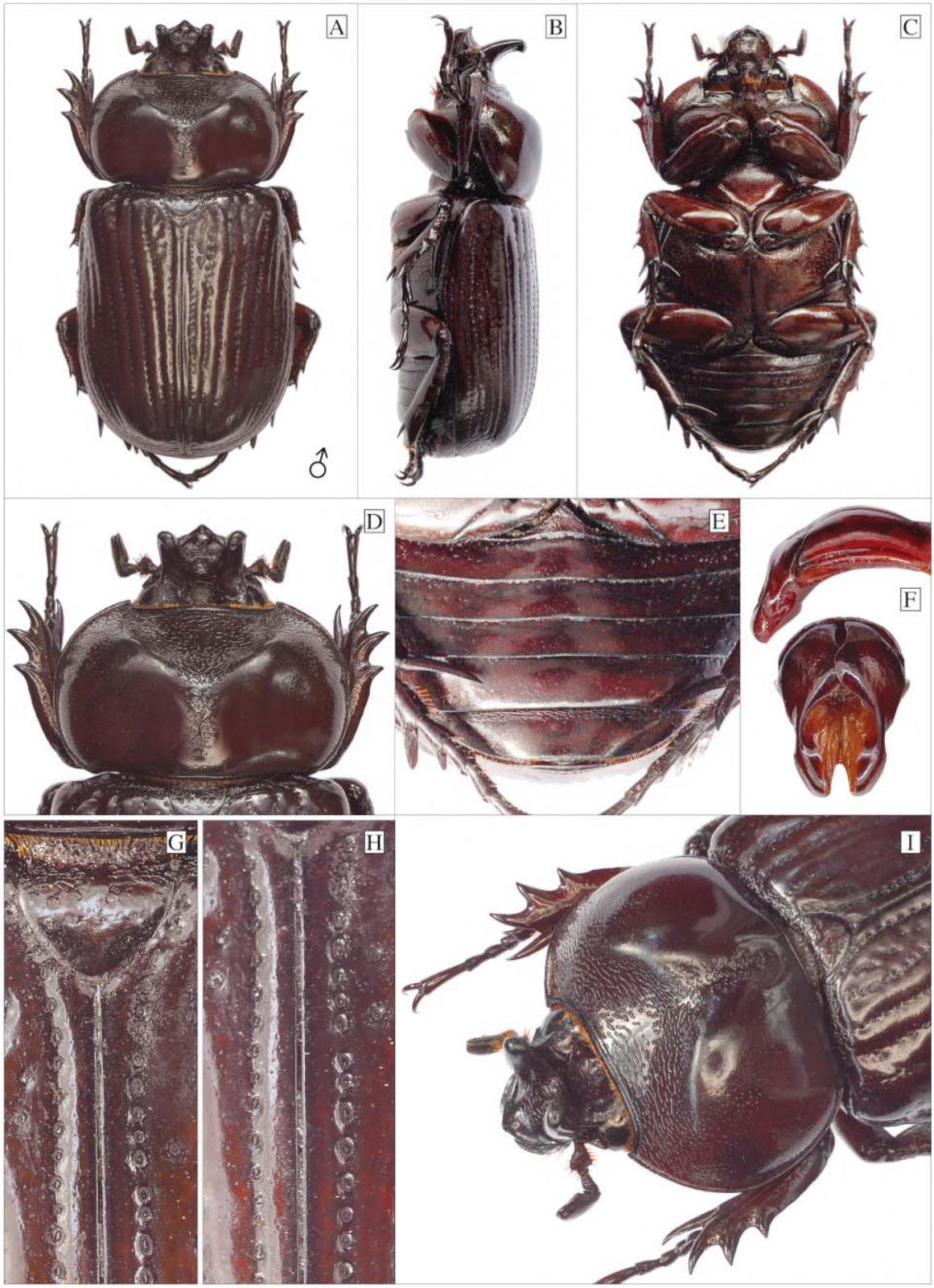

Figure 7. *Phileurus carinatus declivis* Prell, male. **A)** Dorsal view. **B)** Lateral view. **C)** Ventral view. **D)** Head and pronotum, detail. **E)** Abdominal sternum, detail. **F)** Parameres in lateral and caudal views. **G)** Scutellum. **H)** Elytral disc, detail. **I)** Head and pronotum, in perspective view.

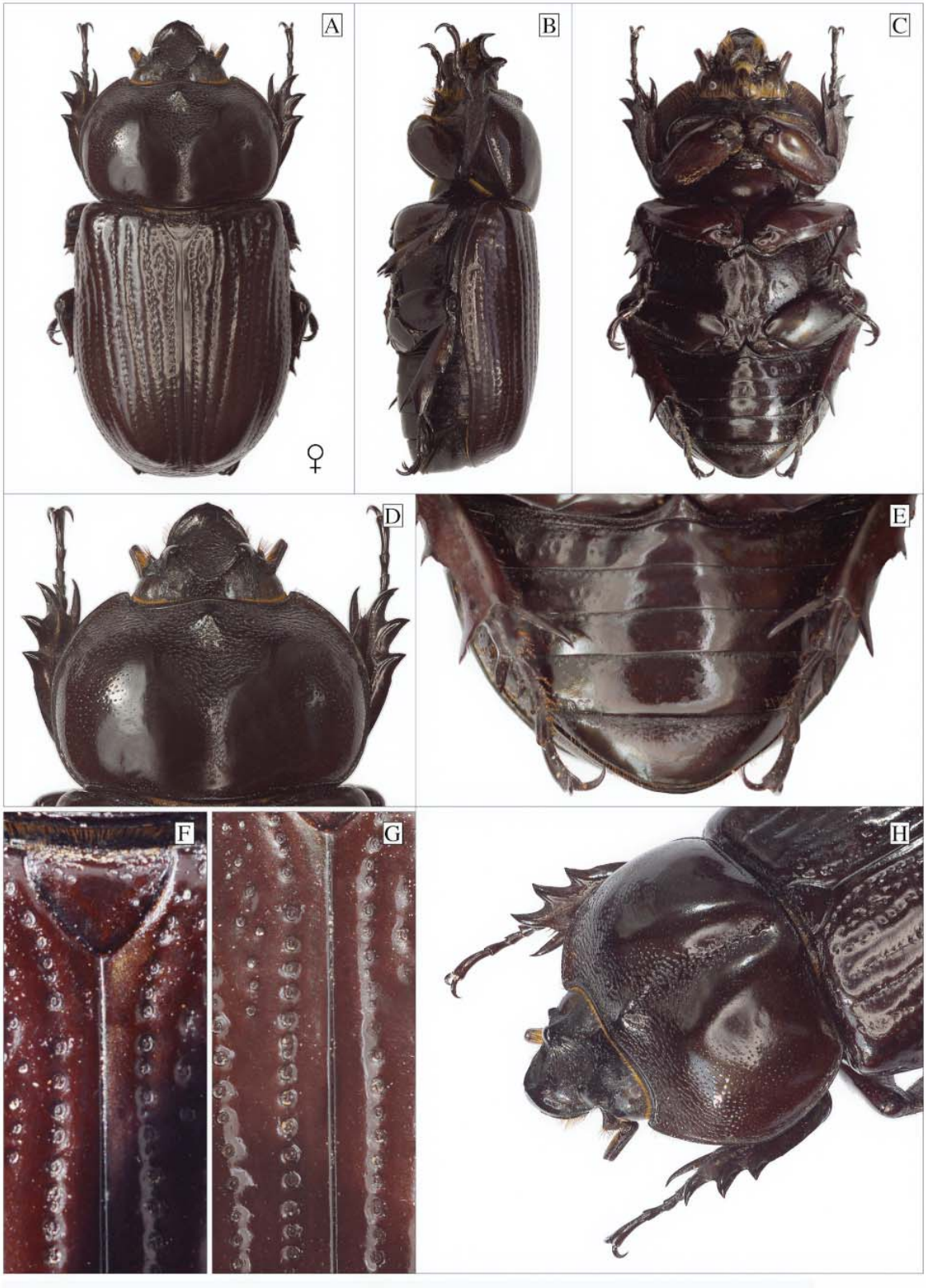

Figure 8. *Phileurus carinatus declivis* Prell, female. **A)** Dorsal view. **B)** Lateral view. **C)** Ventral view. **D)** Head and pronotum, detail. **E)** Abdominal sternum, detail. **F)** Scutellum. **G)** Elytral disc, detail. **H)** Head and pronotum, in perspective view.

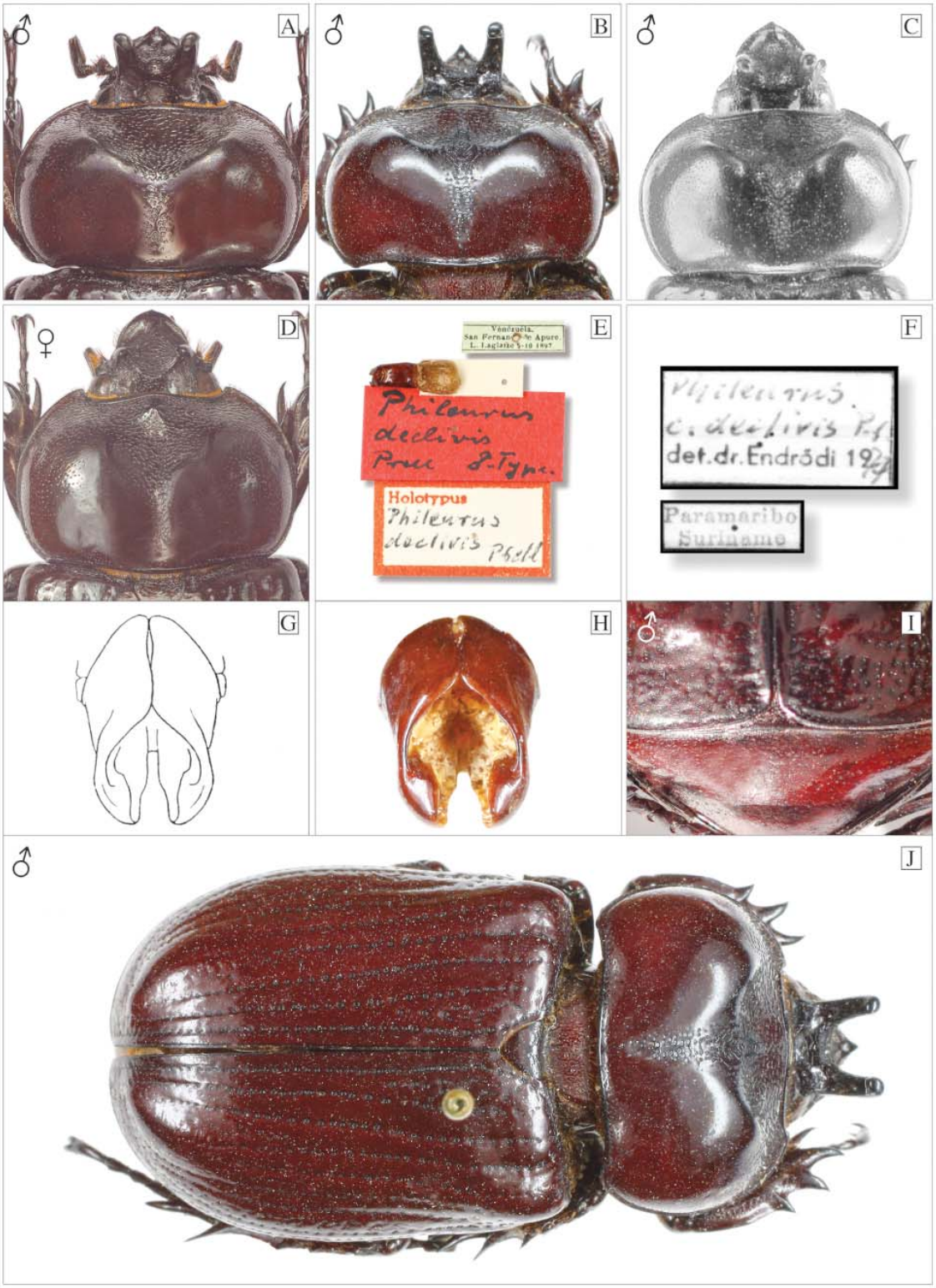

Figure 9. *Phileurus carinatus declivis* Prell. **A)** Male from French Guiana, detail of head and pronotum. **B)** Holotype male (ZMHB), detail of head and pronotum. **C)** Male (HNHM), detail of head and pronotum. **D)** Female from French Guiana, detail of head and pronotum. **E)** Holotype aedeagus and labels. **F)** Labels from C). **G)** Original drawing from Prell (1914). **H)** Parameres of holotype, in caudal view. **I)** Pygidium of male from French Guiana. **J)** Holotype male, in dorsal view (ZMHB).

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Figure 10. Distribution map of *Phileurus carinatus carinatus* Prell, 1914 and *P. carinatus declivis* Prell, 1914 and NEW COUNTRY RECORDS in red – triangle is *Phileurus c. declivis* and circles are *P. c. carinatus*.

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