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A New Species of *Isocopris* Pereira and Martínez, 1960 (Coleoptera: Scarabaeidae: Scarabaeinae) from the Southwest Brazilian Amazon

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A NEW SPECIES OF *ISOCOPRIS* PEREIRA AND MARTÍNEZ, 1960 (COLEOPTERA: SCARABAEIDAE: SCARABAEINAE) FROM THE SOUTHWEST BRAZILIAN AMAZON

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ABSTRACT

A new species from the southwest Brazilian Amazon, *Isocopris rossinii* Arias-Buritica, Bach, and Vaz-de-Mello, **new species**, is described along with a diagnosis, illustrations, and discussion of its taxonomic position in the genus. This new species is readily distinguished by a deep depression in the frons, a large and trapezoidal ventral clypeal process in lateral view, a glabrous metaventral anterior lobe, the morphology of the aedeagus with triangular and symmetrical parameres, the presence of a subgenital plate, and large and asymmetrical lamellae copulatrix. Females show secondary sexual dimorphism, with the elytral striae widened from the first to the fourth in the central area. Here we present an updated key for the species of the genus *Isocopris* Pereira and Martínez, 1960.

Keywords: Amazonia, dung beetles, Neotropical, taxonomy, Scarabaeoidea

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INTRODUCTION

Isocopris Pereira and Martínez, 1960 (Coleoptera: Scarabaeidae: Scarabaeinae) is a Neotropical dung

beetle genus currently classified in the tribe Dichotomini and considered to be a close relative of *Chalcocopris* Burmeister, 1846, *Dichotomius* Hope, 1838, and *Holocephalus* Hope, 1838 (Tarasov and

Dimitrov 2016). It is recognized by the following combination of characters: antenna with eight antennomeres, posterior margin of pronotum with marginal bead, and seventh elytral interstria flat (Rossini and Vaz-de-Mello 2015, 2017; Vaz-de-Mello *et al.* 2011).

Rossini and Vaz-de-Mello (2017) presented a taxonomic revision of *Isocoprís* that included seven valid species with distributions in Peru, Brazil, and northern Argentina: *Isocoprís inhiatus* (Germar, 1824), *Isocoprís hypocrita* (Lucas, 1857), *Isocoprís imitator* (Felsche, 1901), *Isocoprís nitidus* (Luederwaldt, 1922), *Isocoprís foveolatus* (Luederwaldt, 1931), *Isocoprís tarsalis* (Luederwaldt, 1931), and *Isocoprís xacriaba* Rossini and Vaz-de-Mello, 2017.

Recent collections from Serra do Divisor National Park (State of Acre, Brazil) yielded seven individuals that fit the diagnosis of *Isocoprís*. Comparisons with species descriptions provided in the taxonomic review (Rossini and Vaz-de-Mello 2017) and with material deposited at Coleção Entomológica de Mato Grosso Eurides Furtado (CEMT) at the Universidade Federal de Mato Grosso (Cuiabá, Brazil), as well as previous examination of type specimens of all other species in the genus (as cited in Rossini and Vaz-de-Mello 2017), confirmed that these specimens are of a new species in this genus. Here, we describe this new species with diagnoses, photographs, and an updated key to *Isocoprís* species adapted from Rossini and Vaz-de-Mello (2017).

MATERIALS AND METHODS

This study was based on the examination of seven individuals from Serra do Divisor National Park that are deposited at CEMT. Some specimens were deposited at the Coleção Entomológica da Universidade Federal Rural de Pernambuco (CERPE, Recife, Brazil) and the Coleções Entomológicas do Instituto Nacional de Pesquisas da Amazônia (INPA, Manaus, Brazil).

The preparation of specimens followed the methodology of Medina *et al.* (2003). The dissection and preparation of the male genitalia (aedeagus) followed the methodology of Zunino (1978). Photographs were taken of the male and female, and of the male genitalia and endophallites in lateral, dorsal, and ventral views. The terminology of external morphology and the male genital organ was assigned according to Nunes and Vaz-de-Mello (2019) and Tarasov and Solodovnikov (2011), and Génier (2019) for male endophallites. The distribution map was created in Quantum GIS (QGIS version 3.16.8-Hannover).

RESULTS AND DISCUSSION

Isocoprís rossinii Arias-Buritica, Bach, and Vaz-de-Mello, new species

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Etymology. This species is named in honor of Dr. Michele Rossini, Italian scarabaeoidologist and good friend of the authors, who carried out the taxonomic revision of *Isocoprís* with FZVM.

Diagnosis. This species is recognized by the following combination of characters: head with fronto-clypeal carina and deep depression in the frons (Fig. 1), both sexes with head margin distinctly notched at the clypeo-genal junction (Figs. 1a, c), ventral clypeal process in lateral view large and trapezoidal (Figs. 1e, f), metaventral anterior lobe glabrous (Figs. 1b, d), morphology of the male genital organ as in Fig. 2. Females show secondary sexual dimorphism: head with triangular shape, elytral striae from the first to the fourth widened in the central area (Fig. 1c).

Description. Male. Length 19.6 mm, width 11.7 mm (Figs. 1a, b). Body color black and shiny, with brown setae on both sides of head and pronotum (Fig. 1a). **Head:** Wider than long. Antenna with eight antennomeres. Clypeus emarginate at middle, with two obtuse teeth. Surface of clypeus shiny with smooth wrinkles giving it a wavy appearance. Ventral clypeal process in lateral view large and trapezoidal (Fig. 1e). Head margin distinctly notched at the clypeo-genal junction, genal margin broader than clypeus. Fronto-clypeal region with a central and transverse carina of about 2.5 mm and apical ridge flattened (Fig. 1e). Clypeo-genal suture clearly visible. Frons with deep and distinct depression (Fig. 1e). **Pronotum:** Wider than long, simple and convex, anteromedial region without humps. Anterior angles acute. Pronotal punctures dense, very shallow and separated by no more than twice their diameter, near posterior margin with shallow and elliptical ocellate punctures. **Hypomeron:** Shagreened surface with setose punctures spaced about by their diameters, denser on lateral margins, glabrous and smooth in the central area. **Prosternum:** Shagreened surface with smooth central area, glabrous. **Mesoventrite:** Shagreened surface. Smooth in the central area and with large, deep ocellate punctures separated by less than their diameters in the lateral areas. **Mesanepesternum:** Shagreened surface with setose punctures separated by less than one-half their diameter. **Metaventrite:** Anterior lobe with shagreened surface with wrinkles

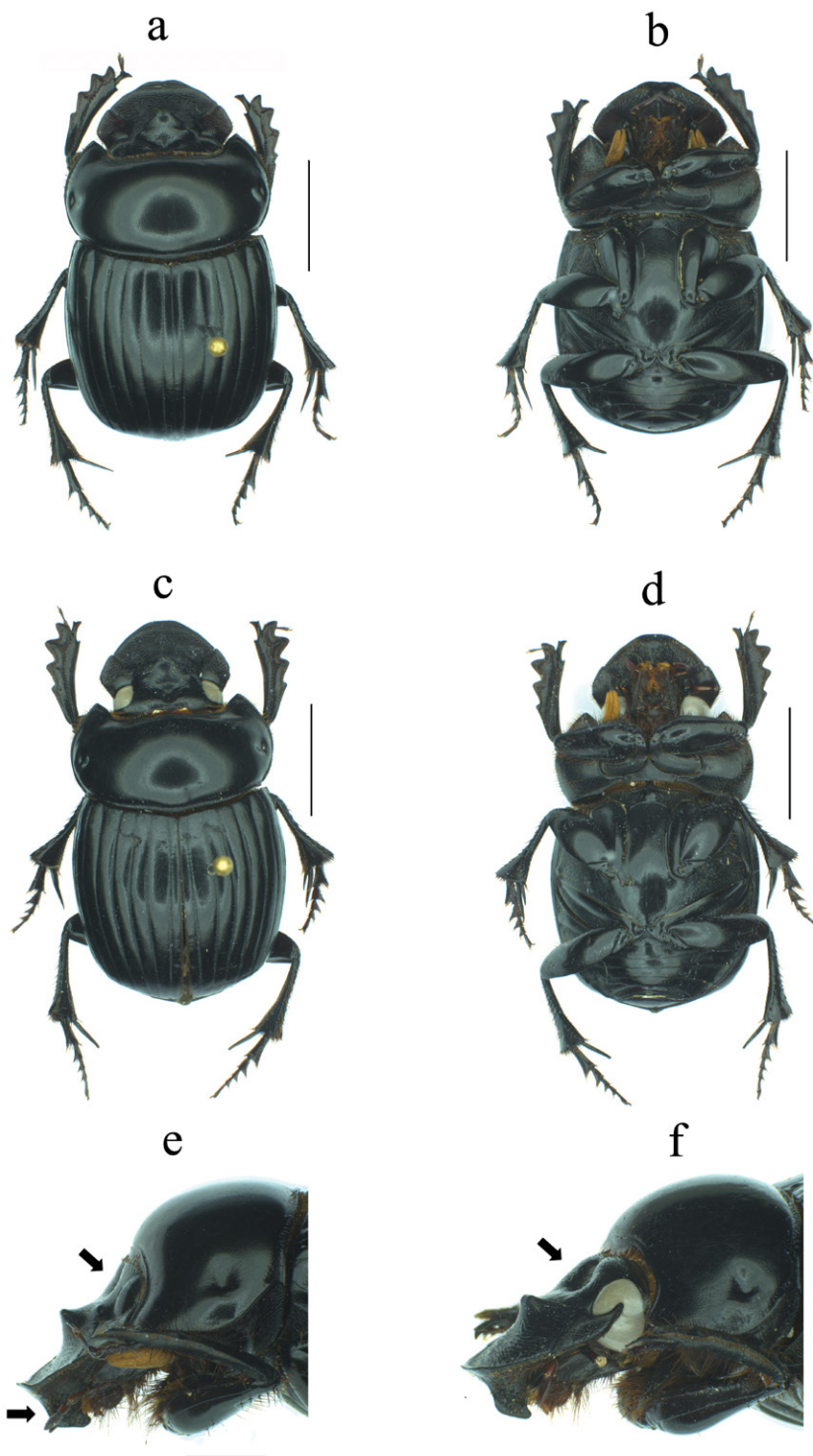


Fig. 1. *Isocopriss rossinii*, new species. Male: a) Dorsal view, b) Ventral view, e) Head, lateral view. Female: c) Dorsal view, d) Ventral view, f) Head, lateral view. Scale bars: a, b, d, e = 5 mm; c, f = 2 mm.

near suture with mesoventrite. With shallow punctures separated by two and three times their diameters in the lateral areas near the insertion of the mesocoxa. Central area with shiny, glabrous surface (Fig. 1b). Metaventral lateral margins with strongly shagreened surface with large and deep ocellate-setose punctures separated by less than their diameter. **Metanepisternum:** Shagreened surface with large, deep ocellate punctures separated by about their diameters, some points with short setae. **Elytra:** Striae bicarinate, distinctly impressed and with shagreened surface, with small ocellate punctures throughout, spaced about three to four times their diameters. Interstriae with shagreened surface, with small and shallow punctures, separated by two to three times their diameters. **Abdomen:** Abdominal ventrites curved and projected at the lateral margin. Shagreened surface with shallow punctures. Anterior area from first to fifth ventrite with a row of large, deep ocellate punctures separated by less than their diameters and denser on the lateral margins. Sixth ventrite compressed in the middle region. **Pygidium:** Pygidial margin complete. Surface shiny, with small, shallow punctures separated by three times their diameters throughout. **Legs:** Apical

margin of protibia obliquely truncate, inner and apical angles finely acuminate, with few straight setae at the apex. Apical spur abruptly angled near the apex (Fig. 1a). Tarsomere 1 of meso- and metalegs as long as the second and third tarsomeres together. Metatibial spur with apical bifurcation (Fig. 1a). **Aedeagus:** Parameres subtriangular in lateral view (Fig. 2a). In dorsal view parameres symmetrical with curved apex (Fig. 2b). In ventral view subgenital plate present, parameres symmetrical with curved apex and base with spine-shaped projection (Fig. 2c). **Endophallites:** Lamella copulatrix (LC) is large, asymmetrical with two sclerotized processes and a fleshy process with many bristles (Fig. 2d). Sclerites of axial and subaxial complex (A+SA complex) with indeterminate shape, more sclerotized in the central area surrounded by a semi-sclerotized membrane (Fig. 2f). Superior-right peripheral sclerite (SRP) with a "C" shape, wide and with undefined margins (Fig. 2e). Fronto-lateral peripheral sclerite (FLP) as shown in Fig. 2g.

Variation. In males the length varies from 17.5–19.7 mm and the width from 10–11.5 mm. Some males have a shorter cephalic process (less than 1.5 mm) and the apical ridge of the carina is bicuspid.

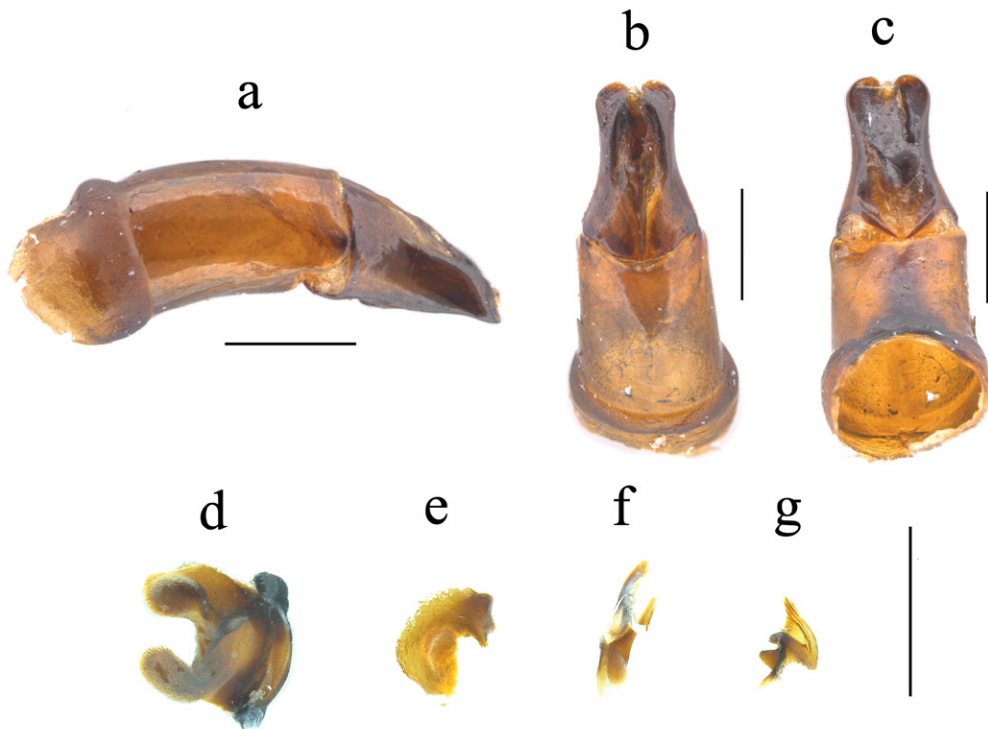


Fig. 2. *Isocopriss rossinii*, new species. Aedeagus: a) Lateral view, b) Dorsal view, c) Ventral view. d) Lamellae copulatrix, e) Superior-right peripheral sclerite (SRP), f) Sclerites of axial and subaxial complex (A+SA complex), g) Fronto-lateral peripheral sclerite (FLP). Scale bars = 1 mm.

Female: Length 18.0–21.1 mm. Width 10.8–11.5 mm. Females differ from males in having a less rounded head, giving the appearance of being triangular, while the cephalic carina changes as mentioned in the variation of males (Fig. 1f). Secondary sexual dimorphism present, with the elytral striae from the first to the fourth widened in the central area (Fig. 1c). Sixth abdominal ventrite not compressed towards the middle.

Type Material. Holotype: 1♂. Labels: 1: {printed text on white label} BRASIL: Acre, Mâncio Lima, Par[que] Na[cional] Serra do Divisor 7°26'46"S 73°39'28"W, FIT. 11-15.xii.2019, R.A.Azevedo. Plot A FIT 1-3 (250) / 2: {printed and handwritten text on red label with black margins} HOLOTYPE ♂ *Isocopris rossinii* sp. nov. Arias-Buritica, Bach and Vaz-de-Mello, 2023 [CEMT]. **Paratypes:** (2♂♂, 4♀♀): Same data as holotype except: 07-11-xii.2019. 1♂. [CEMT]. BRASIL: Acre, Mâncio Lima, Par[que] Na[cional] Serra do Divisor 7°26'46"S 73°39'28"W, 236 m, 07-09.xii.2019. hum[an] dung. RA Azevedo. 1♂ 4♀♀. [2♀♀ CEMT, 1♀ INPA, 1♂, 1♀ CERPE]. All Paratypes have a second label: 2: {printed and handwritten text on yellow label with black margins} *Isocopris rossinii* sp. nov. Arias-Buritica, Bach and Vaz-de-Mello, 2023 PARATYPE.

Distribution and Ecology. Known only from the southwestern Brazilian Amazon from Serra do Divisor National Park, Rondônia province in the South Brazilian Dominion (Morrone *et al.* 2022) (Fig. 3), a lowland *terra firme* site (*i.e.*, non-flooded area) with primary Amazonian forests up to 300 masl. *Isocopris rossinii* has been sampled using flight interception traps (FIT) and pitfall traps baited with human feces.

Taxonomic Commentaries. *Isocopris rossinii* belongs to the small- to medium-sized *Isocopris* species, encompassing *I. foveolatus*, *I. imitator*, *I. nitidus*, *I. tarsalis*, and *I. xacriaba*. It is easily separated from the last four species by the cephalic process; *I. rossinii* has a transverse fronto-clypeal carina as does *I. foveolatus*, whereas the other species have a conical horn. By external morphology, *I. rossinii* is related to *I. foveolatus*, with which it shares the deeply depressed frons and the structure of the fronto-clypeal process. However, it is easily separated by the shape of the ventral clypeal process, the anterior lobe of the metaventricle, which is glabrous in *I. rossinii* but with long setae present in *I. foveolatus*, as well as the morphology of the aedeagus and endophallites. The female secondary sexual dimorphism present in the elytral striae of *I. rossinii* is shared with *I. imitator*, *I. nitidus*, and *I. tarsalis*.

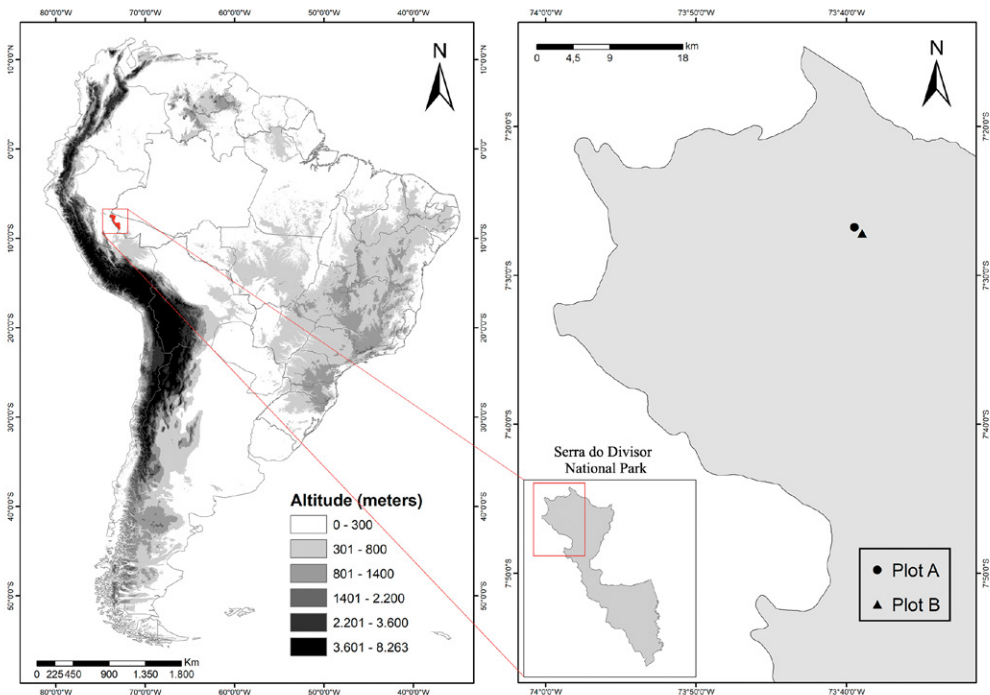


Fig. 3. Distribution map for *Isocopris rossinii*, new species. Plot A and Plot B represent the collection sites in Serra do Divisor National Park, Acre, Brazil.

KEY TO THE SPECIES OF *ISOCOPRIS*
PEREIRA AND MARTÍNEZ, 1960

This key is an adaptation of Rossini and Vaz-de-Mello (2017), updated to include the new species. The sentences between quotation marks (‘’) have been transcribed *ipsis litteris* from this paper and the figures of the others species are available in the same work.

1. “Pronotum abruptly vertical above the head, superiorly with a pair of transverse humps. Male with a cephalic horn always flanked by two low and transverse carinae; female with a cephalic carina tuberculate at middle. Large-sized species, body length > 22 mm” 2
- 1'. “Pronotum simply convex, never with distinct humps on the superior side. Male either with a simple and conical horn or a transverse and strong carina; female with either a cephalic horn or carina, but never tuberculate at middle. Medium-sized species, body length < 22 mm” 3
2. “Clypeus wide and evenly curved, slightly sinuated at middle, male with cephalic horn cylindrical to conical (from above), frontal side of the horn always finely wrinkled; female with cephalic carina on the fronto-clypeal region, anteromedial region of pronotum feebly excavated, pronotal protuberance very weak (figs. 1a, b). Anterior pronotal bead simple, metasternal surface completely covered by long and straight orange hairs. Brazil, Argentina” *Isocopris inhiatus* (Germar, 1824)
- 2'. “Clypeus elongated forward and clearly narrower at middle, lateral margins straight, male with cephalic horn rectangular and transversally elongated, frontal side of the horn smooth to finely punctuated; female with cephalic carina between eyes, anteromedial region of the pronotum distinctly excavated, pronotal humps distinct (figs. 2a, b). Anterior pronotal bead slightly concave at the middle of the posterior margin, metasternum with long hairs along the inner side of mesocoxae, metasternal disc bare. Brazil” *Isocopris hypocrita* (Lucas, 1857)
3. “Both sexes with a strong fronto-clypeal carina flanked by two hump-like weak tubercles, carina acuminate on both sides in male, straight in female, frons deeply depressed (figs. 5a, b). Margin of the head distinctly notched at the clypeo-genal junction, body completely black, head and pronotum shining, elytra more opaque” 4
- 3'. “Both sexes with a conical cephalic horn, margin of the head either notched or angulated (genal margin wider than clypeus) at the clypeo-genal junction, frons either depressed or normal, clypeus weakly to distinctly reflexed at middle” 5
4. Both sexes with ventral clypeal process large and trapezoidal in lateral view (figs. 1e, f). Metaventral anterior lobe glabrous (figs. 1b, c). Females with elytral striae from the first to the fourth widened in the central area (fig. 1c). Southwestern Amazonia, Brazil (fig. 3) *Isocopris rossinii* Arias-Buritica, Bach, and Vaz-de-Mello, new species
- 4'. Both sexes with ventral clypeal process small and tooth-shaped in lateral view. Metaventral anterior lobe with setae. Females without widened elytral striae. Cerrado habitat. Brazil *Isocopris foveolatus* (Luederwaldt, 1931)
5. “Fore tibia with an inner-apical projection, tooth-like and directed inward, last protarsal segment strongly enlarged at the apex, tarsal claws very long and strongly folded (figs. 6a, b, c). Brazil” *Isocopris tarsalis* (Luederwaldt, 1931)
- 5'. “Fore tibia either normal or with an inner-apical projection directed forward, last protarsal segment normal and never strongly enlarged, tarsal claws short and weakly curved” 6
6. “Clypeus acuminate and sides feebly curved, weakly reflexed and distinctly sinuated at middle, with two obtuse teeth, head of both sexes with three conical tubercles, central tubercle stronger, lateral ones slightly backward, frons not depressed. Apical spur of the fore tibia with superior margin normal. Body black, elytra opaque to feebly shining and completely sericeous. Brazil (only known of north of Minas Gerais), dry forest” *Isocopris xacriaba* Rossini and Vaz-de-Mello, 2017
- 6'. “Clypeus with sides sinuated, strongly reflexed at middle, either transversally truncated or weakly sinuated, both sexes with a central conical horn flanked by two weak hump-like tubercles, frons slightly to distinctly depressed. Apical spur of the fore tibia with superior margin bifid (fig. 3h). Body completely shining, black to brownish. Known of Amazon and dry forests” 7
7. “Pronotum and elytra with a dense and shallow punctuation evenly distributed (figs. 3b, c). Size of 15–22 mm. Brazil” *Isocopris imitator* (Felsche, 1901)
- 7'. “Pronotum and elytra with a very fine and inconspicuous punctuation (figs. 4b, c). Size of 12–18 mm. French Guiana, Brazil and Peru” *Isocopris nitidus* (Luederwaldt, 1922)

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