



## New species of *Ateuchus* and *Canthidium* (Coleoptera: Scarabaeidae: Scarabaeinae) from Costa Rica

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### Abstract

The following new species of dung beetles (Coleoptera: Scarabaeidae) from Costa Rica are described: *Ateuchus earthorum* **sp. nov.** (Ateuchini) and *Canthidium (Eucanthidium) darwini* **sp. nov.** (Coprini). Illustrations of the dorsal habitus of the new species and a distribution map are provided, as well as a drawing of the internal sac of *Ateuchus earthorum* **sp. nov.**

**Key words:** Coleoptera, Scarabaeidae, *Ateuchus*, *Canthidium*, new species, Costa Rica

### Introduction

Dung beetles are not only important elements in the recycling process of wastes, but are also significant in the control of dung flies and as environmental bioindicators (Kohlmann *et al.* 2007, *accepted*; Nichols *et al.* 2007, 2008). The description of the present species is part of an attempt to survey and inventory the dung beetles of Costa Rica in addition to defining biodiversity hotspots for this country in order to establish conservation priority life zones.

The previous study on the genus *Ateuchus* (Ateuchini) of Costa Rica (Kohlmann 1997) reported 10 species; we herein increase the number to 11. Ratcliffe (2002) cites only five recorded species of *Ateuchus* for neighboring Panama (there are likely several more), whereas Kohlmann (2003) lists 12 species for Mexico.

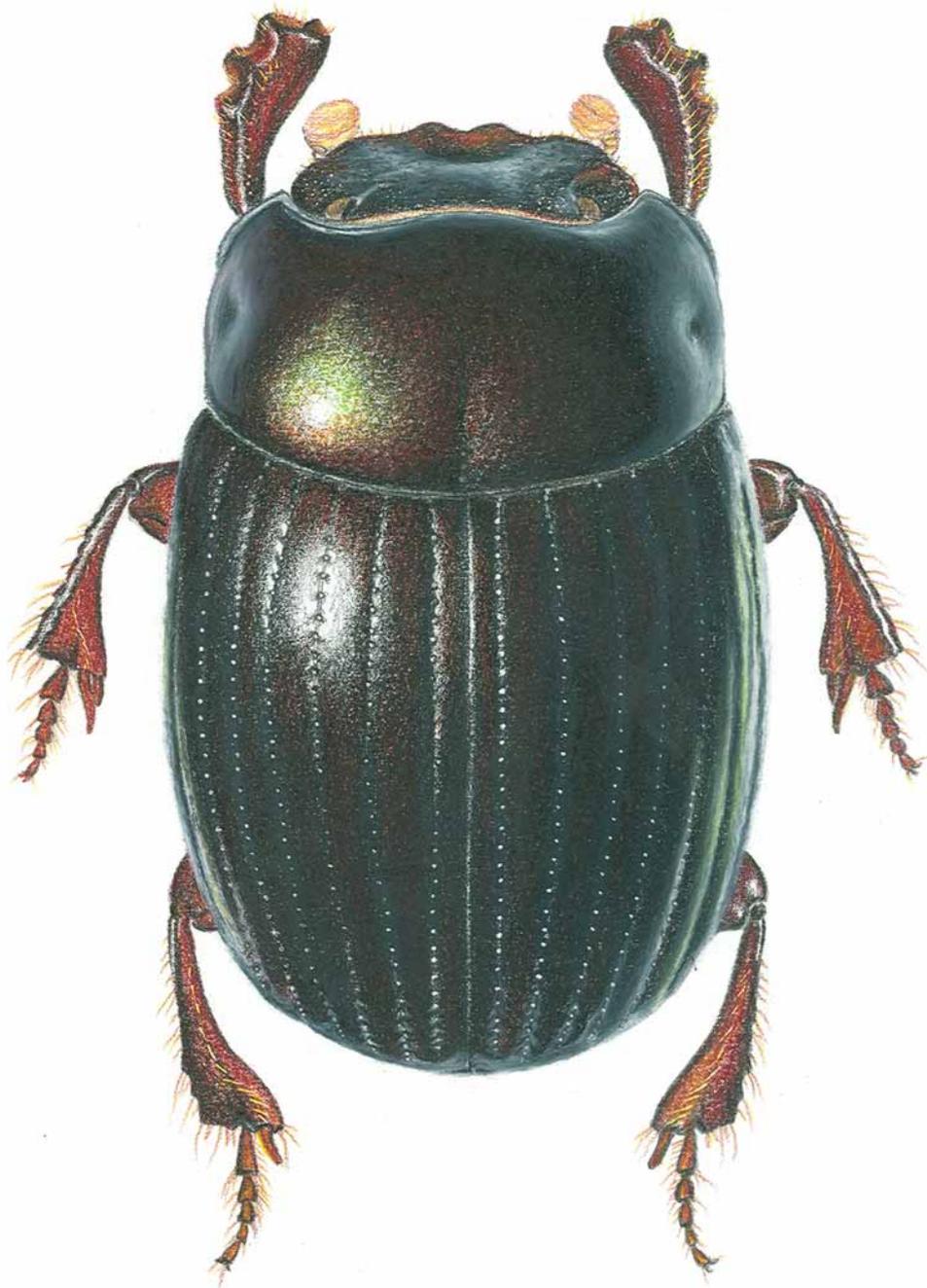
Regarding *Canthidium* (Coprini), Solís and Kohlmann (2004) report 24 species for Costa Rica; the new species described here increases this number to 25. Ratcliffe (2002) lists 19 species in neighboring Panama and Kohlmann and Solís (2006) report 14 for Mexico.

In the descriptions below, measurements were made to the nearest 0.1 mm using an ocular micrometer. All holotypes, allotypes, and paratypes of the new species are deposited in the National Biodiversity Institute (INBio) in Santo Domingo de Heredia, Costa Rica.

### *Ateuchus earthorum* Kohlmann & Solís, **sp. nov.**

(Figs. 1–2, 4)

**Diagnosis:** This species is distinguished from other Costa Rican species by the following combination of characters: head disc finely punctured with coarse punctures at anterior margin; pronotum finely punctured with coarse punctures at the base of the pronotal midline; anterior pronotal margin incomplete; eyes viewed from above 3 times longer than wide; head and pronotum with coppery red reflections; body oval; profemur coarsely punctured; proepimeron without punctures; elytra not shagreened; pygidium very convex; last abdominal segment broad; internal sac with three hooks.



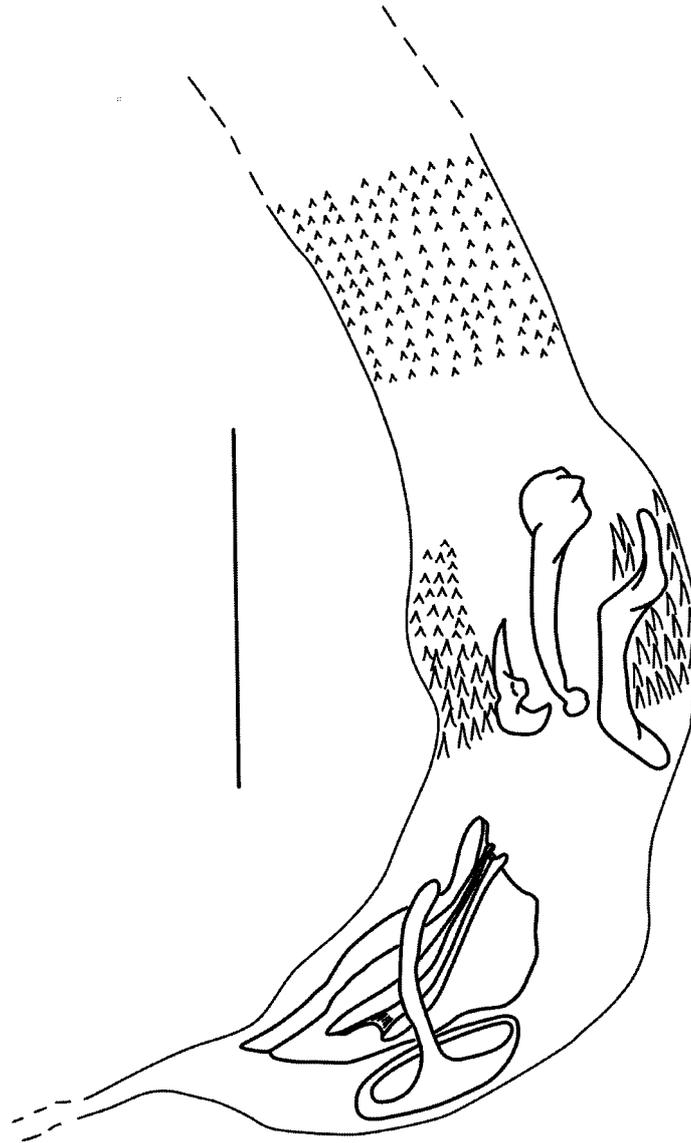
**FIGURE 1.** Dorsal view of a male *Ateuchus earthorum*.

**Holotype description:** Male (Figs. 1–2). Total length 6.7 mm. Elytral width 4.4 mm. Body slightly ovoid and convex, dorsum dark brown, head and pronotum with strong cupreous red reflections; venter dark brown.

Clypeal margin coarsely punctate and broadly V-shaped, tooth on each side rounded, lateral margin arcuate, dorsal surface of head finely punctate and granulate, frons and vertex feebly tumid, eye dorsally small (ten times the interocular distance).

Pronotum finely punctate and granulate, moderately punctate at posterior end of midline, midline impressed only one-third pronotal length, anterior pronotal margin incomplete. Proepisternum finely wrinkled, proepimeron granular.

Elytral surface smooth and shiny; striae slightly impressed, more strongly so anteriorly; striae feebly punctate, intervals slightly convex. Pygidium very convex, surface slightly granulate and minutely punctate, completely grooved.



**FIGURE 2.** Internal sac of the aedeagus of *Ateuchus earthorum*. Line = 1 mm

Protibia quadridentate, basal tooth small, protibial spur oval; apical one-half of profemur ventrally coarsely punctate, punctures extending along posterior margin to base of femur, punctate area black; mesofemur and metafemur short, thick, with minute punctures near apex.

Internal sac of the aedeagus (Fig. 2) with three hooks, one small, two large; three apical lamellae; and a well-developed, spiny fascies.

**Allotype:** Female. Total length: 7.2 mm. Elytral width: 4.9 mm. Differs from the holotype by the following characters: Clypeal margin anteriorly moderately V-shaped, anterior clypeal border moderately punctate, protibia with acute, slender spur slightly bent apically; last abdominal segment broader, pygidium less convex.

**Variation:** Total length: 6.3–7.2 mm. Elytral width: 4.1–4.9 mm. The color intensity varies of the cupreous-red head and pronotum.

**Material Examined** (11 specimens): **Holotype**, male: COSTA RICA: Est. Cacao, 2 km SW del Cerro Cacao, Prov. Guanacaste, 1100 m, 12–14SET1995, C. Scarabaeidae, caca de caballo. L\_N\_323100\_375800, #6292. **Allotype**, female: *ibidem*. **Paratypes**. *ibidem*, 5 males, 3 females; *ibidem*, caca de mono, 1 female.

**Remarks:** This species will key to *A. ginae* in Kohlmann's (1997) key. These species are cryptic and cannot be separated on the grounds of external morphology; only the internal sac differences will distinguish them. In both species there are three hooks, two are long and similar and the third is long and like a simple bar in *A. ginae*, whereas it is short and spine-like in *A. earthorum* (Fig. 2). These sac-hooks morphological differences are not only consistent (external morphology can be very variable and misleading) and geographically circumscribed to Cacao volcano, but also typical for separating *Ateuchus* species (Kohlmann 1984, 1997, 2000). Moreover, the ecology and geology are also critical; the Guanacaste volcanoes are a well-known species generating area for small-sized dung beetle taxa like *Ateuchus*, *Canthidium*, and *Onthophagus* (Kohlmann 1997, Kohlmann & Solís 2001, Kohlmann & Wilkinson 2007, Kohlmann *et al.* 2007, Solís & Kohlmann 2004) and for plants (Araceae, Arecaceae, and Bromeliaceae) as well (Kohlmann *et al.* accepted).

**Habitat:** The new species lives in mountain tropical forest at 1100 m and has been collected in September in horse manure and from monkey's dung.

**Geographical distribution (Fig. 4):** The new species is so far only known from the Pacific slope of Cacao volcano, in the province of Guanacaste.

**Chorological affinities:** The new species is found at the same altitude, in the Guanacaste Cordillera, as its sister species, *A. ginae* Kohlmann, in the Central Cordillera (Kohlmann 1997).

**Taxonomic relationships:** *Ateuchus earthorum* is hypothesized to be the sister species to *A. ginae* Kohlmann based on shared morphological characters discussed above.

**Etymology:** The name is a Latinized noun in the genitive case. This species is dedicated to EARTH University in Costa Rica, an institution committed to the sustainable development of the humid tropics, to celebrate its 20<sup>th</sup> anniversary.

#### ***Canthidium (Eucanthidium) darwini* Kohlmann & Solís, sp. nov.**

(Figs. 3–4)

**Diagnosis:** This species is distinguished from other Costa Rican species by the following combination of characters: Frontoclypeal region with three conical tubercles; clypeal indentation V-shaped; pygidium minutely punctate; elytral striae fine, superficially impressed; protibia with two clearly developed lateral teeth, and third weakly developed; head, pronotal, and elytral surface clearly and evidently shagreened.

**Holotype description:** Male (Figs. 3–4). Total length 4.0 mm. Elytral width 2.7 mm. Body slightly globose, head and pronotal surface green with golden reflections, elytra reddish brown with golden reflections, dorsum shagreened; venter dark brown.

Clypeal margin anteriorly wrinkled and V-shaped, tooth on each side rounded, margin arcuate; dorsal surface of head finely punctate and shagreened; frons with three conical tubercles forming a triangle, area between the tubercles depressed; eye dorsally small (15x the interocular distance).

Pronotum finely punctate and uniformly and evidently shagreened, midline not impressed. Proepisternum finely wrinkled proepimeron granular.

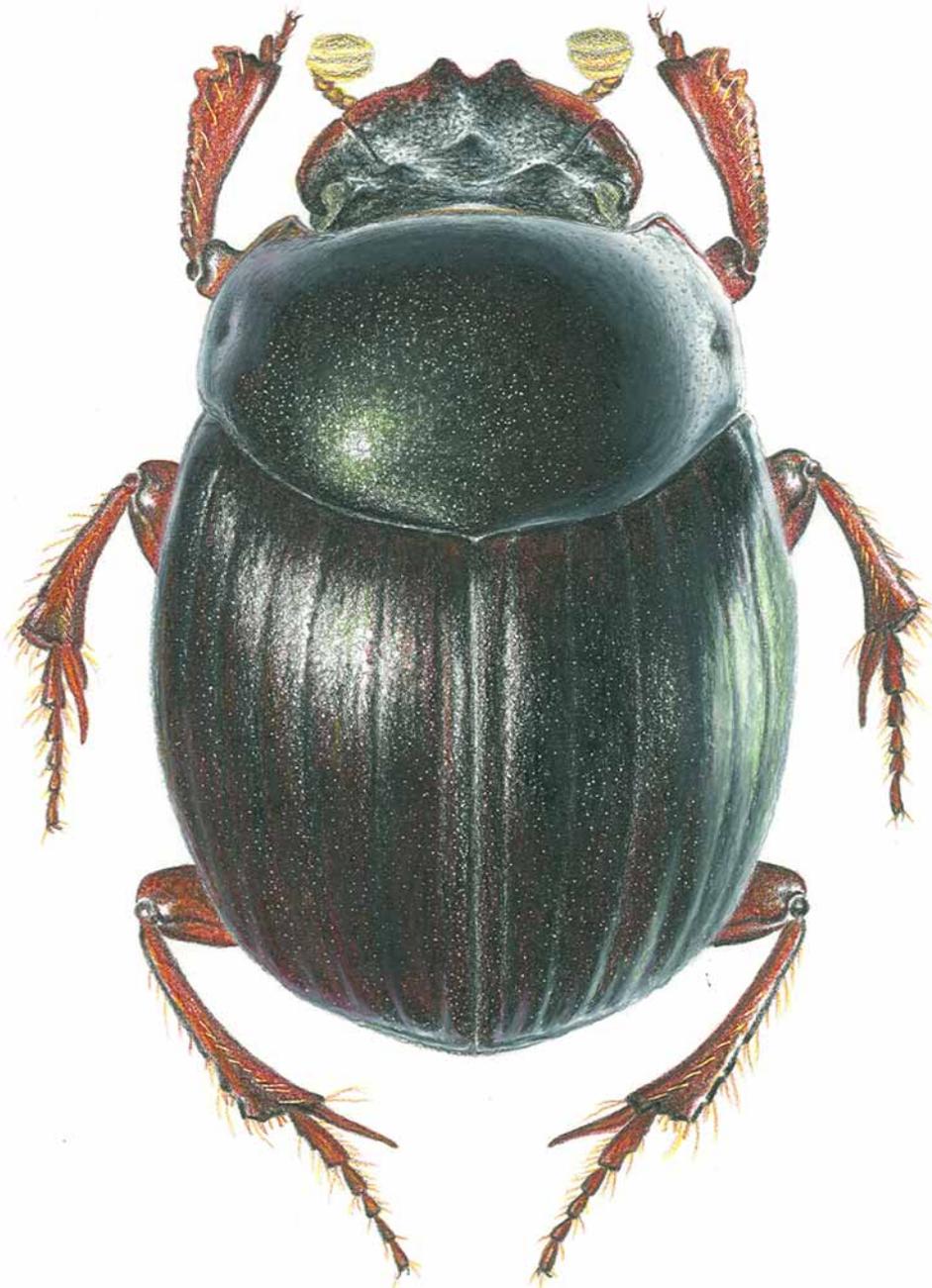
Elytral surface uniformly shagreened; elytral striae broad, dark, smooth, and very slightly impressed; surface dotted with small, polished lunules. Pygidium smooth, shiny, uniformly and minutely punctate, slightly shagreened at base.

Protibia with two developed external teeth, the third weakly developed; protibiae long and slender (same in female), protibial anterior internal angle elongated as a broad, strong spine; mesotibiae and metatibiae clearly dilated apically.

**Allotype:** Female. Total length: 4.2 mm. Elytral width: 2.9 mm. Differs from the holotype by the following characters: protibial anterior internal angle elongated as a fine, slender spine; protibia slightly shorter (0.8 mm).

**Variation:** Total length: 3.9–4.1 mm. Elytral width: 2.5–2.7 mm. Pronotal reflections can be green, red, or dark brown.

**Material Examined** (48 specimens): **Holotype**, male: COSTA RICA: *Limón*. P.N. La Amistad. Punto #5. 1500–1600 m. 24–25 OCT 2007. B. Gamboa, M. Monge. Tp. Foso. L N 198990 627455 #92828. **Allotype**, female: *ibidem*. **Paratypes**. *ibidem*, 6 specimens; *ibidem*, Z.P. Río Banano, Campamento base, 1300–1400 m. 25–26 OCT 2007. L N 199938 627615 #92827, 5 specimens; *ibidem*, P.I. La Amistad Caribe. Camp. 2: Río Coén, Transecto 1. 1700–1800m. 21–23 FEB 2007. B. Gamboa, M. Moraga. Tp. Foso. L\_S\_370381\_549794 #90734, 12 specimens. *Cartago*. La Unión. Z.P. C. Carpintera. Cima. 1870m. 23–25 JUL 2008. J. Azofeifa, B. Hernández, M. Moraga, M. Zumbado. Tp. Malaise/ Intersección. L\_N\_207500\_538000 #94456, 11 specimens; *ibidem*, Z.P. C. Carpintera. Q. Chirracá. 1750m. 22–25 JUL 2008. Azofeifa, Hernández, Moraga, Zumbado. Tp. Malaise/ Intersección. L\_N\_208250\_539000 #94458, 12 specimens; *ibidem*, Z.P. C. Carpintera. Fca. Istarú. 1840–1860m. 22–25 JUL 2008. Azofeifa, Hernández, Moraga, Zumbado. Tp. Malaise/ Intersección. L\_N\_207300\_539000 #94463, 6 specimens.



**FIGURE 3.** Dorsal view of a male *Canthidium darwini*.



**FIGURE 4.** Known distribution of the new species in Costa Rica: *A. earthorum* (■) and *C. darwini* (▲).

**Habitat:** The species has been collected in February, July, and October between 1300 and 1870 m with Malaise/interception and hog dung-baited traps in cloud forest mixed with *Quercus* and Lauraceae.

**Geographical distribution (Fig. 4):** Known only from the Caribbean slope of the Talamanca mountain range.

**Chorological affinities:** The new species is basically occupying a similar altitude (1000–1600 m) in the Caribbean slope of the Talamanca mountain range, as its sister species, *C. marianelae*, does in the Central, Tilarán, and Guanacaste mountain ranges.

**Taxonomic relationships:** This species is hypothesized to be the sister species of *C. marianelae* based on shared morphological characters. These species can be easily separated because the new species is heavily shagreened on the thorax and elytra; whereas *C. marianelae* is only slightly shagreened on the thorax. Moreover, the new species has evident broad, dark, flat, and superficial elytral striae; whereas, *C. marianelae* has broad, flat, and superficial elytral striae, that are very difficult to discern.

**Etymology:** “*Darwini*”, is the genitive form of Darwin. This species is primarily dedicated to the eminent biologist and evolutionist, Charles Darwin. It is additionally dedicated to the UK Darwin Initiative for their contribution to the preservation of tropical biodiversity and as an acknowledgement for financing the project “Basic Tools for Managing the La Amistad (Costa Rica – Panama) International Park.” This project supported the expeditions that resulted in the collection of the specimens used in this study.

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