



## A new species of *Coprophanaeus* Olsoufieff (Coleoptera: Scarabaeidae) from Bolivia

W. D. EDMONDS

P.O. Box 426, Marfa, Texas 79843, USA. E-mail: wdedmonds@sbcglobal.net

### Abstract

*Coprophanaeus caroliae* Edmonds, **new species**, is described. This species occurs in the cloud forests (yungas) of the department of Cochabamba in central Bolivia. It is illustrated and compared with the similar species *Coprophanaeus ignecinctus* (Felsche) and *Coprophanaeus ohausi* (Felsche).

**Key words:** taxonomy, dung beetles, South America, Scarabaeinae, Phanaeini

### Resumen

Se describe *Coprophanaeus caroliae* Edmonds, **especie nueva**, de los nublines (Yungas) del Departamento de Cochabamba, Bolivia. La nueva especie es comparada con las especies similares *Coprophanaeus ignecinctus* (Felsche) y *Coprophanaeus ohausi* (Felsche).

### Introduction

The genus *Coprophanaeus* Olsoufieff comprises 40+ exclusively New World species in three subgenera. The subgenera *Megaphanaeus* Olsoufieff and *Metallophanaeus* Olsoufieff are strictly South American. *Coprophanaeus s. str.* is distributed from Argentina to extreme southern Texas. In contrast to their congeners in the other two subgenera, species comprising the nominate subgenus are known for their sombre coloration and attenuated, but nonetheless distinct sexual dimorphism. The genus was briefly reviewed by Arnaud (2002b) and is currently under taxonomic study by myself and Jiri Zidek. The purpose of this paper is to describe a new species discovered by Caroli Hamel and belonging to the *C. ohausi* species group as redefined by Zidek and myself, in order to enable formal reference to it in faunistic papers to appear before the generic study is completed. The *C. ohausi* species group occurs in South America along the eastern skirts of the Andes from Bolivia to Colombia and differs from other species groups of the subgenus *Coprophanaeus* (*sensu* Edmonds 1972) by the following combination of characters: circumnotal ridge (bead) effaced behind each eye; apical processes of parameres present, acute, elevated dorsally such that tip of paramere (viewed from side) appears sharply hooked; paramere (viewed from side) strongly triangular, base extending well below lower margin of phallobase as heel-like swelling; male and female with trituberculate cephalic carina, sometimes strongly raised, set forward on head such that length of frons along midline greater, usually at least 1.5 times that of clypeus. This new species, which is not referenced in Hamel-Leigue *et al.* (2007), will increase the total number of known Bolivian *Coprophanaeus* from nine to ten.

***Coprophanaeus (Coprophanaeus) caroliae* Edmonds, new species**

Figs. 1–5

**Type Specimens.** Holotype male. BOLIVIA: Cochabamba, Cordillera Mosestenes, Isiboro-Securé N[ational] P[ark], 16°14'10" S 66°24'46" W, 1350 m. 7–16.ix.2003. Humid montane forest. Baited pitfall. Coll. A.C. Hamel L. (*Secondary label*: Human feces baited pitfall trap. Transect IV, trap 3. 14.ix.2003).

Paratypes. 13 males, 8 females: (a) same data as holotype except Transect IV, trap 4, 7.ix.2003 [one male]; (b) same data as holotype except Transect IV, trap 1, 14.ix.2003 [one male]; (c) same data as holotype except Transect IV, trap 5, 15.ix.2003 [one male]; (d) same data as holotype except Transect IV, trap 5, 13.ix.2003 [one male]; (e) same data as holotype except Transect IV, trap 4, 16.ix.2003 [one male]; (f) BOLIVIA: Cochabamba, Cordillera Mosestenes, Isiboro-Securé N[ational] P[ark], 16°13'51" S 66°25'06" W, 1250 m. 1–4.ix.2003. Humid montane forest. Baited pitfall. Coll. A.C. Hamel L. (*Secondary label*: Human feces baited pitfall trap. Transect I, trap 8. 16.ix.2003) [one male]; (g) same as foregoing except Transect I, trap 2, 1.ix.2003 [one male]; (h) same as foregoing except Transect I, trap 3, 1.ix.2003 [one male]; (i) same as foregoing except Transect I, trap 3, 2.ix.2003 [one female]; (j) same as foregoing except Transect I, trap 1, 1.ix.2003 [two males]; (k) same as foregoing except Transect I, trap 10, 1.ix.2003 [one female]; (l) same as foregoing except Transect I, trap 6, 4.ix.2003 [two females]; (m) same as foregoing except Transect I, trap 9, 1.ix.2003 [one female, one male][.]; (n) same as foregoing except Transect 1, trap 7, 2.ix.2003 [one male]; (o) BOLIVIA: Cochabamba, Cordillera Mosestenes, Isiboro-Securé N[ational] P[ark], 16°13'53" S 66°24'53" W, 1320 m. 1–17.ix.2003. coll. D. Embert. Humid montane forest. *Secondary label*: Unbaited pitfall trap (Transect IV – 14.ix.2003) [one male]; (p) same as foregoing except 7.ix.2003 [one female]; (q) BOLIVIA: Cochabamba, Cordillera Mosestenes, Isiboro-Securé N[ational] P[ark], 16°13'53" S 66°24'53" W, 1250 – 1600 m, 1–17.ix.2003, hand collecting, coll. A.C. Hamel L. *No secondary label* [one female]; (r) BOLIVIA: Cochabamba, Cordillera Mosestenes, Isiboro-Securé N[ational] P[ark], 16°14'04" S 66°25'06" W, 1310 m. 17.ix.2003. Humid montane forest. Baited pitfall. Coll. A.C. Hamel L. *Secondary label*: Human feces baited pitfall trap, Transect V, trap 10, 17.ix.2003 [one female].

All type specimens bear my determination/designation labels printed in black ink on white paper with blue (holotype) or red (paratypes) lateral margins. Aedeagi are extracted and mounted on white points tipped with blue (holotype) or red (paratypes) marks; sixth sternites are extracted and contained in microvials mounted beneath each male. The holotype and one female paratype are deposited in the Colección Boliviana de Fauna, La Paz. Remaining paratypes (21) are distributed as follows: Museo de Historia Natural Noel Kempff Mercado, Santa Cruz (two males, two females); Oxford University Museum of Natural History (seven males, two females); The Natural History Museum, London (one male, one female); Canadian Museum of Nature, Ottawa (one male, one female); private collection of W. D. Edmonds, Marfa (two males, one female).

**Diagnosis:** *Coprophanaeus caroliae* (Figs. 1–5) can be separated from the similar, sympatric Bolivian species *C. ignecinctus* (Figs. 6–8) by secondary male characteristics of the head and pronotum, shape of the apical process of the parameres, and sculpturing and relief of the female vertex (see Discussion below).

**Holotype** (Figs. 1–3): Large (major) male, length (including head) ~ 21 mm, width (at base of elytra) ~ 12 mm. Color and color pattern: Head black except for metallic green surrounding upper eye and on posterior angle of paraocular area. Pronotum black except for anterior, lateral and posterior margins (including fossae) and lateral and adjacent median fossae, which are metallic red with golden highlights. Elytra black with very weak green reflections along lateral margin and in small fossae at anterior ends of striae. Pygidium and lower surfaces of femora and of meso- and metatibiae metallic red. Anterior (vertical) portion of metasternum black except metallic green along coxal margins. Head: Clypeus completely transversely ridged. Paraocular areas flat, punctatorugose, sculpturing becoming weaker toward margin of eye. Cephalic carina raised, weakly trituberculate, line connecting tubercles almost straight, only slightly bowed anteriorly. Frons flattened, finely and

sparingly punctate, puncturing progressively weaker and less dense posteriorly. (Note: left antenna missing except for scape). **Pronotum:** Each side with large, anteriorly narrowed fossa mesal to the small, circular lateral fossa. Medially raised as pair of blunt, rounded tubercles separated by elongate concavity; concavity deepest between tubercles, dissipating about one-half distance to anterior pronotal margin; lateral face of each tubercle with fine carina descending toward fossa. Pronotal sculpturing as follows: Sides with dense, squamose granules; granulation becoming finer and less dense mesally and posteriorly except continuing as narrow band that encompasses median tubercles and concavity. Anterior declivity smooth, with simple puncturing becoming finer and sparser toward midline. **Elytra:** Striae very weak; anterior ends of striae 2–4 ending in small pits. Interstriae dull, completely shagreened, distinctly raised and slightly less dull along midline (as in Figs. 1 and 5). **Pygidium:** Completely punctatorugose, with weak basal sulcus. **Aedeagus** (Fig. 3): Length of parameres (measured laterally from tip to basal articulation with phallobase) clearly exceeding one-half that of phallobase (measured from articulation with paramere to basal constriction). Tips of apical processes of parameres (viewed caudally) elevated about 45° above horizontal; apical processes attenuated, (viewed laterally) scarcely projecting above dorsal margin of paramere. Base of parameres (viewed laterally) heel-like, swollen ventrally below tip of phallobase.

The holotype was selected because it is the largest male in the type series; it differs from all paratype males by having reduced coloration on the posterior portion of head, anterior angles of the pronotum, elytra and metasternum.

**Variation:** **Color and color pattern:** Metallic color around eyes and on paraocular area usually red to reddish green. Metallic red on pronotum varies somewhat in extent and degree of infusion with yellow highlights, but when present, always confined to anterolateral angles, margins and concavities. Pygidium with red color sometimes confined to basal one-half. Green infusion on elytra varies in extent from nearly absent (as in holotype) to covering entire elytral surface. Anterior (vertical) surface of metasternum usually bicolored, green ventrally with red band above. **Head:** Line connecting tubercles of female cephalic carina usually anteriorly bowed. **Pronotum:** In smaller males median tubercles smaller, more widely separated, remnants joined by faint line in smallest individuals; lateral face of tubercles lacking carina. In females (Fig. 4) convex, with transverse anteromedian concavity bordered in front by medially raised and weakly bituberculate, anteriorly bowed carina. Pronotal sculpturing as follows: in females squamose granulation covers anterior two-thirds of pronotum; posterior one-third punctate, progressively more weakly and densely so posteriorly. In smaller males squamose granulation usually less pronounced and less widely distributed than in larger males. Length (including head) 17–22 mm; width (at base of elytra) 12–14 mm.

**Etymology of Species Name.** It is a pleasure to dedicate this species to its discoverer, Caroli Hamel-Leigue, in recognition of her pioneering contributions to the growing knowledge of the scarabaeine dung beetle fauna of Bolivia.

**Discussion.** At first glance, *Coprophanaeus caroliae* is strikingly similar to *C. ignecinctus* (Felsche), with which it coexists at the type locality. Similar features include the dark, predominately black dorsal color; the narrow, metallic red band of color around the margin of the pronotum; the metallic red pygidium and femora; and elytral interstriae that are narrowly raised along the midline (as in Fig. 5). *Coprophanaeus caroliae*, however, differs from *C. ignecinctus*, a member of the *telamon* species group as redefined by Zidek and myself, in several important respects: the male head bears a trituberculate carina (Fig. 3) versus an apically horned, laminate process (Fig. 6); the apical processes of the parameres (viewed laterally, Fig. 3) are attenuated versus strong, hook-like processes (Fig. 8); the female vertex is lightly punctured, flattened and (seen laterally) about the same level as the dorsal margin of the upper eye (versus strongly punctured, convex and [viewed laterally] distinctly raised above the dorsal margin of the upper eye); and a smaller size, body length usually less than 20 mm (versus 25 mm or more). The configuration of the male pronotum, elytral relief, distribution, and coloration will distinguish *C. caroliae* from *C. ohausi* (Felsche). The latter species bears a bitumid, transverse prominence above a very smooth, almost vertical anterior pronotal surface; has evenly convex elytral interstriae;



**FIGURE 1–8.** 1. *Coprophanaeus caroliae* Edmonds, male holotype, dorsal view. 2. *Coprophanaeus caroliae* Edmonds, male holotype, anterolateral view of forebody. 3. *Coprophanaeus caroliae* Edmonds, holotype; left: lateral view of aedeagus; right: dorsal view of parameres. 4. *Coprophanaeus caroliae* Edmonds, female paratype, dorsal view. 5. *Coprophanaeus caroliae* Edmonds, portion of left elytron enlarged from Fig. 4. 6. *Coprophanaeus ignecinctus* (Felsche), male, anterolateral view of forebody. 7. *Coprophanaeus ignecinctus* (Felsche), male, dorsal view. 8. *Coprophanaeus ignecinctus* (Felsche), left: lateral view of aedeagus; right: dorsal view of parameres.

bears only blue (rarely green) coloration; and occurs in lower premontane Amazonian forests from extreme northwestern Bolivia to eastern Colombia. The male of *C. caroliae* resembles that of *C. lecromi* Arnaud, a Colombian species known only from the holotype male, which appears also to be a member of the *C. ohausi* species group. The holotype of Arnaud's species was not available for direct examination for this study. Its original (Arnaud 2002a) and subsequent (Arnaud 2002b) descriptions are somewhat inconsistent; they do, however, suggest some similarities in pronotal (central bumps) and paramere (apical processes) structure, and differences in distribution, metallic color (red versus yellowish green [as shown in his photograph]), relief of the elytral interstriae (narrowly raised mid-longitudinally versus "subconvexe"), and transverse pronotal ridge (usually lacking versus extending laterally from central tubercles). Only when additional specimens of *C. lecromi* become available will its relationship to *C. caroliae* become clearer.

## Acknowledgments

My sincerest thanks to Caroli Hamel and Darren J. Mann (Oxford University Museum of Natural History) for graciously arranging the loan of the type series; and to Jiri Zídek for the splendid photographs comprising Figs. 1–8, and for his careful review of the manuscript.

## References

- Arnaud, P. (2002a) Descriptions de nouvelles espèces de Phanaeides (Col. Scarabaeidae). *Besoiro*, 7, 2–9 & 11–12.
- Arnaud, P. (2002b) *Les Coléoptères du Monde, volume 28 Phanaeini*. Hillside Books, Canterbury, Kent, U.K., 151 pp.
- Edmonds, W.D. (1972) Comparative skeletal morphology, systematics and evolution of the phanaeine dung beetles (Coleoptera: Scarabaeidae). *University of Kansas Science Bulletin*, 49, 731–874.
- Hamel-Leigue, A.C., Mann, D.J., Vaz-de-Mello, F.Z., & Herzog, S.K. (2006) Hacia un inventario de los escarabajos peloteros (Coleoptera: Scarabaeinae) de Bolivia: Primera compilación de los géneros y especies registrados para el país. Toward an inventory of the dung beetles (Coleoptera: Scarabaeinae) of Bolivia: First compilation of the genera and species reported for the country. *Revista Boliviana de Ecología y Conservación Ambiental*, 20, 1–18.