Zootaxa 2531: 64–68 (2010)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

A new species of scarab beetle, *Madecorphnus cuccodoroi* (Coleoptera: Scarabaeidae: Orphninae), from northern Madagascar

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Abstract

Madecorphnus cuccodoroi Frolov, **sp. n.** is described from specimens collected in indigenous forest in Amber Mountain National Park, northern Madagascar. The new species differs from the similar species *M. peyrierasi* Frolov and *M. perinetensis* Frolov in the shape of the parameres and internal sac armature.

Key words: scarab beetles, orphnines, new species, Madagascar

Introduction

The scarab beetle genus *Madecorphnus* Paulian, 1992, one of the two larger Madagascan-endemic orphnine genera, was recently revised and currently comprises 12 species (Frolov 2010). After the revision was accepted for publication, I was given the opportunity to examine additional series of a *Madecorphnus* species collected in northern Madagascar and housed in the Muséum d'histoire naturelle de Genève (MHNG). This species proved to be new and it is described below. Two of the seven paratypes were donated to the Zoological Institute of Russian Academy of Sciences, St.-Petersburg (ZIN). The purpose of this paper is to describe the new species and provide an updated key couplet to include the new species.

Material and methods

Photographs of the habitus and parameres were taken with a Leica MZ9.5 stereo microscope from dry specimens. Partially focused serial images were combined in Helicon Focus software (Helicon Soft Ltd.) to produce completely focused images. Photographs of the internal sac armatures were taken with the same microscope from specimens in glycerol. Distribution map was generated with ArcGIS software (ESRI Ltd.). Coordinates of the localities were taken from the specimen labels.

Systematics

Madecorphnus cuccodoroi Frolov, sp. n.

Figs. 1–4, 6, 9

Type material. Holotype, male: North Madagascar, Amber Mountain National Park, 3 km NE camp site, 12°33'09"S, 49°09'40"N, 1300 m. 28.II.2003, G. Cuccodoro leg. (MHNG). Paratypes, 7 specimens with the same data as the holotype except with the exact locality and date as follows: 2,5 km SE camp site, 12°31'12"S, 49°11'42"N, 1050 m. 11.III.2003, 1 male (MHNG); 1 km NW camp site, 12°31'55"S, 49°10'32"N, 1000 m. 2.III.2003, 1 male (MHNG); 3 km NE camp site, 12°32'30"S, 49°10'02"N, 1250 m. 15.III.2003, 2 males (MHNG, ZIN); 2,5 km SE camp site, 12°31'15"S, 49°11'40"N, 950 m. 03.III.2003, 1 female (MHNG); 0,5 km NE camp site, 12°31'50"S, 49°10'25"N, 1000 m. 01.III.2003, 2 females (MHNG, ZIN).

 Accepted by A. Smith: 19 Jun. 2010; published: 9 Jul. 2010

Description. Holotype, male (Fig. 1). Body length 5.5 mm. Color uniformly dark brown, almost black, legs somewhat paler.

Right mandible slightly longer than left, without tooth behind apex. Labrum trapezoidal, with slightly rounded sides, length about 1/6 width (in dorsal view). Clypeus very slightly asymmetrical, apically obtuse, with 2 long and 2 shorter setae on the apical margin. Genae very small, not protruding past eyes. Canthus and frontal suture indistinct. Clypeus slightly depressed apicomedially. Head without traces of frontoclypeal suture, finely punctate with minute punctures separated by greater than 4 times their diameter.

Pronotum approximately 1.5 times wider than long, widest medially. Disc of pronotum convex, without any depressions, tubercles, or ridges. Punctation on pronotum finer than on head, almost indistinct. Margins with relatively wide border, lateral margins with 4 long setae: 1 seta on basal angle, 1 seta approximately in the middle of lateral margin, and 2 setae on the apical angle.

Scutellum triangular, angulate apically, about 1/12 length of elytra.

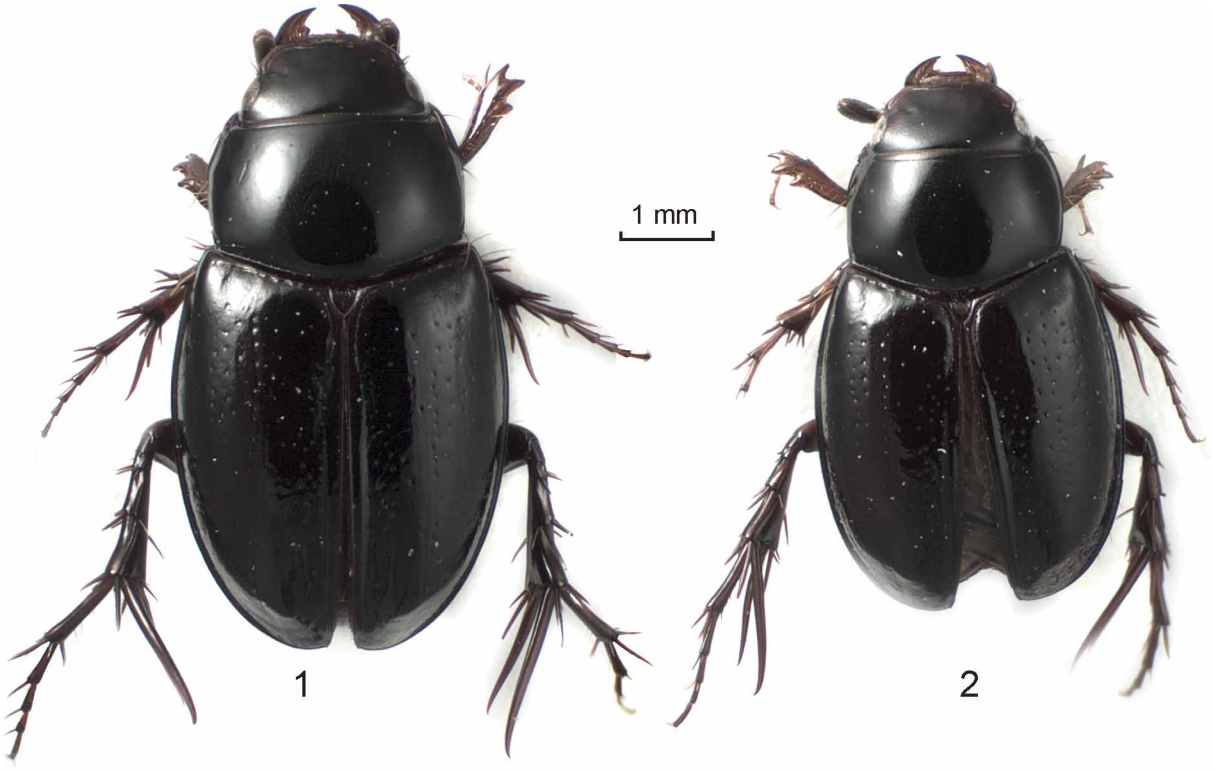
Elytra convex, with distinct humeral and apical, widest at basal third. First stria distinct and reaching the apex of elytron, other striae indistinct. Disc of elytra sparsely punctate with relatively large punctures. Epipleura with long, sparse, brown setae. Base of elytron with border from scutellum to humeral callus. Wings fully developed.

Protibiae with 3 outer teeth, lateral margin basad of outer teeth not crenulate. Apex with robust, spur-like seta and a few smaller setae basally. Middle and posterior legs similar in shape to each other. Longer tibial spur shorter than 2 basal tarsomeres in middle legs and as long as 2 tarsomeres in posterior legs.

Parameres with small teeth laterally, narrowly rounded apically in dorsal view and curved downwards in lateral view (Fig. 3). Internal sac with 2 long sclerites and a large number of small spinules; some spinules more robust and form two indistinctly separated clusters in apical part (Fig. 6, indicated by arrows).

Female (Fig. 2) differs from male in having apical spur of protibiae that is slightly longer and more robust than apical seta in male.

Variability. Body length of the paratypes varies from 5.0 to 5.5 mm. Left and right mandibles of male paratypes are almost equal in length and similar to those in females. Otherwise the paratypes are similar to the holotype.



FIGURES 1–2. *Madecorphnus cuccodoroi* Frolov dorsal habitus: (1) holotype, male, (2) paratype, female.

FIGURES 3–8. *Madecorphnus* spp., male genitalia details: (3, 6) *M. cuccodoroi* Frolov holotype, (4, 7) *M. perinetensis* Frolov, (5, 8) *M. peyrierasi* Frolov; (3–5) parameres in dorsal and lateral view, (6–8) armature of the invaginated internal sac of the aedeagus.

Diagnosis. This species is externally similar to *M. peyrierasi* Frolov and *M. perinetensis* Frolov. It can reliably be separated from these species only by the shape of the parameres and, especially, the internal sac armature. In *M. peyrierasi* and *M. perinetensis*, the internal sac armature consists of two larger sclerites basally, two smaller comma-shaped sclerites apically and an area of numerous minute spinules situated between the sclerites (Figs. 7, 8). In *M. cuccodoroi*, the two larger sclerites are probably homologous to those in the previous species, but they differ slightly in shape. The area composed of numerous minute spinules is larger in the new species and the spinules are somewhat coarser on average. Most prominently, a part of the

apical spinules is much more robust than in the other species and they are almost tooth-shaped (Fig. 6). This type of internal sac armature is not known in other *Madecorphnus* species.

The new species also differs from *M. peyrierasi* and *M. perinetensis* in the shape of the parameres, which are somewhat wider and more curved at apices (Figs. 3–5).

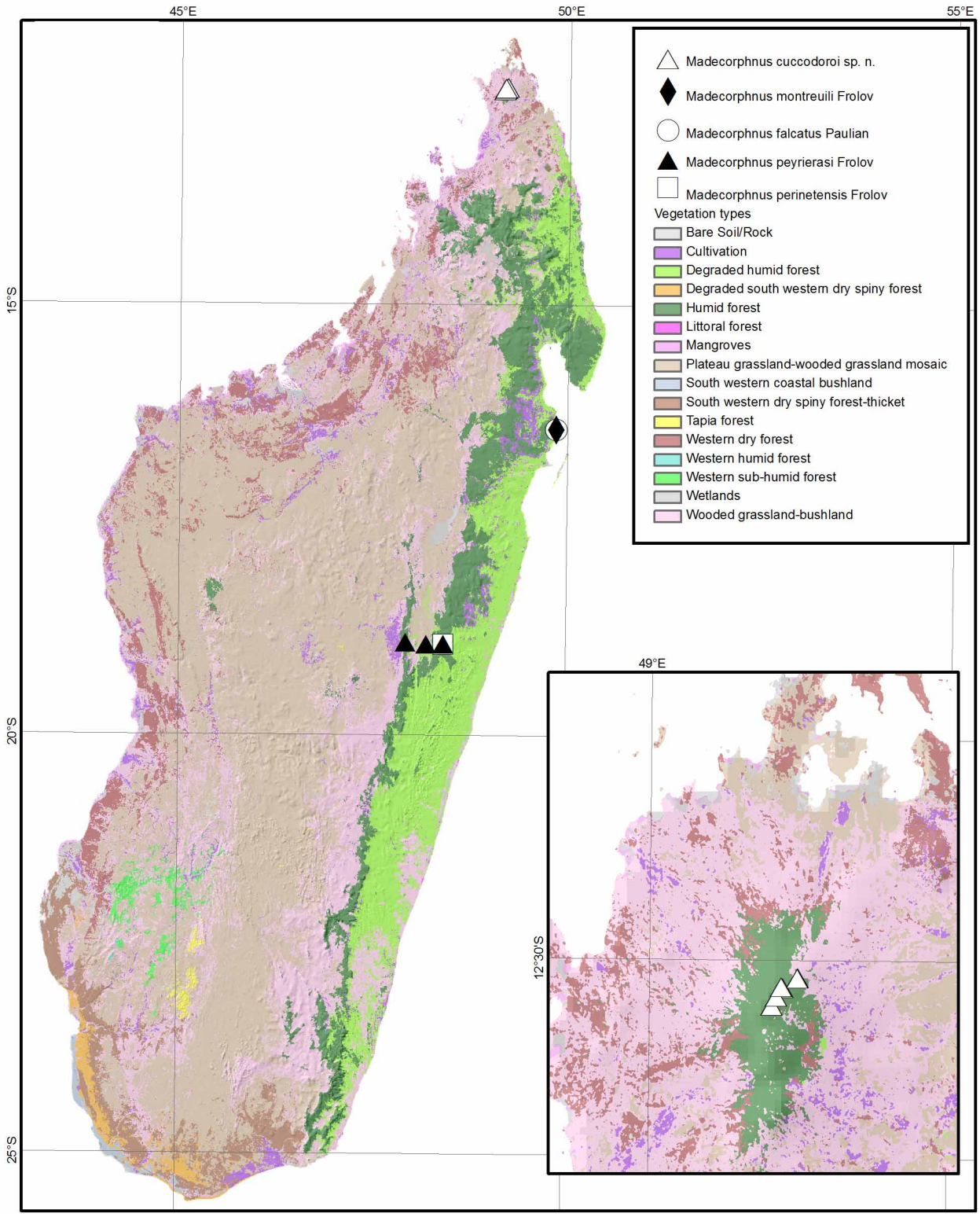


FIGURE 9. *D*istribution map of *Madecorphnus cuccodoroi* Frolov, *M. perinetensis* Frolov, *M. montreuili* Frolov, *M. falcatus* Paulian, and *M. peyrierasi* Frolov.

In the key to *Madecorphnus* species (Frolov, 2010), couplet 10 should be updated to accommodate the new species as follows:

10. Internal sac of aedeagus with two large separate sclerites and numerous small spinules, some of which are robust and almost tooth-shaped and may be arranged into two indistinctly separated clusters..... *M. cuccodoroi* **sp. n.**
- Internal sac of aedeagus with two or more separate sclerites and numerous small spinules; the later are very fine and are all approximately the same size .....11 (*M. brunneus* Frolov, *M. perinetensis* Frolov, *M. peyrierasi* Frolov)

Distribution. The beetles were collected near the main camp site of the Amber Mountain National Park in Antsiranana Province (northern Madagascar). The park occupies the Madagascan northernmost remnant of indigenous humid forest covering about 200 square km (Fig 9). It is possible that the range of the new species is limited to this forest. This locality record is now the northernmost for the genus *Madecorphnus,* and is some 450 km north of the collecting localities of *M. falcatus* Paulian and *M. montreuili* Frolov in Antongil Bay. All the other species of the genus were collected south of the latitude of 18°30'S (Frolov 2010, Fig. 31).

Bionomy. The natural history of the new species was not specifically studied by the collector. All the specimens were collected by sifting forest litter. The number of collected specimens suggests that the population density of *M. cuccodoroi* is low at least during the season when the collecting was done.

Etymology. The new species is named after Giulio Cuccodoro (MHNG) who collected the type series.

Acknowledgments

I would like to thank Giulio Cuccodoro for the opportunity to work with the material he collected in Madagascar and for assistance during my visit to the MHNG. Two anonymous reviewers and Andrew Smith (Canada Museum of Nature) are acknowledged for their comments on this paper. This work was supported by an Ernst Mayr Travel Grant and by the Russian Foundation for Basic Research (grant number 10-04-00539-a).

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