

## Revision of the Madagascan genus *Madecorphnus* Paulian (Coleoptera: Scarabaeidae: Orphninae)

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A scarab beetle genus, *Madecorphnus* Paulian, endemic to Madagascar, is revised. Nine new species are described: *M. brunneus* sp. nov., *M. dentatus* sp. nov., *M. montreuili* sp. nov., *M. niger* sp. nov., *M. pauliani* sp. nov., *M. perinetensis* sp. nov., *M. peyrierasi* sp. nov., *M. punctatus* sp. nov., *M. simplex* sp. nov. Diagnosis of the genus is clarified. Distribution map and a diagnostic key to all species are presented.

**Keywords:** scarab beetles; orphnines; new species; *Madecorphnus*; Madagascar

### Introduction

Scarab beetles of the subfamily Orphninae occurring in Madagascar include 4 genera and 21 described species (Paulian 1937, 1977, 1992; Frolov and Montreuil 2006, 2009). The genus *Madecorphnus* Paulian comprises small-sized, dark brown to black, apparently saprophagous beetles which are widely distributed on the island. The first known species of the genus and its type species, *M. falciger* (Lansberge, 1886), was originally described in the genus *Drepanognathus* Lansberge, along with *D. mandibularis* Lansberge (currently *Orphnus mandibularis*). Since the generic name *Drepanognathus* was preoccupied, the substitute name *Sissantobius* Ritsema was used for the two species. The name *Madecorphnus* was proposed by Paulian (1977) to accommodate *M. falciger* and *S. falcuoides* Paulian from Madagascar and to separate these two species from African *Orphnus mandibularis*, the type species of the genus *Sissantobius*. Synonymy of the names *Drepanognathus*, *Sissantobius*, and *Madecorphnus* is discussed in more detail in Paulian (1992) and Frolov (2005).

Before the present contribution the genus *Madecorphnus* comprised three nominal species: *M. falciger*, *M. falcuoides* and *M. falcatus* Paulian. The two later species were only known from small type series. Most of the collected *Madecorphnus* specimens were previously identified as *M. falciger*. The previous workers, however, did not use characters of the male genitalia, especially parameres and internal sac armature, which are the most reliable diagnostic characters at species level in the Orphninae (unpublished data). After dissecting most of the specimens, I found that more than 10 species can be recognized in this material. This necessitated examination of the type specimens of the described species and revision of the genus.

*Madecorphnus* specimens are extremely rare in collections. Most probably, population densities of all Madagascan species of the Orphninae are low. Some of

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the new species are described below from single specimens. I believe, however, that the descriptions are justified since the differences found cannot be attributed to aberrations, malformations, or interspecific variability of fewer species. The shape of the parameres is very stable at species level in the Orphninae as is the armature of the internal sac of the aedeagus, especially if it consists of a few large sclerites. This was found during examination of a reasonable series of different species of the genus *Orphnus* and some other genera of Orphninae (unpublished data).

The diagnostic key is provided for all species, but is suitable for males only. Differentiation of females of closely related species may be difficult or impossible in some cases as in many scarab beetle groups. Also, females of some *Madecorphnus* species are unknown.

### Material and methods

The material used for this study is housed at the Muséum National d'Histoire Naturelle, Paris, (MNHN) which, for historical reasons, is the only institution possessing a reasonable number of *Madecorphnus* specimens at the moment.

To analyze the distribution of the species, a map was generated with ArcGIS software (ESRI, Inc.). As the base map, a Madagascar vegetation map (<http://www.veg-mad.org>) was used. The vegetation map provides a good general representation of the main biomes of Madagascar. Localities were traced using available atlases and a special publication about the main collecting localities on the island (Viette 1991). Co-ordinates of the localities were taken from the NGA GEONet Names Server (GNS, <http://earth-info.nga.mil/gns/html/index.html>). Preparation of genitalia follows the common technique used in entomological research.

### *Madecorphnus* Paulian, 1992

Type species *Drepanognathus falciger* Lansberge, 1886, designated by Paulian (1977).

= *Drepanognathus* Lansberge, 1886, pars.

= *Sissantobius* Ritsema, 1888: Paulian, 1977, pars.

### Diagnosis

Small-sized beetles (4.5–5.0 mm) with mostly uniform, brown to black colouration. Clypeus symmetrical to asymmetrical in males, wide, bordered anteriorly. Mandibles asymmetrical, subequal in length in females and subequal to strongly unequal in males. Head smooth. Frontal tubercles absent. Pronotum wider than long, smooth, lateral margins bordered, with four to five long setae. Disc of pronotum similar in both sexes, without any depressions, tubercles, or ridges. Elytra with only first stria distinct. Scutellum triangular, widely rounded apically, about 1/10 length of elytra. Wings fully developed. Parameres symmetrical. Internal sac of aedeagus with one or a few sclerites.

The members of *Madecorphnus* have a number of characters which distinguish the genus from other Orphninae and which are uncommon or unique among the Scarabaeidae. First, the mandibles in males may be highly asymmetrical in both

shape and length. In some specimens, the right mandible is twice as long as the left one or even longer. Such specimens also have a clearly asymmetrical clypeus (Figures 1, 3–7). The shape of the mandibles is species-specific at least in some species, but it is subject to allometric variability and, therefore, cannot always be a reliable diagnostic character.

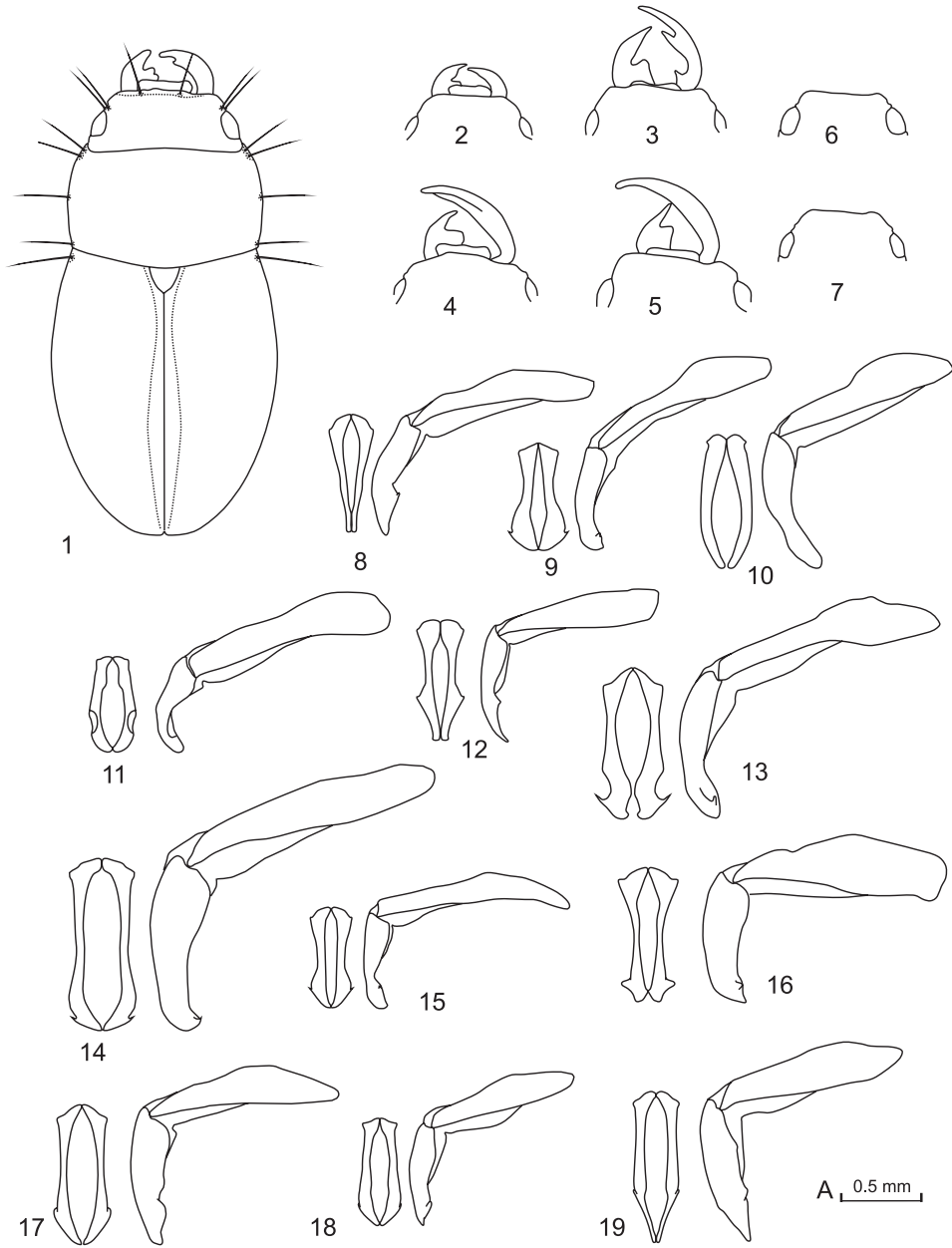
The second feature, characteristic of the genus, is the presence of a few long setae on the sides of the body and head; the setae have distinct numbers and locations. In general, pubescence of the body is extremely diverse in scarab beetles, ranging from almost absent in some groups to very dense, long, and almost completely hiding sclerites in others. It is subject to some variation within and among species and often differs in the different sexes. Pubescence of the body is widely used in species identification. However, as far as I know, individual homologizable setae, at least on the pronotum and elytra, have not been described in the Scarabaeidae. All the *Madecorphnus* species except for two possess the following symmetrically located long setae (Figure 1): one seta on elytral base near epipleuron, one seta on posterior angle of pronotum, one seta approximately in the middle of lateral margin of pronotum, two setae on the anterior angle of pronotum, two setae on each gena, and two setae on the anterior margin of clypeus. As an exception, *M. pauliani* sp. nov. has three setae on each anterior angle of pronotum and a female of *M. dentatus* sp. nov. has two setae on the hind angle. Even if one or a few of these setae are absent, there is no doubt that they were lost as a result of abrasion, since in the places where they should be according to the scheme given previously, there are characteristic foveae with chaetiferous pores. There are no other setae on the dorsal side of the body except for mouthparts. There are long, relatively sparse setae on epipleura and ventral side of thorax, but they do not have definite locations. Also, often there are small setae on the anterior margin of clypeus.

The third feature that distinguishes *Madecorphnus* among other *Orphninae* is a weaker sexual dimorphism. The sexes mostly differ in the shape of the mandibles. Males with relatively feebly developed mandibles are similar to females. In *Madecorphnus*, the sexual dimorphism character common for all *Orphninae* genera, namely the absence of distinct anterior tibial spur in males, is less expressed than in other genera. Often, the apical seta is longer and more robust than others and it is similar to the spur. *Madecorphnus* males also lack any clypeal horns and prothoracic ridges and excavations which are found in majority of species of almost all genera of *Orphninae*.

#### *Distribution and bionomy*

Judging from the known collecting localities (Figure 31), *Madecorphnus* species are distributed throughout Madagascar but mostly in the eastern part of the island. The notable exception is *M. falculoides* which was found in the western part. The majority of the localities agree well with current distribution of remnants of indigenous forests. This suggests that forest is the preferred habitat for *Madecorphnus*. However, collecting might be biased since more insect sampling was done in the forests than in the arid central and western Madagascar.

Almost nothing is known about bionomy of *Madecorphnus*. The labels of the collected specimens lack any data about the way the beetles were collected. It is possible that *Madecorphnus* species are generally saprophagous litter dwellers. They might



Figures 1–19. *Madecorphus* spp. (1) Habitus and scheme of chaetotaxy; (2–7) head; (8–19) aedeagus in lateral view and parameres in dorsal view. (1, 9) *M. montreuili* sp. n.; (2, 12) *M. punctatus* sp. n.; (3, 8) *M. ferculoides*; (4, 10) *M. pauliani* sp. n.; (5, 14) *M. falcatus*; (6, 18) *M. perinetensis* sp. n.; (7, 19) *M. peyrierasi* sp. n.; (13) *M. dentatus* sp. n.; (15) *M. simplex* sp. n.; (16) *M. falciger*; (17) *M. brunneus* sp. n. Note: Scale for Figures 8–19.

also be attracted to carrion like *Pseudorphnus hiboni* Paulian (Frolov and Montreuil 2006). Nesting behaviour and preimaginal stages are so far unknown.

*Key to the Madecorphanus species (males)*

1. Right mandible with a tooth on inner side of scissorial part (Figures 1, 3) ..... 2  
 Right mandible without a tooth on inner side of scissorial part (Figures 2, 4, 5) ..... 3
2. Parameres slender in dorsal view (Figure 8). Internal sac of aedeagus with two large bifurcated sclerites and a few dozen spinules (Figure 20). Mentum without tubercles ..... *M. falculoides* Paulian  
 Parameres wider in dorsal view, with one small tooth each (Figure 9). Internal sac of aedeagus with two bifurcated sclerites, with smaller spinules (Figure 21). Mentum with two tubercles. .... *M. montreuili* sp. nov.
3. Apices of parameres without lateral teeth (Figures 10, 11) ..... 4  
 Apices of parameres with more or less developed lateral teeth (Figures 12–19) ..... 5
4. Parameres without lateral excavations, about 1.5 times longer than basal sclerite of aedeagus (Figure 10) ..... *M. pauliani* sp. nov.  
 Parameres with lateral excavations, about two times longer than basal sclerite of aedeagus (Figure 11) ..... *M. niger* sp. nov.
5. Head and pronotum with fine dense punctuation. Internal sac of aedeagus with three large sclerites and an area with smaller spinules (Figure 23) .....  
 ..... *M. punctatus* sp. nov.  
 Head and pronotum with indistinct to sparse punctuation (punctures separated by at least three times their diameter). Internal sac of aedeagus with different armature ..... 6
6. Parameres with large lateral teeth (Figure 13) ..... *M. dentatus* sp. nov.  
 Parameres with small lateral teeth (Figure 14–19) ..... 7
7. Internal sac of aedeagus with one sclerite composed of two long slender spinules connected basally (Figure 25) ..... *M. simplex* sp. nov.  
 Internal sac of aedeagus with two or more separate sclerites ..... 8
8. Parameres with small teeth at extreme apex (Figure 14, lateral view). Larger (7.0 mm) ..... *M. falcatus* Paulian  
 Parameres of different shape. Smaller than 6.0 mm ..... 9
9. Parameres with angulate lateral teeth (Figure 16). Internal sac of the aedeagus with two large semicircular sclerites and one long spur-shaped sclerite (Figure 27) ..... *M. fasciger* (Lansberge)  
 Parameres with small lateral teeth. Internal sac armature different ..... 10
10. Parameres less acute in lateral view (Figure 17). Internal sac of the aedeagus with one longer sclerite and one smaller, somewhat bifurcated sclerite (Figure 28) ..... *M. brunneus* sp. nov.

Parameres more acute in lateral view (Figures 18–19). Internal sac with two longer and two smaller sclerites (Figures 29, 30) . . . . .11

- 11. Parameres less tapering apically, lateral teeth closer to paramere apices (Figure 18). Eyes somewhat larger (Figure 6). . . . . *M. perinetensis* sp. nov.  
Parameres more tapering apically, lateral teeth not so close to paramere apices (Figure 19). Eyes somewhat smaller (Figure 7). . . . . *M. peyrierasi* sp. nov.

***Madecorphnus ferculoides* (Paulian, 1977)**  
(Figures 3, 8, 20, 31)

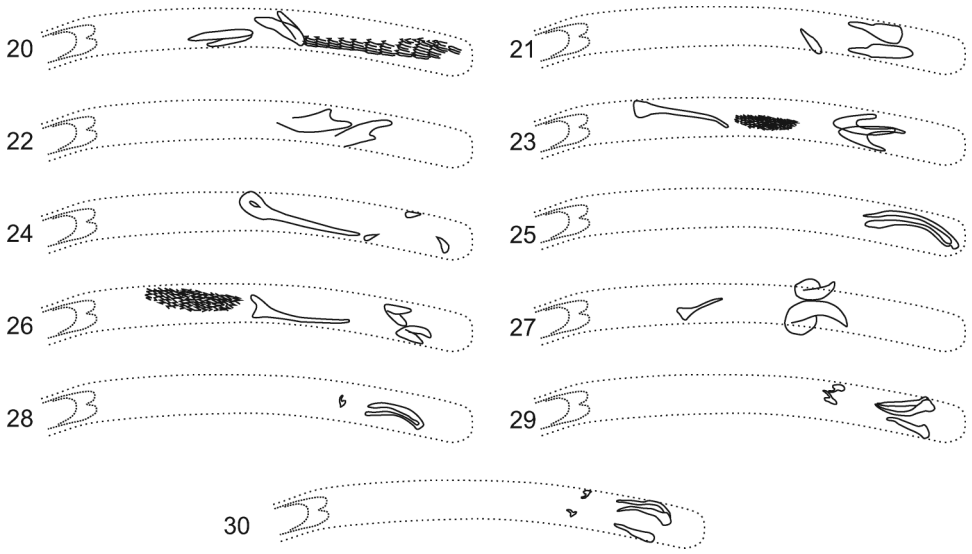
*Type material*

*Holotype, male.* Antsalova, Antsingy, Nature Reserve no 9, I.1975, A. Peyrieras leg (MNHN).

*Paratypes.* One male and four females with the same data as the holotype.

*Diagnosis*

This species is similar to *M. montreuili* sp. nov. in having the right mandible with a tooth on inner side of scissorial part; it differs from it in the shape of the mandibles (Figure 3) and parameres (Figure 8) and in the absence of tubercles on the mentum.



Figures 20–30. *Madecorphnus* spp., schematic representation of invaginated internal sac of aedeagus with armature. (20) *M. ferculoides*; (21) *M. montreuili* sp. n.; (22) *M. pauliani* sp. n.; (23) *M. punctatus* sp. n.; (24) *M. dentatus* sp. n.; (25) *M. simplex* sp. n.; (26) *M. falcatus*; (27) *M. falciger*; (28) *M. brunneus* sp. n.; (29) *M. perinetensis* sp. n.; (30) *M. peyrierasi* sp. n. Note: Not to scale.

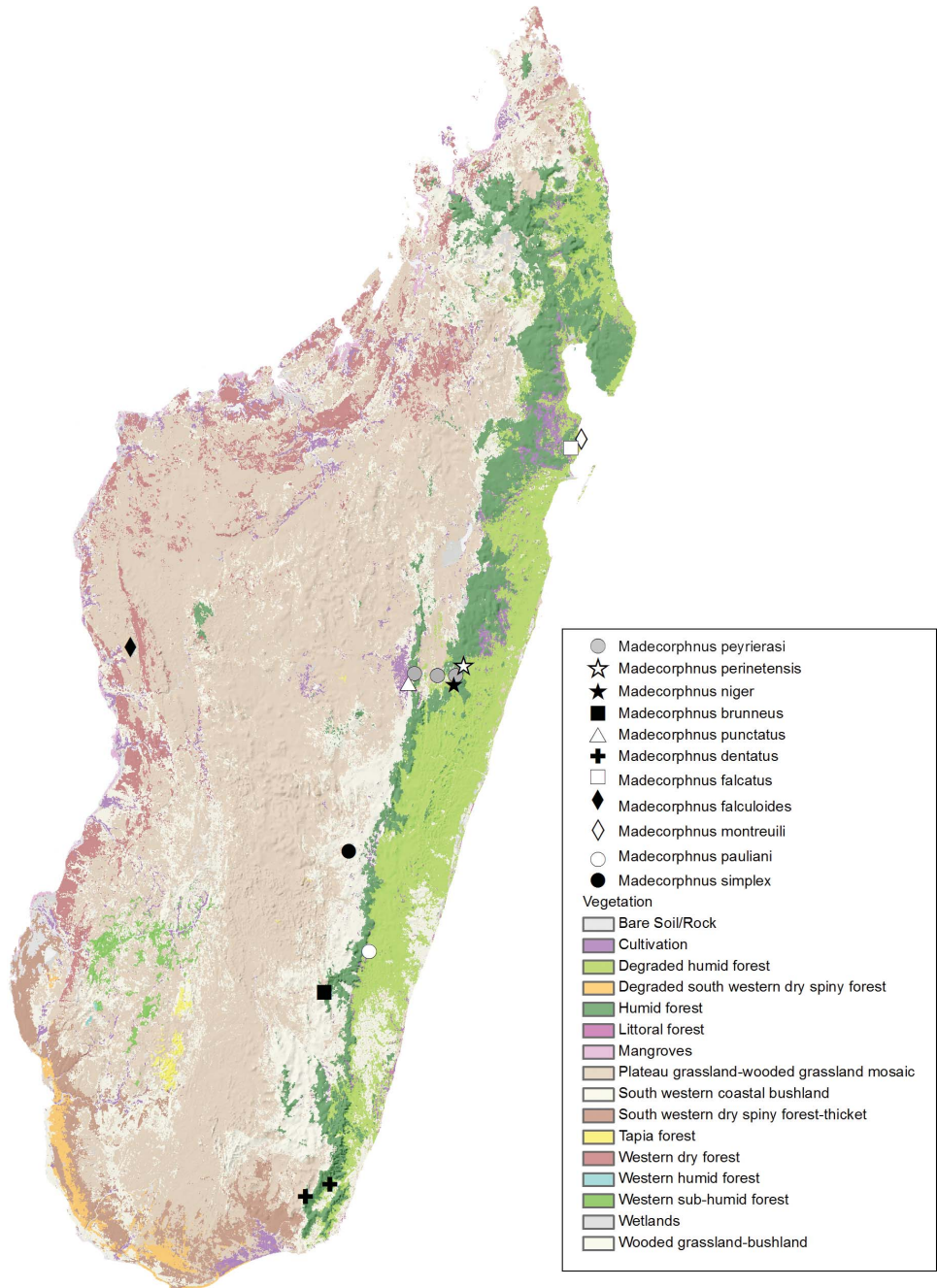


Figure 31. *Madecorphnus* spp., distribution map.

***Madecorphnus montreuili*** Frolov, sp. nov.  
(Figures 1, 9, 21, 31)

*Type material*

*Holotype, male.* Antanambe, 25.I.1990 (MNHN).

*Description*

*Holotype.* Body length 5.8 mm. Colour uniformly dark brown. Right mandible about 1.5 times longer than left, strongly curved, with a tooth behind apex (Figure 1). Labrum trapezoidal, its length about 1/5 width (in dorsal view).

Clypeus slightly asymmetrical, slightly convex anteriorly, obtuse, with two long and a number of smaller setae. Genae very small, not protruding past eyes. Canthus and frontal suture indistinct. Clypeus somewhat depressed in the middle anteriorly, minutely punctate.

Pronotum 1.8 times wider than long, widest medially. Margins with relatively wide border, lateral margins with four long setae. Pronotum evenly convex, minutely punctate.

Elytra convex, with distinct humeral and apical calli. Maximum width approximately at basal third. First stria distinct and reaching the apex of elytron, other striae indistinct. Epipleura with long, sparse, brown setae. Base of elytra with border from scutellum to humeral callus. Elytra punctate with sparse relatively large punctures in the middle of each elytron near stria one.

Anterior tibiae with three 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. Longer tibial spur shorter than two basal tarsomeres in middle legs and shorter than three tarsomeres in posterior legs.

*Aedeagus.* Parameres symmetrical, relatively wide in dorsal view, with two distinct teeth laterally (Figure 9). Internal sac with two large and one smaller sclerites (Figure 21).

*Diagnosis*

This species differs from other *Madecorphnus* species in having 2 distinct tubercles on the mentum. It is similar to *M. falcuoides* in having the right mandible with a tooth on inner side of scissorial part but differs from it in the shape of the mandibles and parameres.

*Etymology*

The species is named after Olivier Montreuil, a scarab beetle specialist at the Natural History Museum, Paris.

***Madecorphnus pauliani*** Frolov, sp. nov.  
(Figures 4, 10, 22, 31)

*Type material*

*Holotype, male.* Tanala Forest [Fort-Carnot] (MNHN).



*Description*

*Holotype*. Body length 5.2 mm. Colour dark brown, head and legs somewhat paler, pronotum with feeble bronze tint.

Right mandible about two times longer than left, without tooth behind apex. Labrum trapezoidal, its length 1/4–1/5 width (in dorsal view).

Clypeus asymmetrical, slightly convex anteriorly, obtuse, with two long and a number of smaller setae. Genae very small, not protruding past eyes. Canthus and frontal suture indistinct. Clypeus somewhat depressed in the middle anteriorly, minutely punctate.

Pronotum 1.8 times wider than long, widest medially. Margins with relatively wide border, lateral margins with five long setae (three setae located on each anterior angle). Pronotum evenly convex, minutely punctate.

Elytra convex, with distinct humeral and apical calli. Maximum width approximately at basal third. First stria distinct and reaching the apex of elytron, other striae indistinct. Epipleura with long, sparse, brown setae. Base of elytra with border from scutellum to humeral callus. Elytra minutely punctate except for a few relatively large punctures in the middle of each elytron near stria one.

Anterior tibiae with three 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. Longer tibial spur as long as two basal tarsomeres in middle legs and as long as three tarsomeres in posterior legs.

*Aedeagus*. Parameres widely rounded apically, without lateral teeth (Figure 10). Internal sac with two large, feebly sclerotized sclerites (Figure 22).

*Diagnosis*

This species differs from other *Madecorhynchus* species in having three setae on anterior angles of pronotum and in a distinct shape of the parameres.

*Etymology*

The species is named after Renaud Paulian (1913–2003) whose publications provided a sound framework for the taxonomic research on African and Madagascar Orphninae.

***Madecorhynchus niger* Frolov, sp. nov.**  
(Figures 11, 31)

*Type material*

*Holotype, male*. Perinet, A. Peyrieras leg., X.1972. *Paratype, male*: Perinet, A. Peyrieras leg., X.1973 (MNHN).

*Description*

*Holotype, male*. Body length 5.5 mm. Colour black, mouthparts and legs brown.

Right mandible slightly longer than left, without tooth basad of apex. Labrum trapezoidal, its length about 1/4–1/5 width (in dorsal view).

Clypeus asymmetrical, slightly convex anteriorly, obtuse, with two long and a number of smaller setae. Genae very small, not protruding past eyes. Canthus and frontal suture indistinct. Clypeus slightly depressed in the middle anteriorly, minutely punctate (punctures separated by more than 10 times their diameters).

Pronotum 1.8 times wider than long, widest medially. Margins with relatively wide border, lateral margins with four long setae. Pronotum evenly convex, minutely punctate.

Elytra convex, with distinct humeral and apical calli. Maximum width approximately at basal third. First stria distinct and reaching the apex of elytron, other striae indistinct. Epipleura with long, sparse, brown setae. Base of elytra with border from scutellum to humeral callus. Elytra minutely punctate except for a few relatively large punctures in the middle of each elytron near stria 1.

Anterior tibiae with three 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. Longer tibial spur as long as two basal tarsomeres in middle legs and as long as three tarsomeres in posterior legs.

*Aedeagus.* Parameres curved and rounded in lateral view, without teeth but with concavities laterally (Figure 11).

#### *Variation*

The paratype differs from the holotype in slightly larger size (body length 5.7 mm), paler coloration, and longer right mandible.

#### *Diagnosis*

This species can be separated from other *Madecorphnus* species by the shape of the parameres and from many species also by darker colour of the body.

### ***Madecorphnus punctatus* Frolov, sp. nov.** (Figures 2, 12, 23, 31)

#### *Type material*

*Holotype, male.* E of Lake Mantasoa, Ambohiboatavo, 1340 m, III.1973, P. Griveaud and A. Peyrieras leg (MNHN). Paratypes, two males with the same data as the holotype.

#### *Description*

*Holotype.* Body length 5.0 mm. Head and pronotum dark brown, elytra and legs brown.

Right mandible as long as left, without tooth basad of apex. Labrum trapezoidal, its length about 1/4–1/5 width (in dorsal view).

Clypeus symmetrical, slightly convex anteriorly, obtuse, with two long and a number of smaller setae. Genae very small, not protruding past eyes. Canthus and frontal suture indistinct. Clypeus, slightly depressed in the middle anteriorly, rather densely, irregularly punctate (punctures separated by one to three times their diameters).

Pronotum 1.8 times wider than long, widest medially. Margins with relatively wide border, lateral margins with four long setae. Pronotum evenly convex, densely, irregularly punctuate (punctures separated by one to three times their diameters anteriorly, becoming sparser basally).

Elytra convex, with distinct humeral and apical calli. Maximum width approximately at basal third. First stria distinct and reaching the apex of elytron, other striae indistinct. Epipleura with long, sparse, brown setae. Base of elytra with border from scutellum to humeral callus. Elytra sparsely punctate with relatively large punctures (more densely near suture).

Anterior tibiae with three 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. Longer tibial spur a bit shorter than two basal tarsomeres in middle legs and a bit shorter than three tarsomeres in posterior legs.

*Aedeagus.* Parameres tapering apically, somewhat arrow-shaped, angulate laterally (Figure 12). Internal sac with three large sclerites and an area of short spinules (Figure 23).

#### *Variation*

Length of the paratypes varies from 4.5 to 5.0 mm, otherwise they are similar to the holotype.

#### *Diagnosis*

This species can be separated from other *Madecorphnus* species by the densely pubescent head and pronotum and by the shape of the parameres and internal sac armature.

### ***Madecorphnus dentatus* Frolov, sp. nov.** (Figure 13, 24, 31)

#### *Type material*

*Holotype, male.* Chaînes Anosyennes, SW of Trafonaomby, plateau Andohahelo, 1770–1950 m, V.1972 (MNHN). Paratype, female with the same data as the holotype. Paratype, male: NW of Fort-Dauphin, massif Andohahelo, forest Andranomangara, Integral Nature Reserve no. 11, 1750 m, 20-25.I.1974, A. Peyrieras leg.

#### *Description*

*Holotype, male.* Body length 6.0 mm. Colour reddish brown, head, legs, and apices of elytra somewhat darker.

Right mandible slightly longer than left, without tooth behind of apex. Labrum trapezoidal, its length about 1/4–1/5 width (in dorsal view).

Clypeus asymmetrical, slightly convex anteriorly, obtuse, with two long and a number of smaller setae. Genae very small, not protruding past eyes. Canthus and frontal suture indistinct. Clypeus somewhat depressed in the middle anteriorly, sparsely punctate.

Pronotum 1.8 times wider than long, widest medially. Margins with relatively wide border, lateral margins with four long setae. Pronotum evenly convex, punctate (punctures separated by two to three puncture diameters).

Elytra convex, with distinct humeral and apical calli. Maximum width approximately at basal third. First stria distinct and reaching the apex of elytron, other striae indistinct. Disc of elytra with sparse punctures. Epipleura with long, sparse, brown setae. Base of elytra with border from scutellum to humeral callus. Elytra minutely punctate except for a few relatively large punctures in the middle of each elytron near stria 1.

Anterior tibiae with three 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. Longer tibial spur as long as two basal tarsomeres in middle legs and as long as three tarsomeres in posterior legs.

*Aedeagus*. Parameres symmetrical, tapering apically in lateral view, with large teeth laterally (Figure 13). Internal sac of aedeagus with one sclerite composed of two long slender spinules connected basally (Figure 24).

#### *Variability*

The paratypes are about the same size as the holotype, somewhat paler. Male paratype with shorter mandibles similar to those in female. Female, except for shorter mandibles, differs in having two setae on hind angles of pronotum and in robust protibial spur.

#### *Diagnosis*

This species can be separated from other *Madecorphnus* species by distinct shape of parameres and internal sac armature.

### ***Madecorphnus simplex* Frolov, sp. nov.**

(Figure 15, 25, 31)

#### *Type material*

*Holotype, male*. Ambatofitorahana, 1800 m, 31.XII.1972, A. Peyrieras leg (MNHN).

#### *Description*

*Holotype, male*. Body length 5.5 mm. Colour reddish brown.

Right mandible 1/5 longer than left, without tooth behind apex. Labrum trapezoidal, its length about 1/4–1/5 width (in dorsal view).

Clypeus asymmetrical, slightly convex anteriorly, obtuse, with two long and a number of smaller setae. Genae very small, not protruding past eyes. Canthus and frontal suture indistinct. Clypeus slightly depressed in the middle anteriorly, sparsely punctate (punctures separated by about five times their diameters).

Pronotum 1.8 times wider than long, widest medially. Margins with relatively wide border, lateral margins with four long setae. Pronotum evenly convex, sparsely punctate.

Elytra convex, with distinct humeral and apical calli. Maximum width approximately at basal third. First stria distinct and reaching the apex of elytron, other striae indistinct. Epipleura with long, sparse, brown setae. Base of elytra with border from scutellum to humeral calli. Elytra sparsely punctate except for a few relatively large punctures.

Anterior tibiae with three 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. Longer tibial spur as long as two basal tarsomeres in middle legs and shorter than three tarsomeres in posterior legs. Posterior femora with a few pectinate setae on the inner side apically.

*Aedeagus.* Parameres rounded apically (in lateral view), with small teeth laterally (Figure 15). Internal sac with one long, spur-shaped sclerite and three small, tooth-shaped sclerites (Figure 25).

*Diagnosis*

This species can be separated from other *Madecorphnus* species by the distinct shape of its parameres and the internal sac armature.

***Madecorphnus falcatus* Paulian, 1992**  
(Figures 5, 14, 26, 31)

*Type material*

*Holotype, male.* Antanambe, 25.I.1990 (MNHN).

*Diagnosis*

This is the largest known species of *Madecorphnus*: the length of the holotype is a little over 7 mm. Also, it differs from other *Madecorphnus* species in having a distinctive shape of the parameres (Figure 14) and internal sac armature consisting of two small bifurcated sclerites, one long spur-like sclerite and numerous small spinules (Figure 26).

***Madecorphnus falciger* (Lansberge, 1886)**  
(Figure 16, 27)

*Type material*

*Holotype, male.* Madagascar [without exact locality] (MNHN).

*Diagnosis*

It differs from other *Madecorphnus* species in having characteristic shape of the parameres (Figure 16) and armature of internal sac of the aedeagus consisting of two large semicircular sclerites, one short spur-like sclerite and numerous small spinules (Figure 27).

*Madecorphnus brunneus* Frolov, sp. nov.  
(Figure 17, 28, 31)

*Type material*

*Holotype, male.* East Adringitra Massif, Anjavidilava, 1850–1950 m, 18.XII.1971–15.I.1971 (MNHN).

*Description*

*Holotype.* Body length 6.2 mm. Colour brown, pronotum and head dark brown.

Right mandible about two times longer than left, without tooth basad of apex. Labrum trapezoidal, its length about 1/5 width (in dorsal view).

Clypeus asymmetrical, slightly convex anteriorly, obtuse, with two long setae. Genae very small, not protruding past eyes. Canthus and frontal suture indistinct. Clypeus slightly depressed in the middle anteriorly, finely punctate.

Pronotum 1.9 times wider than long, widest medially. Margins with relatively wide border, lateral margins with four long setae. Pronotum evenly convex, minutely punctate.

Elytra convex, with distinct humeral and apical calli. Maximum width approximately at basal third. First stria distinct and reaching the apex of elytron, other striae indistinct. Disc of elytra with sparse punctuation. Epipleura with long, sparse, brown setae. Base of elytra with border from scutellum to humeral callus.

Anterior tibiae with three 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. Longer tibial spur shorter than two basal tarsomeres in middle legs and as long as two tarsomeres in posterior legs.

*Aedeagus.* Parameres acutely rounded in lateral view (Figure 17). Internal sac of the aedeagus with one longer sclerite and one smaller, somewhat bifurcated sclerite (Figure 28).

*Diagnosis*

*M. brunneus* sp. nov. is similar to *M. perinetensis* sp. nov. and *M. peyrierasi* sp. nov., but differs from them in having parameres less acute in lateral view and different internal sac armature.

*Madecorphnus perinetensis* Frolov, sp. nov.  
(Figures 6, 18, 29, 31)

*Type material*

*Holotype, male.* Perinet, XI.1972, A. Peyrieras leg (MNHN). Paratypes, one male and two females with the same data as the holotype. Paratype, male: Perinet, X.1972, A. Peyrieras leg.

*Description*

*Holotype.* Body length 5.8 mm. Colour uniformly brown.

Right mandible about two times longer than left, without tooth behind apex. Labrum trapezoidal, its length about 1/6 width (in dorsal view).

Clypeus asymmetrical, slightly convex anteriorly, obtuse, with two long and two shorter setae on the anterior margin. Genae very small, not protruding past eyes. Canthus and frontal suture indistinct. Clypeus slightly depressed in the middle anteriorly, finely punctate.

Pronotum 1.8 times wider than long, widest medially. Margins with relatively wide border, lateral margins with four long setae. Pronotum evenly convex, minutely punctate.

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

Anterior tibiae with three 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. Longer tibial spur shorter than two basal tarsomeres in middle legs and as long as two tarsomeres in posterior legs.

Aedeagus. Parameres less tapering apically than in the previous species, wider in dorsal view and acute in lateral view (Figure 18). Internal sac with two longer and two smaller sclerites (Figure 29).

#### *Variability*

Body length of the paratypes is about 5.5 mm. Paratypes have smaller mandibles (right and left almost the same length) and otherwise similar to the holotype.

#### *Diagnosis*

This species is similar to *M. peyrierasi* sp. nov. externally and in the shape of internal sac armature, but can be separated from it by the different shape of the parameres and somewhat larger eyes (Figure 6).

#### *Etymology*

The name of this species is derived from the toponym Perinet, where the type series was collected.

***Madecorphnus peyrierasi*** Frolov, sp. nov.  
(Figures 7, 19, 30, 31)

#### *Type material*

*Holotype, male.* Perinet, XI.1972, A. Peyrieras leg (MNHN). Paratype, female with the same data as the holotype. Paratype, female: Perinet, X.1972, A. Peyrieras leg. Paratype, male: Mandraka, 25.III.1975, A. Peyrieras. Paratype, male: road to Anosibe, 6.IV.1975, A. Peyrieras leg.

### *Description*

*Holotype*. Body length 6.2 mm. Colour uniformly brown, head a bit darker.

Right mandible about 1.7 times longer than left, without tooth behind apex. Labrum trapezoidal, its length is about 1/6 width (in dorsal view).

Clypeus asymmetrical, slightly convex anteriorly, obtuse, with two long and two shorter setae on the anterior margin. Genae very small, not protruding past eyes. Canthus and frontal suture indistinct. Clypeus slightly depressed in the middle anteriorly, finely punctate.

Pronotum 1.8 times wider than long, widest medially. Margins with relatively wide border, lateral margins with four long setae. Pronotum evenly convex, minutely punctate.

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

Anterior tibiae with three 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. Longer tibial spur shorter than two basal tarsomeres in middle legs and as long as two tarsomeres in posterior legs.

Aedeagus. Parameres tapering apically, acute in lateral view (Figure 19). Internal sac with two longer and two smaller sclerites (Figure 30).

### *Variability*

Body length of the paratypes from 4.6 to 5.5 mm. Paratypes also differ from the holotype in smaller mandibles.

### *Diagnosis*

This species is similar to *M. perinetensis* sp. nov. externally and in the shape of internal sac armature, but can be separated from it by different shape of the parameres and somewhat smaller eyes (Figure 7).

### *Etymology*

The species is named after A. Peyrieras, who collected many specimens of *Madecorphnus* including the type series of this species.

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