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New species of *Ochodaeus* Dejean from Madagascar II  
(Coleoptera: Scarabaeoidea: Ochodaeidae)

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## New species of *Ochodaeus* Dejean from Madagascar II (Coleoptera: Scarabaeoidea: Ochodaeidae)

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**Abstract.** Three new species of *Ochodaeus* Dejean (Coleoptera: Scarabaeoidea: Ochodaeidae) from Madagascar are described that have a strongly granulate pronotum and, unlike all previously described species from the country, possess a clypeal tubercle or minute horn: *O. meridialis*, *O. umbonulus*, and *O. iniquipes*. An update to the key to the species of *Ochodaeus* from Madagascar is provided.

**Key words.** Taxonomy, scarab, Africa.

### Introduction

The genus *Ochodaeus* Dejean is distributed in Europe, Asia, and Africa and contains around 40 species (Scholtz and Evans 1987; Pittino 2006; Huchet 2016). Paulian (1959, 1976) treated the fauna of Madagascar, which at that time consisted of three species. Paulsen (2019) named an additional three species that, in contrast with the existing species, either completely lacked or showed only weak granulation on the pronotum. This brought the number of *Ochodaeus* species known from the country to six.

In the material from the California Academy of Sciences project on Madagascar Biodiversity, additional undescribed species were found in relatively small series that possess strongly granulate pronota and, unlike the three existing granulate species, also display tubercles or minute horns on the clypeal disc. The relatively few specimens of these species made them more difficult to diagnose. However, sufficient characters were found to describe them here, providing another step toward a comprehensive treatment of the island's ochodaeid fauna.

### Materials and Methods

**Specimens and taxonomic material.** Approximately 100 specimens from or deposited in the following institutions and collections were examined for this study: (CASC) California Academy of Sciences, San Francisco, CA, USA; (DKC) Denis Keith Collection, Chartres, France; (FSCA) Florida State Collection of Arthropods, Gainesville, FL, USA; (JBHC) Jean-Bernard Huchet Collection, Paris, France; (MNHN) Muséum national d'Histoire naturelle, Paris, France; (MJPC) M.J. Paulsen Collection, Lincoln, NE, USA; (UNSM) University of Nebraska State Museum, Lincoln, NE, USA.

As with Paulsen (2019), the majority of material studied originated from the Madagascan biodiversity surveys of CASC, and the holotypes are deposited there. Label data are presented verbatim, with each label denoted by a letter (a, b, etc.), and with each line separated by a slash. Entirely handwritten labels are noted, and handwritten portions of otherwise printed labels are indicated in brackets. Size measurements given are length (total length from mandibular apex to pygidium) and width (greatest width, here medially across elytra).

## Taxonomic Treatment

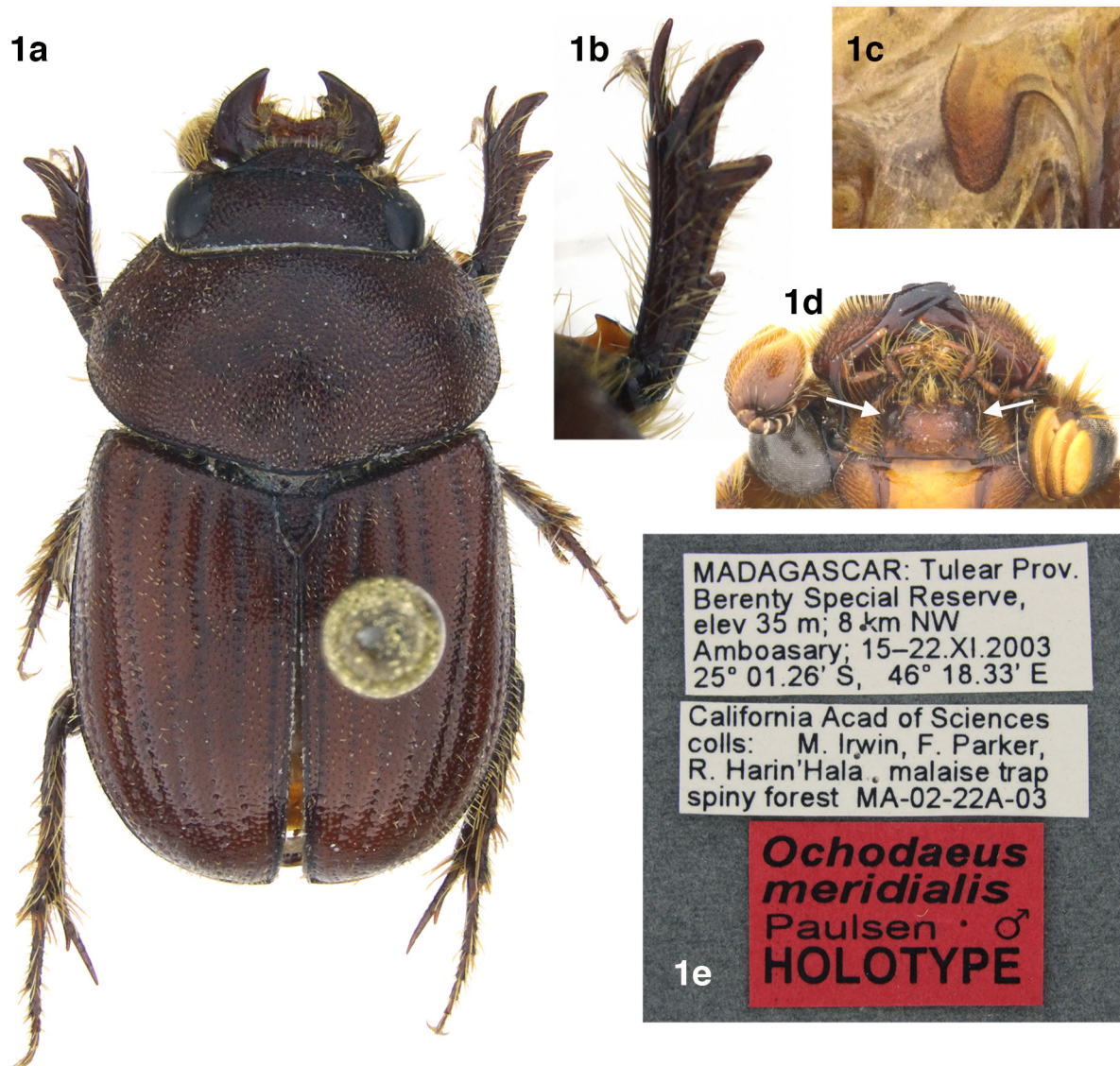
### *Ochodaeus meridialis* Paulsen, new species

**Type material.** Holotype male (CASC; Fig. 1a), labeled: a) “MADAGASCAR: Tulear Prov. / Berenty Special Reserve, / elev 35 m; 8 km NW / Amboasary; 15–22.XI.2003 / 25° 01.26' S, 46° 18.33' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / spiny forest MA-02-22A-03”; c) on red paper, “*Ochodaeus / meridialis* / Paulsen / HOLOTYPE”. (Fig. 1e).

One male, one female paratypes (CASC) labeled: a) “MADAGASCAR: Tulear Prov. / Berenty Special Reserve, / elev 35 m; 8 km NW / Amboasary; 10–19.VI.2003 / 25° 01.26' S, 46° 18.33' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / spiny forest MA-02-22A-01”. Paratype female (CASC) labeled: a) “MADAGASCAR: Tulear Prov. / Berenty Special Reserve, / elev 35 m; 8 km NW / Amboasary; 22–30.VI.2003 / 25° 01.26' S, 46° 18.33' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / spiny forest MA-02-22A-04”. Paratype female (JBHC) labeled: a) “MADAGASCAR: Tulear / Province, Berenty Special / Reserve, elev 35 m, / 8 km NW Amboasary / 4–5 April 2004”; b) “25° 01.26' S, 46° 18.33' E” / “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / spiny forest MA-02-22A-16”. Paratype male (CASC) labeled: a) “MADAGASCAR: Tulear / Province, Berenty Special / Reserve, elev 35 m, / 8 km NW Amboasary / 23 June–4 July 2004 / 25° 01.26' S, 46° 18.33' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / spiny forest MA-02-22A-20”. Paratype male (MJPC) labeled: a) “MADAGASCAR: Tulear Prov. / Berenty Special Reserve, / elev 35 m; 8 km NW / Amboasary; 18–31.VII.2004 / 25° 01.26' S, 46° 18.33' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / spiny forest MA-02-22A-22”. Two paratype females (CASC, FSCA) labeled: a) “MADAGASCAR: Tulear / Province, Berenty Special / Reserve, elev 85 m, 8 km NW / Amboasary; 7–14.XII.2002 / 25° 00.40' S, 46° 18.20' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / gallery forest MA-02-22-08”. Paratype female (CASC) labeled: a) “MADAGASCAR: Tulear / Berenty Special Reserve, / elev 85 m, 8 km NW / Amboasary; 16–27.XII.2002 / 25° 00.40' S, 46° 18.20' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / gallery forest MA-02-22-10”. Paratype female (MJPC) labeled: a) “MADAGASCAR: Tulear / Berenty Special Reserve, / elev 85 m, 8 km NW Amboasary; 30.XI–7.XII.2002 / 25° 00.40' S, 46° 18.20' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / gallery forest MA-02-22-07”. Paratype male (MNHN) labeled: a) on blue paper, “Museum Paris / Madagascar / Ambovombe / R. Decary 1925”.

All paratypes ( $n = 11$ ) with label: on yellow paper, “*Ochodaeus / meridialis* / Paulsen / PARATYPE”.

**Description.** Holotype male (Fig. 1a). Coleoptera: Scarabaeoidea: Ochodaeidae. Length 7.3 mm. Width 3.7 mm. **Color:** Uniformly dark reddish brown; surface shiny. **Head:** Surface granulate; granules transverse, setose. Eyes large, globose; lacking ventral projection of canthus. Antennal club subequal to eye in size. Mandibles broadly concave, basal angle prominent (ventral portion strongly produced); apices blunt; left mandible with apex blade-like, distal internal tooth triangular; right mandible with simple apex and distal internal tooth triangular and closer to apex. Frons weakly convex. Clypeus trapezoidal, short (at most 1/3 as long as wide), with central tubercle; anterior margin lacking bead medially. Labrum shallowly emarginate. Mentum (as in Fig. 1d) 2 × wider than long, broadly excavated anteriorly; anterolaterally with knobby protuberance on each side. **Pronotum:** Form convex. Surface densely granulate; granules shiny, setose. **Elytra:** Form convex, somewhat elongate, elytra together slightly longer than wide. Surface with striae moderately impressed, punctate, surface smooth between punctures (except sutural stria with connecting groove); striae punctures separated by 1–2 puncture diameters, lacking setae. Intervals smooth, with small, setose punctures; setae longer than diameter of striae punctures. **Legs:** Protibia tridentate externally, with short, acute pollex directed anteriorly (Fig. 1b). Profemur with apical tooth strong, acute. Mesofemur and metafemur with apical tooth reduced to rounded lobe. Metatibia cylindrical near base. **Venter/Abdomen:** Metasternum and abdomen sparsely punctate; punctures large with long, erect, golden setae. Pygidium punctate, setose; setae sparse. Stridulatory peg strongly bent, rasp-like, produced posteriorly (Fig. 1c). **Male genitalia:** Sclerotized lobe on internal sac between parameres broadly triangular, internal sac with complex armature including a large sclerotized denticle.



**Figure 1.** *Ochodaeus meridialis* Paulsen, new species. **a)** Dorsal habitus, male holotype. **b)** Right front leg, dorsal view. **c)** Right stridulatory peg, dorsal view (elytra lifted). **d)** Head, female paratype, ventral view. Arrows indicating knob-like protuberances of mentum. **e)** Holotype labels.

**Paratype variation.** Males ( $n = 4$ ; length 8.7–10.2 mm; width 4.5–8.4 mm), females ( $n = 7$ . length 7.3–9.5 mm; width 3.5–5.0 mm). This species exhibits minimal sexual dimorphism, the protibiae being equal in the sexes and females apparently differing only by having the seta of the last abdominal segment recumbent rather than erect.

**Remarks.** The dark, knobby protuberance (Fig. 1d) on each side of the mentum anteriorly will immediately distinguish *O. meridialis* from all other *Ochodaeus* species in Madagascar. Both males and females have a strong apical tooth on the profemur. This is a moderately large species, and at a glance it could be confused with smaller specimens of *O. isoanalensis*.

**Etymology.** The name is a Latin masculine adjective in the nominative singular meaning ‘southerly, to the south’.

**Distribution.** This species thus far is known only from the extreme southern tip of the island in the vicinity of the type locality, Berenty Private Reserve (Fig. 9).

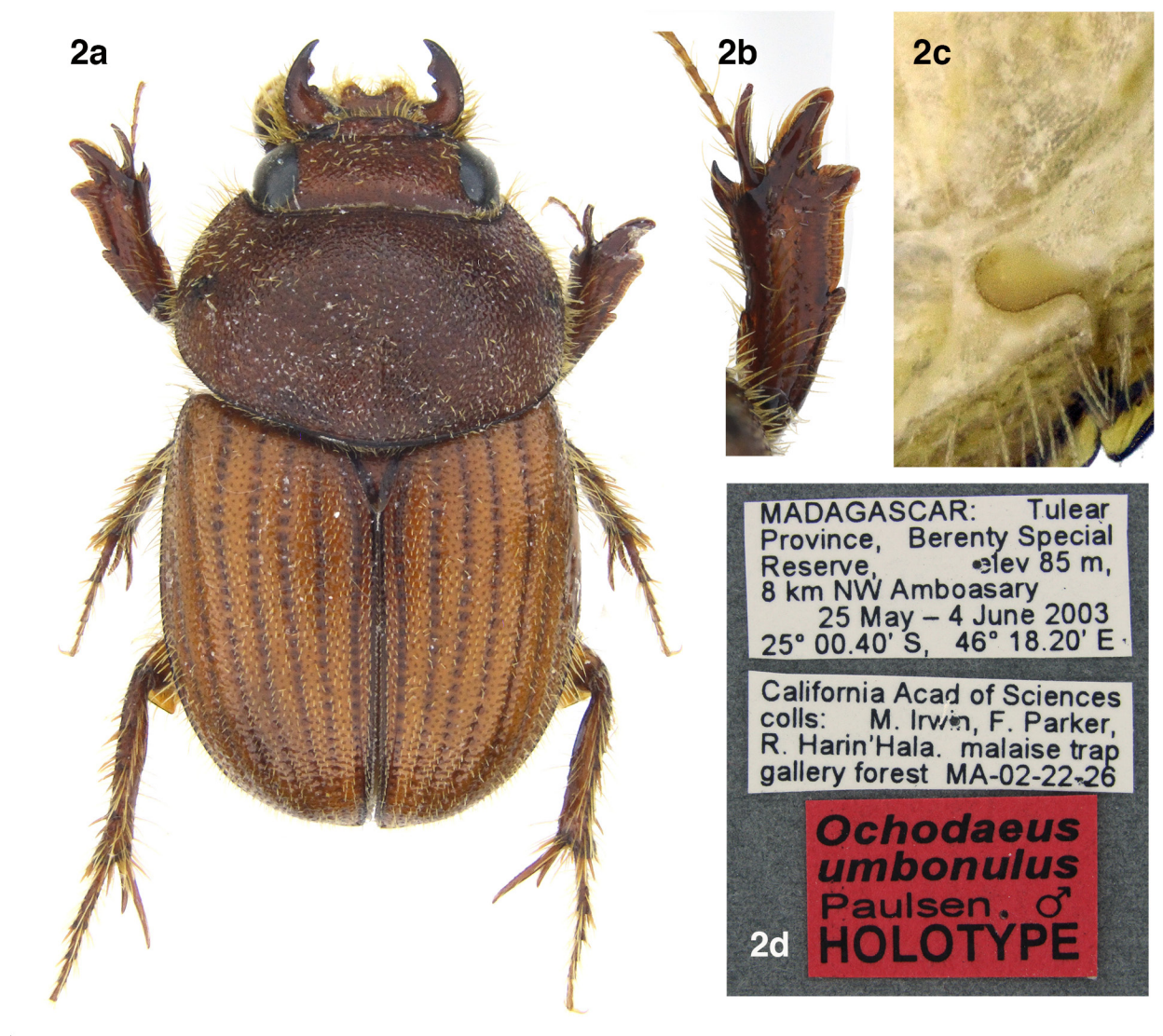
### *Ochodaeus umbonulus* Paulsen, new species

**Type material.** Holotype male (CASC; Fig. 2a) labeled: a) “MADAGASCAR: Tulear / Berenty Special Reserve, / elev 85 m, 8 km NW / Amboasary / 25 May–4 June 2003 / 25° 00.40' S, 46° 18.20' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / gallery forest MA-02-22-26”; c) on red paper, “*Ochodaeus / umbonulus* / Paulsen / HOLOTYPE” (Fig. 2d).

One male, one female paratypes (CASC) labeled: a) “MADAGASCAR: Tulear / Berenty Special Reserve, elev 85 m / 8 km NW Amboasary / 30.XI–7.XII.2002 / 25° 00.40' S, 46° 18.20' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / gallery forest MA-02-22-07”. One female paratype (CASC) labeled: a) “MADAGASCAR: Tulear / Berenty Special Reserve, / elev 85 m, 8 km NW Amboa- / sary; 30.XI–7.XII.2002 / 25° 00.40' S, 46° 18.20' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / gallery forest MA-02-22-07”. One male, one female paratypes (CASC) labeled: a) “MADAGASCAR: Tulear / Berenty Special Reserve / elev 85 m, 8 km NW Amboa- / sary; 4–15 February 2004 / 25° 00.40' S, 46° 18.20' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / gallery forest MA-02-22-39”. Female paratype (CASC) labeled: a) “MADAGASCAR: Tulear: / Berenty Special Reserve, / elev 85 m, 8 km NW Amboa- / sary; 7–22.VIII.2004 / 25° 00.40' S, 46° 18.20' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / gallery forest MA-02-22-54”. Paratype male (MJPC) labeled: a) “MADAGASCAR: Tulear / Province, Berenty Special / Reserve, elev 85 m, 8 km / NW Amboasary; 14–24. IV. / 2003; 25° 00.40' S, 46° 18.20' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / gallery forest MA-02-22-22”; orange paper “DNA VOUCHER / 9424 2012 / MJ Paulsen – UNSM”. Paratype male (MJPC) labeled: a) “MADAGASCAR: Tulear / Province, Berenty Special / Reserve, elev 35 m, / 8 km NW Amboasary / 24 March–4 April 2004 / 25° 01.26' S, 46° 18.33' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / spiny forest MA-02-22A-15”. Female paratype (CASC) labeled: a) “MADAGASCAR: Tulear Prov. / Berenty Special Reserve, / elev 35 m, 8 km NW Ambo- / asary; 31.VII–5.VIII.2004 / 25° 01.26' S, 46° 18.33' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / spiny forest MA-02-22A-23”. Male paratype (FSCA) labeled: a) “MADAGASCAR: Tulear / Prov., Berenty Special / Reserve, elev 85 m, 8 km NW / Amboasary; 7–14.XII.2002 / 25° 00.40' S, 46° 18.20' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / gallery forest MA-02-22-08”. One male (JBHC), two female (JBHC, MJPC) paratypes labeled: a) “MADAGASCAR: Tulear Prov. / Berenty Special Reserve, / elev 35 m, 8 km NW / Amboasary; 10–19 June 2003 / 25° 01.26' S, 46° 18.33' E”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala, malaise trap / spiny forest MA-02-22A-01”. Female paratype (UNSM) labeled: a) “MADAGASCAR: Toliara Prov. / Forêt de Mite, elev 75m, / 20.7 km 29° WNW Tongobory / 23° 31' 27" S 44° 7' 17" E / 27 Feb–3 March 2002”; b) “coll: Fisher, Griswold et al. / California Acad. of Sciences / malaise trap - in gallery forest / collection code: BLF5849”; c) “CASENT / 8027109”; d) on orange paper, “DNA VOUCHER / P064 2008 / M.J. Paulsen UNSM”. Female paratype (CASC) labeled: a) “MADAGASCAR: Tulear / Province, Andohahela Nat’l / Park, Tsimelahy, Parcelle II / 24° 56.21' S, 46° 37.60' E / 5–15 February 2003”; b) “California Acad of Sciences / colls: M. Irwin, F. Parker, / R. Harin’Hala. el 180 m / malaise trap in transitional / forest, MA-02-20-15”. Male paratype (CASC) labeled: a) “MADAGASCAR: Tulear / Ambohimahavelona village / 33 km NE of Tulear / 4–11 March 2009 / 23° 26.45' S 43° 53.98' E”; b) “Calif. Acad. of Sciences / coll: M. Irwin, R. Harin’Hala / malaise trap, dry forest / elev 45 m MG-50B-24”. Male paratype (MNHN) labeled: a) “Museum Paris / Madagascar / Rég. d’Ankazoabo / C. Le Barbier 1920”.

All paratypes ( $n = 17$ ) with label: on yellow paper, “*Ochodaeus / umbonulus* / Paulsen / PARATYPE”.

**Description.** Holotype male (Fig. 2a). Coleoptera: Scarabaeoidea: Ochodaeidae. Length 5.3 mm. Width 3.1 mm. **Color:** Uniformly light yellowish brown; surface shiny. **Head:** Surface weakly tuberculate; tubercles transverse, setose. Eyes large, globose, lacking ventral projection of canthus. Antennal club relatively small, approximately 1/2 size of eye. Mandibles broadly concave, basal angle prominent, apices falcate; left mandible with triangular internal tooth and second tooth behind; right mandible with



**Figure 2.** *Ochodaeus umbonulus* Paulsen, new species. **a)** Dorsal habitus, male holotype. **b)** Right front leg, dorsal view. **c)** Right stridulatory peg, dorsal view (elytra lifted). **d)** Holotype labels.

first internal tooth weaker, also with second tooth behind. Frons weakly convex. Frontoclypeal suture straight, transverse. Clypeus trapezoidal, short (about 1/4 as long as wide), with central tubercle (minute horn); anterior margin with bead eroded medially. Labrum deeply, semicircularly emarginate. Mentum slightly wider than long, anteriorly emarginate with broad semicircular fovea. **Pronotum:** Form convex. Surface densely granulate; granules shiny, with short seta, some flattened. **Elytra:** Form convex, not elongate, elytra together as long as wide. Surface with striae moderately impressed, punctate, surface smooth between punctures (except sutural stria with connecting groove); strial punctures large, separated by ~1 puncture diameter, lacking setae. Intervals irregularly tuberculate; tubercles uniformly small, setose; setae shorter than diameter of largest strial punctures. **Legs:** Protibia broad (Fig. 2b), tridentate externally, with moderately long, curved pollex. Profemur with apical tooth strong, acute. Mesofemur and metafemur with apical teeth reduced to obtuse lobe. Metatibia flattened, dorsal surface with internal margin blade-like basally. **Venter/Abdomen:** Metasternum and abdomen sparsely punctate; punctures large with long, golden setae. Last abdominal segment with erect setae. Pygidium rugosely punctate, setose, setae. Stridulatory peg subcircular (Fig. 2c). **Male genitalia:** Sclerotized patch on internal sac

between parameres broadly triangular, rounded apically; internal sac lacking complex armature.

**Paratype variation.** Males ( $n = 9$ ; length 5.0–7.8 mm; width 2.5–3.8 mm), females ( $n = 8$ ; length 5.3–6.5 mm; width 2.8–3.3 mm). Color is not informative, varying from testaceous to dark reddish brown. Larger males have the apical teeth of the middle and hind femora distinct and acute. Females have narrower protibiae, and the setae on the last abdominal segment are recumbent rather than erect.

**Remarks.** The centrally located clypeal tubercle, blade-like edge on the metatibia near the femoral tooth, and broad protibiae of males distinguish *O. umbonulus* from its congeners in Madagascar. The labrum is somewhat deeply emarginate for a Madagascan species, as if a semicircular area had been removed, but the emargination is even deeper and narrower (U-shaped) in the following species.

**Etymology.** The name is a Latin noun in the nominative singular derived from *umbo*, ‘round protuberance’, with the diminutive suffix “-ulus”. This refers to the small tubercle on the clypeus.

**Distribution.** This species is distributed in the southern third of the island (Fig. 10).

### *Ochodaeus iniquipes* Paulsen, new species

Type material. Holotype male (CASC; Fig. 3a), labeled: a) “MADAGASCAR: Tulear / Tsifota, 20 km N Manombo / 1 km E of Tsifota Village / 26 Jan–4 Feb 2009 / 22° 49.08' S 43° 22.36' E”; b) “Calif. Acad. of Sciences / coll: M. Irwin, R. Harin’Hala / malaise trap, elev 15 m / spiny forest MG-48-12”; c) on red paper, “*Ochodaeus / iniquipes / Paulsen / HOLOTYPE*” (Fig. 3d).

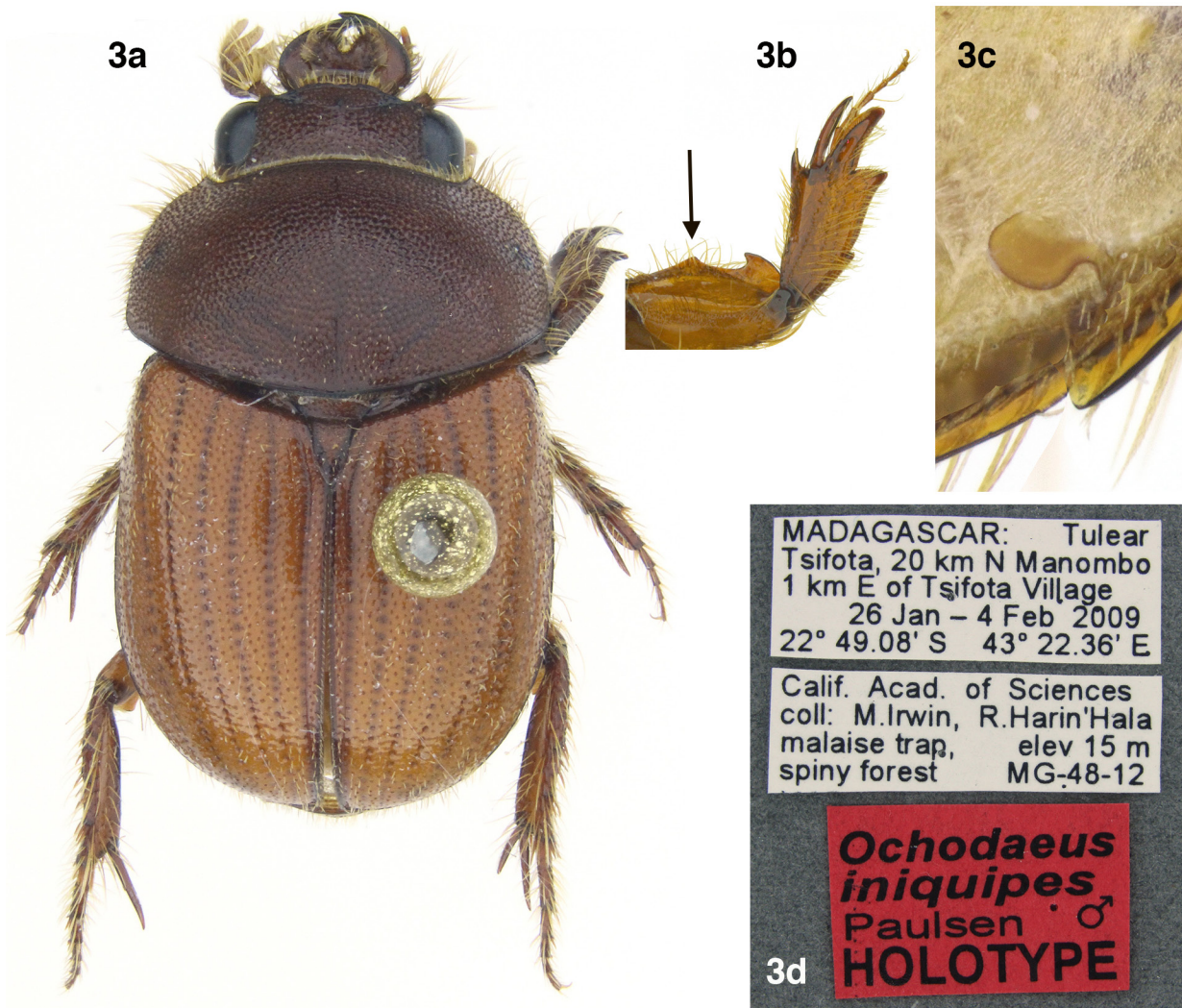
Female paratype (MJPC) labeled: a) “MADAGASCAR: Tulear / Tsimanampetsotsa National / Park, Mitoho Forest / 25 March–2 April 2009 / 24° 2.91' S 43° 45.14' E”; b) “Calif. Acad. of Sciences / coll: M. Irwin, R. Harin’Hala / malaise, transitional forest / elev 120 m MG-53C-21”. Male paratype (DKC) labeled: a) “Madagascar / Camp Catta 40 km S Ambalavao / 810 m, 26.XI-2.XII.2003 / S. Murzin & A. Sharnaev leg.”.

Both paratypes ( $n = 2$ ) with label: on yellow paper, “*Ochodaeus / iniquipes / Paulsen / PARATYPE*”.

**Description.** Holotype male (Fig. 3a). Coleoptera: Scarabaeoidea: Ochodaeidae. Length 7.6 mm. Width 4.1 mm. **Color:** Everywhere reddish brown, surface shiny. **Head:** Surface strongly granulate; granules setose, shiny; surface between granules shagreened. Eyes large, globose, lacking ventral projection of canthus. Antennal club moderately large, approximately size of eye in distal view. Mandibles broadly concave, basal angle broadly rounded, apices falcate; left mandible with triangular internal tooth and second tooth behind; right mandible with internal teeth weakly developed. Frons weakly convex. Frontoclypeal suture triangular (projecting posteriorly, not transverse). Clypeus rhomboidal, long (about 1/2 as long as wide), with small horn on posterior margin; anterior margin distinctly beaded throughout, bead slender, bisinuate. Labrum with deep, U-shaped emargination. Mentum slightly wider than long, anteriorly emarginate with broad, subtriangular fovea. **Pronotum:** Form convex. Surface densely granulate everywhere (except furrowed midline in basal fourth); granules shiny, with short seta; surface shagreened between granules. **Elytra:** Form convex, distinctly narrower than pronotum, slightly elongate, elytra together as long as wide. Surface with striae moderately impressed, punctate, surface smooth between punctures (except sutural stria with connecting groove); striae punctures large, separated by ~1 puncture diameter, lacking setae. Intervals irregularly tuberculate; tubercles uniformly small, setose; setae slightly longer than diameter of largest striae punctures. **Legs:** Protibia broad (Fig. 3b), tridentate externally, with moderately long pollex. Profemur with strong, apical and median teeth (Fig. 3b). Mesofemur and metafemur with apical teeth large, acute. Metatibia flattened, dorsal surface with internal margin blade-like basally. **Venter/Abdomen:** Metasternum and abdomen sparsely punctate; punctures large with long, golden setae. Last abdominal segment with erect setae. Pygidium rugopunctate, setose, setae sparse. Stridulatory peg oblong (Fig. 3c). **Male genitalia:** Sclerotized patch on internal sac between parameres broadly triangular, apex rounded; internal sac lacking complex armature.

**Paratype variation.** Male ( $n = 1$ ; length 7.4 mm; width 4.0 mm). Female ( $n = 1$ ; length 8.2 mm; width 4.5 mm). The female specimen has much narrower protibiae, the median tooth on the profemur is reduced, and the setae on the last abdominal segment are recumbent rather than erect.





**Figure 3.** *Ochodaeus iniquipes* Paulsen, new species. **a)** Dorsal habitus, male holotype. **b)** Right front leg, dorsal view. Arrow indicating median tooth of anterior margin of profemur. **c)** Right stridulatory peg, dorsal view (elytra lifted). **d)** Holotype labels.

**Remarks.** *Ochodaeus iniquipes* has the clypeal armature most strongly developed, clearly referable to as a small horn rather than a shiny tubercle or bump. The frontoclypeal suture is produced posteriorly to the horn, which lies on the suture itself, whereas in *O. umbonulus* the suture is straight. The profemur has an anteromedian tooth in all three known specimens, although it is reduced in the female paratype. This tooth would presumably be partially or entirely obsolete in smaller individuals, and the largest specimens of *O. umbonulus* have the median tooth weakly indicated. In such a case, the clypeal character will better serve to distinguish the two species. The deep U-shaped labrum is also diagnostic for *O. iniquipes*.

**Etymology.** The name is a Latin noun in the nominative singular derived from 'iniquus', dangerous or evil, with "pes", legs. The evil legs are the heavily armed profemora, with a large apical tooth and also a median tooth on the anterior margin (Fig. 3b).

**Distribution.** This species is distributed in the southern third of the island (Fig. 9).

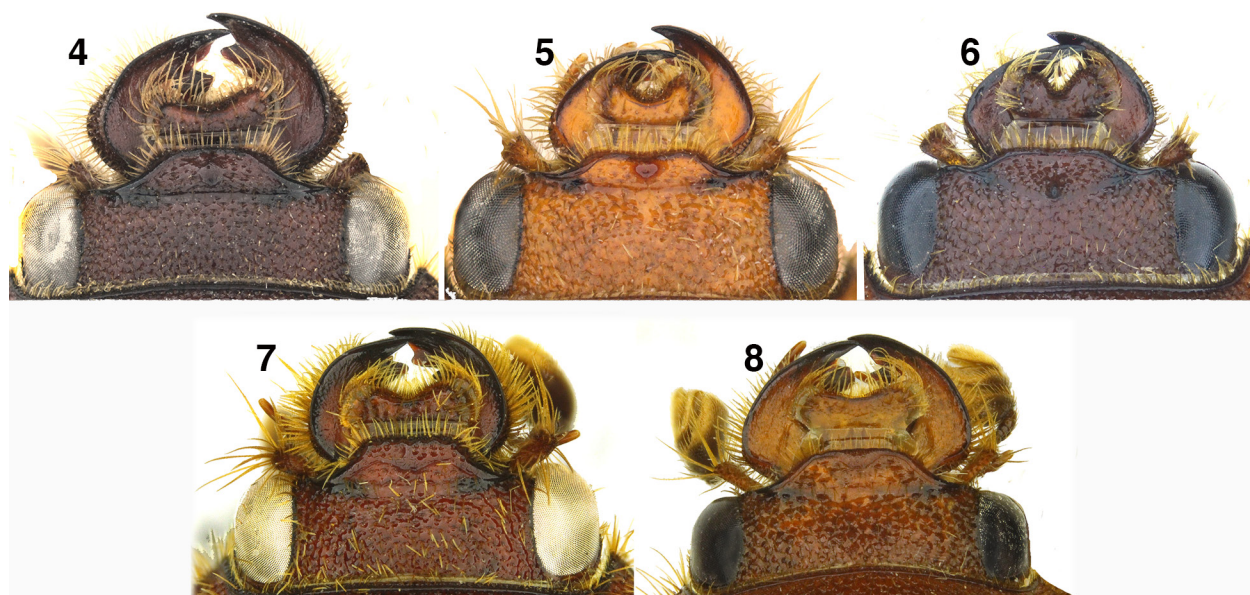
**Madagascan *Ochodaeus* species**

- Ochodaeus iniquipes* Paulsen, new species  
*Ochodaeus isoanalensis* Paulian, 1959: 129  
*Ochodaeus meandrus* Paulsen, 2019: 8  
*Ochodaeus meridialis* Paulsen, new species  
*Ochodaeus miliaris* Klug, 1832: 164  
     *Ochodaeus cannellinus* Fairmaire, 1868: 785  
     *Ochodaeus infuscatus* Fairmaire, 1868: 785  
*Ochodaeus modopunctatus* Paulsen, 2019: 2  
*Ochodaeus polypollicatus* Paulsen, 2019: 5  
*Ochodaeus pygmaeus* Paulian, 1976: 151  
*Ochodaeus umbonulus* Paulsen, new species

**Updated key couplets to *Ochodaeus* spp. in Madagascar**

The following couplet changes to the species key in Paulsen (2019) allow for determination of all Madagascan species having a granulate pronotum, including the three newly described species.

- 2(1). Elytral intervals with setose tubercles of 2 sizes, with setae of larger tubercles flattened, scale-like  
     ..... ***O. pygmaeus* Paulian**  
 — Elytral intervals with tubercles either absent or of uniform size and without flattened setae . **3**  
 3(2). Clypeus with median tubercle or small horn that is distinct from anterior margin (Fig. 4–6)  
     ..... **4**  
 — Clypeus lacking free tubercle or horn, anterior margin usually thickened medially (Fig. 7–8) . **6**  
 4(3). Mentum with a knobby protuberance on each side (Fig. 1d) . . . . ***O. meridialis* Paulsen, n. sp.**  
 — Mentum lacking protuberances laterally . . . . . **5**

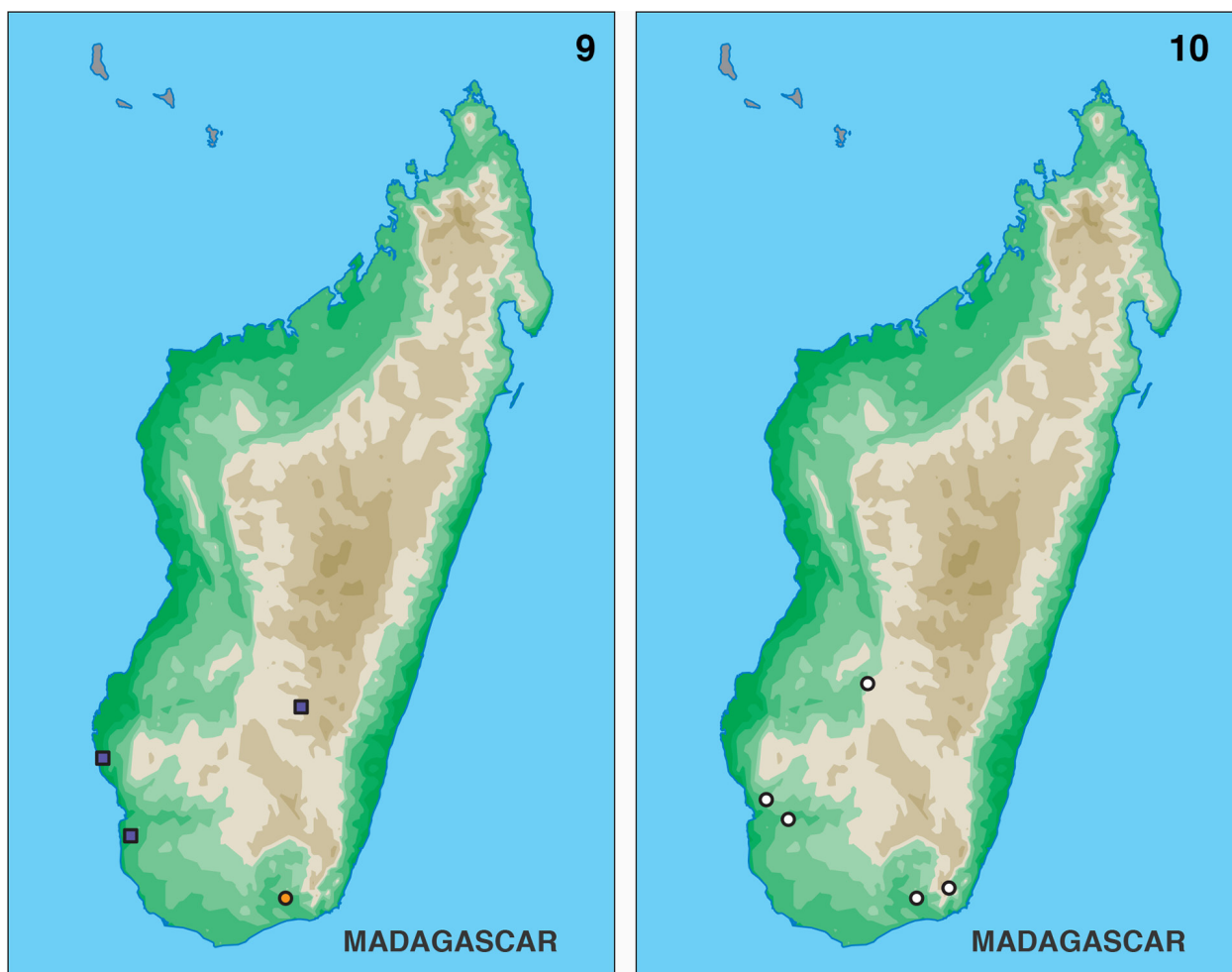


**Figures 4–8.** Key characters of Madagascar *Ochodaeus* species. **4)** Head of *O. meridialis* Paulsen, n. sp., showing central tubercle of clypeus. **5)** Head of *O. umbonulus* Paulsen, n. sp., showing tubercle anterior to straight frontoclypeal suture. **6)** Head of *O. iniquipes* Paulsen, n. sp., showing minute horn on posteriorly curved frontoclypeal suture. **7)** Head of *O. isoanalensis* Paulian showing broadly thickened clypeal margin. **8)** Head of *O. miliaris* (Klug), showing narrowly thickened clypeal margin.

- 5(4). Clypeus (Fig. 5) with median tubercle anterior to frontoclypeal suture; anterior margin of clypeus indistinct and eroded medially . . . . . *O. umbonulus* Paulsen, n. sp.  
 — Clypeus (Fig. 6) with small horn located on frontoclypeal suture; anterior margin of clypeus distinct and entire throughout . . . . . *O. iniquipes* Paulsen, n. sp.
- 6(3). Median thickening of clypeal bead variable, lateral thickening always evident (Fig. 7); body length usually >9.0 mm . . . . . *O. isoanalensis* Paulian  
 — Median thickening of clypeal bead simply convex, bead slender laterally (Fig. 8); body length usually 4.5–8.0 mm . . . . . *O. miliaris* Klug

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**Figures 9–10.** Distributions of new species of Madagascar *Ochodaeus*. **9)** Blue squares = *O. iniquipes* Paulsen, new species; orange circle = *O. meridialis* Paulsen, new species. **10)** White circles = *O. umbonulus* Paulsen, new species.

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