

Occurrence of the family Ochodaeidae (Coleoptera: Scarabaeoidea) on the Arabian Peninsula

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Abstract. First country records of *Ochodaeus carinatus* Benderitter, 1913 from Oman and Yemen are presented. These data represent the first report of the occurrence of the family Ochodaeidae on the Arabian Peninsula. Currently *O. carinatus* is known from all of the Horn of Africa (Djibouti, Eritrea, Ethiopia and Somalia (both Somalia and Somaliland)), Kenya, Oman and Yemen. Known distribution on the Arabian Peninsula is mapped.

Key words. *Ochodaeus carinatus*, Ochodaeidae, Coleoptera, distribution, first record, Afrotropical region, Palearctic region, Arabian Peninsula, Oman, Yemen.

INTRODUCTION

Ochodaeidae is a small family belonging to superfamily Scarabaeoidea, which includes about 130 species (e.g. Huchet 2016). The genus *Ochodaeus* Dejean, 1821 is richest with 52 described taxa at the species level (e.g. Schoolmeesters 2020). Little is known about the biology of Ochodaeidae. Adults are usually collected at lights, mostly in semi-arid sandy areas (e.g. Scholtz & Evans 1987, Scholtz & Grebennikov 2016).

Ochodaeus carinatus was described by Benderitter in 1913 based on material from “Obock” (nowadays approx. Djibouti) (Benderitter 1913). Later on, Benderitter described *O. ciliatus* Benderitter, 1921 from “Erythrée” (nowadays approx. Eritrea) and *O. minutus* Benderitter, 1923 from “Abyssinie” (nowadays approx. Ethiopia) (Benderitter 1921, 1923). Subsequently Scholtz & Evans (1987) in their revision of African Ochodaeidae synonymized both these taxa with *O. carinatus*. At that time the species was known only from Djibouti and Ethiopia (with no more precise data) and from Kenya: Tsavo (as *O. castaneus* nomen nudum, see Scholtz & Evans 1987, for details). Carpaneto & Piattella (1990) recorded this species also from Somalia (six localities in Somalia and Somaliland).

MATERIAL AND METHODS

The following abbreviations identify the collections housing the material examined (curators are given in parentheses):

DSLH – David Sommer & Lucie Hřůzová collection, Praha, Czech Republic;
JPCH – Jan Pelikán collection, Hradec Králové, Czech Republic;
LMCT – Ladislav Mencl collection, Týnec nad Labem, Czech Republic;
NMPC – National Museum Praha, Czech Republic (Jiří Hájek);
PKCL – Pavel Kučera collection, Liberec, Czech Republic;
TKCJ – Tomáš Kopecký collection, Jablonné nad Orlicí, Czech Republic.

Habitus photographs were taken using a Canon EF-S 60mm f/2.8 Macro USM lens attached to a Canon EOS 70D camera. Partially focused images of each specimen were combined using Zerene Stacker (Zerene Systems LLC, Richland, USA). All pictures were digitally enhanced using Adobe Photoshop CC. Distribution map was produced and edited in ESRI ArcMap

10.6 of ArcGIS Desktop 10.6 suite. For map layers, free levels 0–1 data from Global Administrative Areas (<http://www.gadm.org>, ver. 2.8), Natural Earth (<http://naturalearthdata.com>, Natural Earth I with Shaded Relief, Water, and Drainages), combined with World Shaded Relief (<https://www.arcgis.com/home/item.html?id=9c5370d0b54f4de1b48a3792d7377ff2>) (with 45% transparency) were used. For distribution maps, we used present data.

RESULTS

Ochodaeus carinatus Benderitter, 1913 (Figs. 1–5)

RECORDS. Oman: Dhofar Governorate: Tawi Attair env. [ca. 17°06'N, 54°33'E], ca. 850 m, 9 August 1999, Radek Červenka lgt., David Sommer det. 2019, at light, 3 ♂♂, 2 ♀♀, 1 unsexed spec. (NMPC) (Fig. 1); Jabal al Qamar, Rakhyut, 16°45'12"N, 53°23'54"E, 35 m, 23 September 2011, P. Kučera lgt., L. Mencl det., 1 spec. (PKCL); Jabal al Qamar, Ajdarawt env. [ca. 16°47'N, 53°33'E], 750 m, Ra's Sajir-Wadí, 30 m, 24 September 2011, P. Kučera lgt., L. Mencl det., 1 ♂, 1 ♀ (LMCT); Jabal al Qamar, 20 km N of Dhalqut, 16°42'39"N, 53°09'12"E, 1100 m, 28 August 2012, P. Kučera lgt., L. Mencl det., 1 spec. (PKCL); NE of Taqah, Wadi Darbat, 17°04'26"N, 54°25'53"E, 32 m, 23 September 2018, Jan Pelikán lgt., David Sommer det. 2018, riverside pasture, at light, 2 spec. (JPCH), 1 spec. (DSLH); same data, Tomáš Kopecký lgt., David Král det. 2020, riverside, succulent, 1 spec. (TKCJ). – **Yemen:** Al Mahra Governorate: NE of Hawf env., 16°39'54"N, 53°05'19"E, 736 m, 12–16 October 2005, David Král lgt., David Sommer det. 2019, semi desert area, densely covered with trees and shrubs, at light, 1 spec. (NMPC). – Ta'izz Governorate: S of Suq al Dabab, 13°30'08"N, 43°57'22"E, 1290 m, 24–25 October 2005, David Král lgt., David Sommer det. 2019, semi desert area, densely covered with trees and shrubs, at light, 1 spec. (NMPC).



Figs. 1–2. Habitus of *Ochodaeus carinatus* Benderitter, 1913 in dorsal view. 1 – male from Oman, Tawi Attair (body length: 4.5 mm); 2 – male from Somalia, Somaliland, E of Boorama, Amoud University Campus (body length: 6.0 mm).

ADDITIONAL MATERIAL EXAMINED. **Kenya**: Eastern Province: 8 km E of Turbi [ca. 03°20'N, 38°27'E], 1 May 2018, S. Prepsl lgt., David Sommer det. 2019, 4 spec. (DSLH). **Somalia, Somaliland**: Awdal Region: E of Boorama, Amoud University Campus, 09°56'52"N, 43°13'23"E, ca. 1400 m, 9–13 September 2017, David Král lgt., David Sommer det. 2019, semi desert area, densely covered with trees and shrubs, at light, 1 ♂, 1 ♀, 1 spec. (NMPC) (Fig. 2).

DISTRIBUTION. Currently known from Ethiopia, Djibouti, Kenya (Scholtz & Evans 1987), and Somalia (from both parts, Somalia and Somaliland) (Carpaneto & Piattella 1990). First country records from Oman and Yemen. Published data and new findings presented here are summarized in the form of a map in Fig. 3.

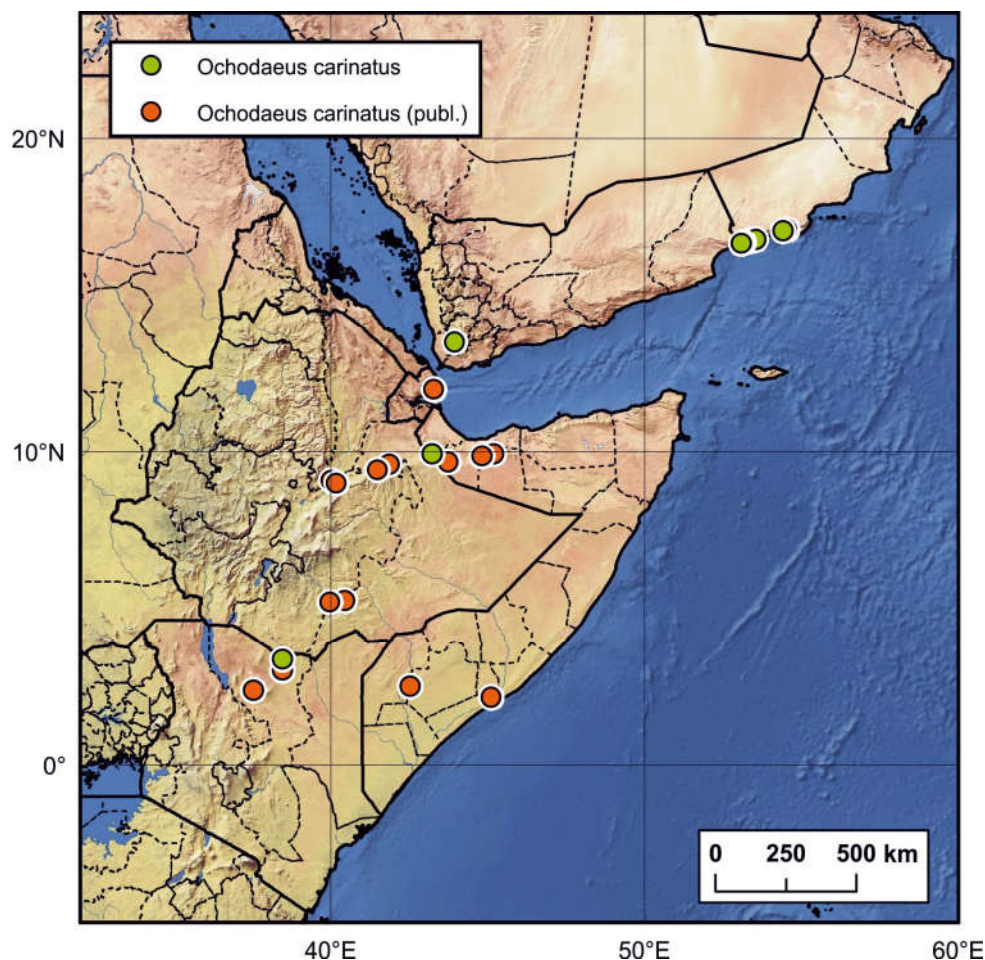


Fig. 3. Map of the Arabian Peninsula and the Horn of Africa on which the distribution of *O. carinatus* is marked. Orange circles represent published data, green circles our data.

DISCUSSION

Ochodaeidae are currently not known from the Arabian Peninsula. The nearest occurrence of this family are the countries in the Levant: Israel (*O. berytensis* Petrovitz, 1965, *O. cornifrons* Solsky, 1876, *O. gigas* Marseul, 1878), Lebanon (*O. berytensis*) and Syria (*O. cornifrons*) and Iran (*O.*



Fig. 4. Typical habitat of *Ochodaeus carinatus* in the environs of Hawf, Yemen. Photo by David Král (October 2005).



Fig. 5. Typical habitat of *Ochodaeus carinatus* in the environs of the Amoud University Campus, Boorama, Somaliland. Photo by David Král (September 2017).

cornifrons, *O. solskyi* Semenov, 1891) (e.g. Nikolajev & Bezděk 2016, Schoolmeesters 2020). All these species belong to the Mediterranean or Middle Asian faunal elements of the Palaearctic zoogeographical region. Based on presence of *O. carinatus* in Oman and Yemen we can say that the occurrence of Ochodaeidae on the Arabian Peninsula is of afrotropical origin.

Distribution of *O. carinatus* is still not well known. Adults of the family Ochodaeidae are relatively difficult to collect and this species is probably no exception. *Ochodaeus carinatus* is currently known from all countries on the Horn of Africa, from Kenya and from the Arabian Peninsula. Some species distributed in the Horn of Africa also occur on the Arabian Peninsula, from superfamily Scarabaeoidea, for example *Afromorgus gemmatus* (Olivier, 1789) and *A. procerus* (Harold, 1872) – both Trogidae, *Mesontoplatys arabicus* (Harold, 1875) (Aphodiinae) or *Onthophagus (Eremonthophagus) sticticus* Harold, 1867 – Scarabaeinae (Král & Batelka 2017). The current known area of distribution of *O. carinatus* is therefore not surprising. Based on using special collecting methods (e.g. yellow dishes, window traps) it is almost certain that this species is present in at least semi desert localities with a relatively rich cover of trees and shrubs (Figs. 4–5).

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