

Phalacridae of Socotra Island (Coleoptera: Cucujoidea)

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Abstract. The family Phalacridae is newly reported from Socotra. Three species in three genera are recorded, including two new species: *Olibrosoma eudaimonarabiana*, sp. nov., *Olibrus socotrana*, sp. nov., and *Pseudolibrus gestroi* Flach, 1889. Illustrations of each species are provided, and a key is given to allow identification of Socotran species.

Key words. Coleoptera, Phalacridae, *Olibrosoma*, *Olibrus*, taxonomy, new species, new records, Yemen, Socotra

Introduction

The family Phalacridae, though recently revised at the genus level (GIMMEL, in press), are still among the poorest known beetle families at the species level. Their appearance is highly uniform over most of the family. Male genitalia are required in most cases to definitively establish species identities. A few recent studies by Z. Švec have focused on select East African (ŠVEC 2002, 2003, 2005, 2006) and Middle Eastern species (ŠVEC 2010), and GIMMEL (2009) treated the Seychellois fauna. Socotran species have never been treated, so this report contains the first records of the family from the island.

Three genera are reported from Socotra: 1) *Olibrosoma* Tournier, 1889 is represented by two previously described species from Mauritania to Transcaucasia; 2) *Olibrus* Erichson, 1845, the largest genus of Phalacridae with 128 previously described species, is represented on all habitable continents except South America and is especially rich in arid and semiarid regions; and 3) *Pseudolibrus* Flach, 1889 known from five described species from subsaharan Africa and outlying islands (GIMMEL, in press). Based on morphological similarity, the closest apparent relatives of Socotran species in each genus are mainland Afrotropical species, with one species reported both from Socotra Island and mainland Yemen.

The known Socotran species are easily distinguished from each other externally. However, since species within the reported genera may be extremely similar-looking, specimens should be dissected to detect the presence of additional species in the Socotran fauna.

Materials and methods

Specimens were dissected by removing the abdomen using a method similar to that of DETTMER (1974). The abdomen was then placed in warm KOH for 10 minutes, transferred to water, whereupon the aedeagus was extracted and sclerites separated for clearer observation and illustration. The sclerites were remounted in water- and alcohol-soluble dimethylhydantoin formaldehyde (DMHF) resin on cellulose acetate rectangles and pinned with the specimen. Female genitalia were not studied for this work. Although they have been shown to contain diagnostic characters (especially in *Olibrus*), they are too poorly known in most species to be useful, and their description awaits further revision. Habitus photographs were taken using a Canon EOS 70D digital camera with an Infinity K-2 long-distance microscope lens, and images were assembled using CombineZM.

Specimens for this study were made available from the National Museum, Prague, Czech Republic (NMPC); the Faculty of Forestry, Czech University of Life Sciences, Prague, Czech Republic (CULS); and Pietro Lo Cascio and Flavia Grita private collection, Lipari, Italy (PLFG). The type of *Pseudolibrus gestroi* Flach, 1889 was borrowed from Museo Civico di Storia Naturale 'Giacomo Doria,' Genova, Italy (MSNG). A small number of specimens were retained for my personal collection (MLGC). Label data of holotypes in the type material sections are given verbatim; separate labels are divided by (//) and individual lines on labels are divided by (/).

Taxonomy

Key to Phalacridae of Socotra Island

1. Elytron with nine distinct, nearly complete striae (Fig. 11); frontoclypeus not emarginate above antennal base. *Pseudolibrus gestroi* Flach, 1889
- Elytron with one or two incomplete striae near suture, remainder of elytron smooth (Figs. 1, 6); frontoclypeus with small emargination above antennal base. 2
2. Elytron with one stria near suture (Fig. 1); antenna with four-segmented club (Fig. 5); metatarsus exceedingly long and slender (Fig. 4). *Olibrosoma eudaimonarabiana* sp. nov.
- Elytron with two striae near suture (Fig. 6); antenna with three-segmented club (Fig. 10); metatarsus not notably longer than other tarsi (Fig. 9). *Olibrus socotranus* sp. nov.

Olibrosoma eudaimonarabiana sp. nov.

(Figs. 1–5)

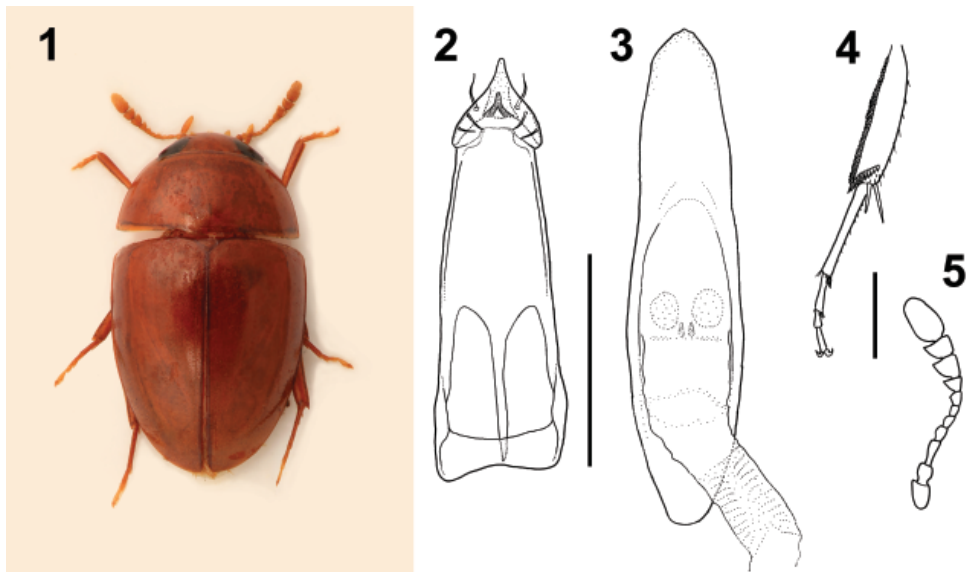
Type locality. Yemen, Socotra Island, Zerik.

Type material. HOLOTYPE: ♂ (NMPC), point mounted, genitalia removed and placed in DMHF on acetate card with specimen, abdomen removed and remounted on point, with label data 'Yemen; Socotra Isl. / Zerik, 25.-27.iii.2001 / V. Bejček & K. Šťastný leg. // HOLOTYPE ♂ / *Olibrosoma* / *eudaimonarabiana* Gimmel / des. M.L. Gimmel 2012 [red label]'. PARATYPES (N=41): **YEMEN: SOCOTRA:** Noked Plain, Qaareh (waterfall), 12°20'10"N, 53°37'56"E, 57m, 05–06.xii.2003, J. Farkač leg. (5, CULS); same data except D. Král leg. (2, NMPC); Wadi Ayhaft, 12°36.5'N,

53°58.9'E, 200 m, 07–08.xi.2010, J. Hájek leg. (1, NMPC); same except J. Bezděk leg. (1, NMPC); Wadi Ayhaft, 12°36'38"N, 53°58'49"E, 190 m, 24–26.xi.2003, D. Král leg. (1, NMPC); Firmihin, 12°28'27"N, 54°00'54"E, 400–500 m, 06–07.ii.2010, L. Purchart & J. Vybíral leg., at light (4, NMPC; 1, MLGC); Dixam Plateau, Wadi Esgego, 12°28'09"N, 54°00'36"E, 300 m, 02–03.xii.2003, J. Farkač leg. (1, NMPC); same except P. Kabátek leg. (2, NMPC); Zemhon area, 12°20'58"N, 54°06'39"E, 270–300 m, 16–17.vi.2010, V. Hula leg. (1, NMPC); Zemhon area, 12°30'58"N, 54°06'39"E, 270–350 m, 03–04.ii.2010, L. Purchart & J. Vybíral leg. (1, NMPC); Homhil protected area, 12°34'27"N, 54°18'32"E, 364 m, 28–29.xi.2003, P. Kabátek leg. (1, NMPC); Hadiboh environs, 12°65'02"N, 54°02'04"E, 10–100 m, 21.xi–12.xii.2003, P. Kabátek leg. (3, NMPC); Kesa environs, 12°39'37"N, 53°26'42"E, 220–300m, 28–29.i.2010, L. Purchart leg. (1, NMPC); Qualentiah environs, slopes 5 km SE from Quaysoh, 12°39.691'N, 53°26.658'E, 04–05.vi.2010, V. Hula & J. Niedobová leg. (8, NMPC; 1, MLGC). **HADRAMAUT:** Wada Daw'an, NW of Al Mukalla, 15°09'N, 48°26'E, 946 m, 20.x.2005, S. Kadlec leg. (1, NMPC); Kushum al Ain, 50 km SE of Hisn al Abr, 15°52'N, 47°40'E, 745 m, 09.x.2005, S. Kadlec leg. (1, NMPC). **TA'IZZ:** Suq ad Dabab, WSW of Ta'izz, 13°32'N, 43°57'E, 1208 m, 26.x.2005, S. Kadlec leg. (1, NMPC); **MA'RIB:** Wadi as-Sudd, 10 km W of Ma'rib, 15°24'N, 45°16'E, 1117 m, 08.x.2005, S. Kadlec leg. (1, NMPC). **SANA'A:** Wadi Anis, 60 km SW of Sana'a, 15°00'N, 44°09'E, 1522 m, 07.x.2005, S. Kadlec leg. (1, NMPC). **AL MAHRAH:** Jabal al Fatk, Hawf, NE of Al Ghaydah, 16°39'N, 53°04'E, 477 m, 31.iii.2007, S. Kadlec leg. (1, NMPC). Each paratype with label 'PARATYPE / *Olibrosoma eudaimonarabiana* Gimmel / det. M.L. Gimmel 2012 [yellow label]'.

Description. Total length 2.3–3.2 mm. Color uniform rufotestaceous dorsally (Fig. 1) and ventrally, appendages usually somewhat lighter; diffraction grating evident on elytra.

Head finely, densely punctate; frontoclypeus with shallow emargination above antennal insertion; eye large, distinctly emarginate at level of frontoclypeal shelf, eyes separated by slightly more than one eye width in frontal view; with weak perioocular groove along margin of posterior half of eye. Mandible unidentate; maxillary palp with palpomere IV subequal to II and III combined; labial palpomere III broad, fusiform. Antenna (Fig. 5) short, not reaching



Figs. 1-5. *Olibrosoma eudaimonarabiana* sp. nov. 1 – dorsal habitus; 2 – tegmen, ventral; 3 – penis, ventral; 4 – metatibia and tarsus, ventral; 5 – antenna. Scale bars = 0.3 mm.

posterior corner of pronotum; antennomeres VIII–XI distinctly expanded into club, antennomere VII slightly expanded, causing club to appear 4- to 5-segmented. Pronotum with hind angle sharp, about right; scutellar lobe moderately developed. Pronotal lateral bead coarse, distinctly thickened at front angle; pronotum lacking border along posterior margin; punctation as fine as that of head but less dense, especially sparse medially; pronotum completely lacking microsculpture. Elytron with a single stria near suture, evident in apical three-fourths; elytral surface smooth, with trace of additional longitudinal striae represented by rows of exceedingly weak punctures; weak transverse strigae evident laterally in apical two-thirds of elytron; elytron sparsely micropunctulate over entire surface, microsculpture not evident at 60× magnification. Prosternum with a few very short, ventrally directed setae; prosternal process apex with margin indistinct; protibia with ctenidium long, extending about three-fourths of length of tibia. Metaventral process extending slightly anterior of mesocoxae, not forming a shelf over mesoventrite; metaventral postcoxal line smoothly arcuate, enclosing area about one-fifth longitudinal distance between meso- and metacoxae; metaventricle weakly punctate; metatarsus about as long as metatibia, with four tarsomeres in both sexes; dorsal (longest) metatibial spur about one-third length of metatarsomere I (Fig. 4); metatarsomere I longer than remaining tarsomeres combined; metatarsomere II as long as III and IV combined.

Aedeagus with fused parameres of tegmen (Fig. 2) acuminate pointed apically, with three pairs of setae (two pairs ventrally, one pair dorsally, the latter positioned more apically); penis (Fig. 3) broadly pointed and minutely tripartite at apex, internal sac with paired, weakly sclerotized, rounded spicules, based of penis broadly rounded.

Differential diagnosis. Distinguished from other Socotran phalacrids by the single elytral sutural stria, long metatarsi (Fig. 4), and rufotestaceous coloration (Fig. 1). It differs from other species of *Olibrosoma* by the uniform rufotestaceous coloration and details of the aedeagus, especially the three pairs of setae on the parameres (Fig. 2) and lack of an X-shaped sclerite in the penis (Fig. 3).

Distribution. Collected from multiple localities on the island of Socotra and mainland Yemen.

Etymology. The specific epithet derives from *Eudaimon Arabia* ('Happy Arabia'), the name given to the region of present-day Yemen by the ancient Greek geographer Ptolemy.

Notes. Only one other species of *Olibrosoma* has been illustrated previously, *O. testacea* Tournier, 1889, which occurs in the Saharan and Arabian deserts (illustrated in ŠVEC 2010). Another species, *O. strigosus* (Reitter, 1899), was placed in the genus tentatively by GIMMEL (in press). At least two additional, undescribed species occur in eastern and southern Africa. One form occurring in the Horn of Africa is similar externally to *O. eudaimonarabiana* sp. nov. but differs significantly with regard to the male genitalia.

Olibrus socotranus sp. nov.

(Figs. 6–10)

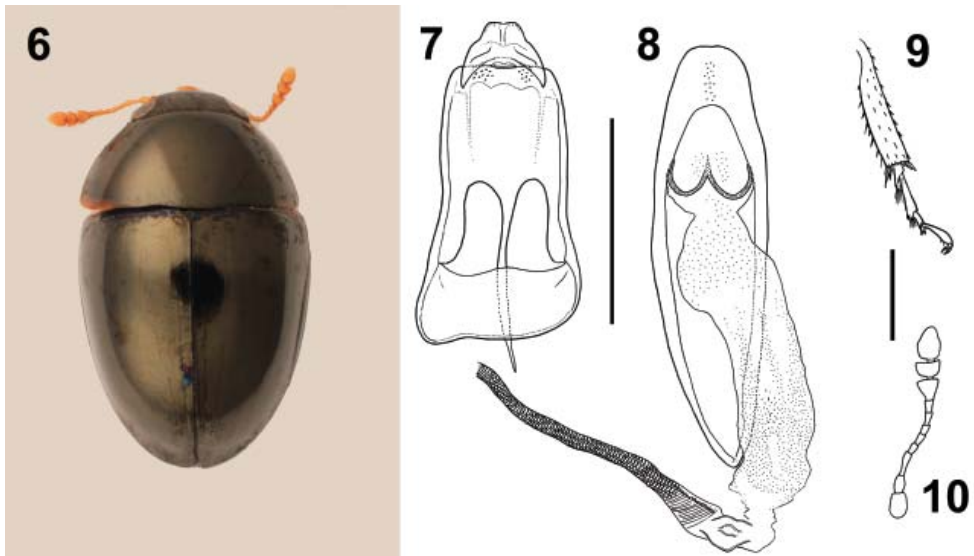
Type locality. Yemen, Socotra, Noked, Mokhar, 12°18'43"N 53°43'31"E.

Type material. HOLOTYPE: ♂ (NMPC), point mounted, genitalia removed and placed in DMHF on acetate card with specimen, abdomen removed and remounted on point, with label data 'Yemen, Socotra Isl., / Noked, Mokhar, / 31.iii.2001, / leg. V. Bejček & K. Štátný // HOLOTYPE ♂ / *Olibrus / socotranus* Gimmel / des. M.L. Gimmel

2012 [red label]'. PARATYPES ($N=17$): Same capture data as holotype, with label 'PARATYPE / *Olibrus / socotranus* Gimmel / det. M.L. Gimmel 2012 [yellow label]' (5 CULS; 9, NMPC; 3, MLGC).

Description. Total length 1.8–2.2 mm. Color uniformly black or nearly black dorsally, with faint greenish metallic tinge (Fig. 6); ventrally dark rufotestaceous, appendages bright rufotestaceous.

Head extremely finely, moderately densely punctate; frontoclypeus with distinct emargination above antennal insertion; eye medium-sized, extremely shallowly emarginate at level of frontoclypeal shelf, eyes separated by about two eye widths in frontal view; lacking pericocular groove. Maxillary palp with palpomere IV short, wide, fusiform; labial palp very small, inconspicuous. Antenna (Fig. 10) short, not reaching posterior corner of pronotum; antennomeres VII and VIII distinctly longer than wide, IX slightly longer than X, XI weakly turbinate, shorter than IX and X combined. Pronotum with hind angle distinctly obtuse; scutellar lobe weakly developed. Pronotal lateral bead fine, complete, not distinctly thickened at front angle; pronotum with very weak but evident border along posterior margin; punctuation finer and sparser than that of head; pronotum completely lacking microsculpture. Elytron with two striae near suture, medial stria extending about two-thirds length of elytron, lateral stria extending about one-half length of elytron, striae joining near apex; elytral surface smooth, with faint trace of additional longitudinal striae represented by rows of exceedingly weak elongate punctures, with round interstitial punctures also faintly indicated; transverse strigae and microsculpture completely absent from elytron. Prosternum entirely glabrous; prosternal process apex with margin completely absent; protibia with two spines at outer apical angle.



Figs. 6-10. *Olibrus socotranus* sp. nov. 6 – dorsal habitus; 7 – tegmen, ventral; 8 – penis, ventral; 9 – metatibia and tarsus, ventral; 10 – antenna. Scale bars = 0.3 mm.

Metaventral process broader than mesocoxal cavity, extending distinctly anterior of mesocoxae, evenly rounded at apex, forming a shelf over mesoventrite; metaventral postcoxal line closely adhered to mesocoxal cavity; metaventrite very weakly, sparsely punctate, punctures entirely absent from large areas posteromedially; metatarsus shorter than metatibia, male with four tarsomeres, female with five; ventral (longest) metatibial spur nearly equal to metatarsomere I (Fig. 9); metatarsomere I less than half length of II; metatarsomere II subequal to III–IV(–V in female) combined.

Aedeagus with tegmen (Fig. 7) short, broad, fused parameres broader than long, slightly emarginate at apex, without setae; penis (Fig. 8) blunt to slightly emarginate at apex, acutely pointed at base, internal sac with ‘ω’-shaped sclerite, ejaculatory duct with spirally arranged sclerotization proximal to penis.

Differential diagnosis. Distinguished from other Socotran phalacrids by the two elytral sutural striae, short metatarsi (Fig. 9), and deep black coloration (Fig. 6). It differs from other species of *Olibrus* by the combination of deep black coloration, two sutural striae that coalesce apically and do not approach the base of the elytra, the almost total lack of striae on the elytral disc, lack of microsculpture on the dorsal surface, the unbordered pronotal base, the bright rufotestaceous appendages (with antennal club not infuscated), the highly obtuse pronotal hind angles, and details of the aedeagus, especially the short, wide parameres (Fig. 7) and the acutely pointed base of the penis (Fig. 8).

Distribution. So far known only from Socotra, from one locality in the Noged Plain.

Etymology. The specific epithet refers to the island of Socotra, from which all known specimens of this species originate.

Notes. This species keys to *Olibrus platysternus* Champion, 1925 in LYUBARSKY’S (1998) treatment of some southern African members of this genus. However, *O. socotranus* sp. nov. is slightly larger on average, has a more slender antennal club, and differs in aedeagal morphology based on the illustration in LYUBARSKY (1998). It is also similar to *O. quadristriatus* Champion, 1925 but differs from that species in lacking a medio-basal border on the pronotum, antennal club not darkened, and differences in aedeagal morphology (that species also illustrated in LYUBARSKY 1998).

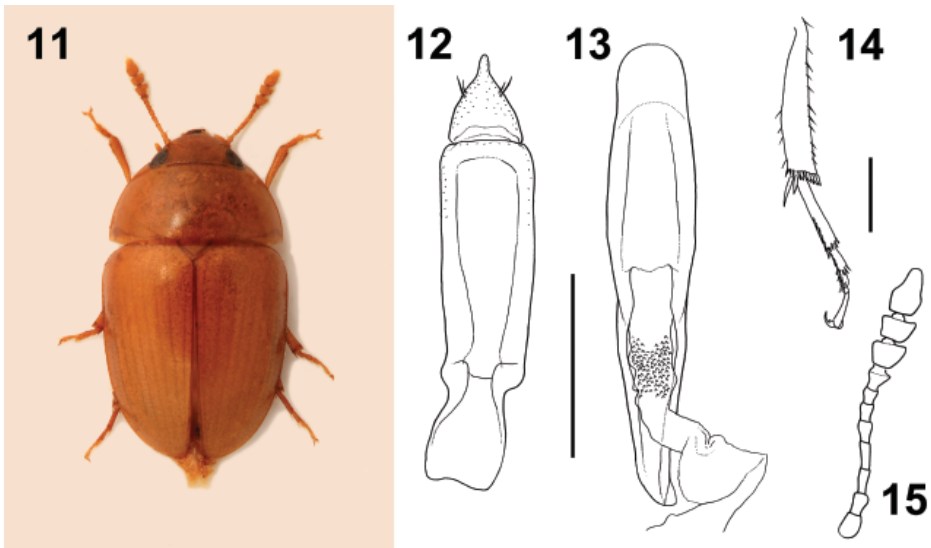
I have seen a small collection of northeastern African *Olibrus* and none were similar to this new species. Additionally, investigation of primary literature for previously described but still poorly known African, Eastern Mediterranean, and Middle Eastern species of *Olibrus* revealed specific differences in all cases. However, without examination of a large number of types scattered among numerous museums, the possibility exists that this species has been previously described from another locality.

Pseudolibrus gestroi Flach, 1889

(Figs. 11–15)

Pseudolibrus Gestroi Flach, 1889: 270 (original description; Type locality: Eritrea).

Type material. HOLOTYPE: ♂ (MSNG), point mounted, genitalia removed and placed in DMHF on acetate card with specimen, abdomen removed and remounted on point, with label data ‘Bogos 1870 / Sciotel [handwritten] / O. Beccari. // Museo Civ. / Genova // Olibrus / pallescens / m. [handwritten] // Olibrus / pallescens / n.sp. in litt. [handwritten] / det.E.Reitter // ? TYPUS of / Pseudolibrus / gestroi Flach, 1889 / R.Poggi [handwritten] [red label] // HOLOTYPE / Pseudolibrus / gestroi Flach / det. M.L. Gimmel 2011 [red label]’.



Figs. 11-15. *Pseudolibrus gestroi* Flach, 1889. 11 – dorsal habitus; 12 – tegmen, ventral; 13 – penis, ventral; 14 – metatibia and tarsus, ventral; 15 – antenna. Scale bars = 0.3 mm.

Material examined ($N=80$). **YEMEN:** **Socotra:** Noked Plain (Sand Dunes), Sharet Halma village environs, 12°21.9'N, 54°05.3'E, 20 m, 10–11.xi.2010, J. Hájek leg. (17, NMPC; 2, MLGC); same data except P. Hlaváč leg. (5, NMPC); same data except J. Bezděk leg. (20, NMPC); Esdegob, 24.ii.2000, V. Bejček & K. Šťastný leg. (1, NMPC); Zerik, 25–27.iii.2001, V. Bejček & K. Šťastný leg. (2, NMPC); Noked Plain, Qaareh (waterfall), 12°20'10"N, 53°37'56"E, 57 m, 05–06.xii.2003, coll. J. Farkač leg. (6, CULS; 1, MLGC); same data except D. Král leg. (3, NMPC); same data except P. Kabátek leg. (1, NMPC); Hadiboh environs, 12°65'02"N, 54°02'04"E, 10–100 m, 21.xi–12.xii.2003, P. Kabátek leg. (2, NMPC); Wadi Ayhaft, 12°36.5'N, 53°58.9'E, 200 m, 07–08.xi.2010, J. Bezděk leg. (1, NMPC); Dixam Plateau, Wadi Zeeriq, 12°31'08"N, 53°59'09"E, 750 m, 03.xii.2003, D. Král leg. (1, NMPC); Dixam Plateau, Firmihin (*Dracaena* forest), 12°28.6'N, 54°01.1'E, 490 m, 15–16.xi.2010, J. Bezděk leg. (7, NMPC); same data except J. Hájek leg. (2, NMPC); same data except L. Purchart leg. (1, NMPC); Firmihin Plateau, 12°28'46"N, 54°01'E, 400–500 m, 18–19.vi.2010, V. Hula & J. Niedobová leg. (2, NMPC); Dixam Plateau, Wadi Esgego, 12°28'09"N, 54°00'36"E, 300 m, 02–03.xii.2003, P. Kabátek leg. (2, NMPC); same data except J. Farkač leg. (1, NMPC); Aloove area, Hassan village environs, 12°31.2'N, 54°07.4'E, 221 m, 09–10.xi.2010, J. Hájek leg. (1, NMPC); Khayrha Mountains, north slopes, Qalansiyah environs, 12°38'50"N, 53°27'45"E, 85–592 m, 09–10.xii.2003, P. Kabátek leg. (1, NMPC); Wadi Da'arho, 21.ii.2009, P. Lo Cascio & F. Grita leg. (1, PLFG).

Diagnosis. Distinguished from other Socotran phalacrids by the nine nearly complete elytral striae (Fig. 11), large scutellum, and by the structure of the metatarsus (Fig. 14) and antenna (Fig. 15). It differs from other species of *Pseudolibrus* by the uniform testaceous coloration and details of the aedeagus, especially the two pairs of setae on the parameres (Fig. 12) and the blunt, evenly rounded apex of the penis (Fig. 13).

Distribution. Reliably identified specimens are known only from the type locality (Eritrea) and Socotra Island, but the species is probably much more widespread in Africa.

Notes. The genus *Pseudolibrus* had not been used outside of catalogues since the original description, until GIMMEL (submitted) recognized it as a senior synonym of *Biophytus* Guillebeau, 1894 and *Polyaloxus* Guillebeau, 1894.

Acknowledgments

I thank Zdeněk Švec (Prague, Czech Republic) for making me aware of the Socotran material and Jiří Hájek (NMPC) for the loan of the material for this study, and both for helpful reviews of this manuscript, along with an anonymous reviewer. Roberto Poggi (MSNG) kindly investigated and sent the cryptic holotype of *Pseudolibrus gestroi*. Crystal Maier (University of Kansas, USA) assisted with the habitus illustrations and Chris Carlton (Louisiana State University, USA) helped to improve the manuscript.

References

- DETTMER W. 1974: Zur Genitalpräparation von Phalacriden (Coleoptera). *Mitteilungen des Internationalen Entomologischen Vereins E.V. Frankfurt* **2(6)**: 82–84.
- FLACH K. 1889: *Pseudolibrus* nov. gen. Phalacridarum. *Deutsche Entomologische Zeitschrift* **1889**: 269–270.
- GIMMEL M. L. 2009: Family Phalacridae. The shining mold beetles. Pp. 106–108. In: GERLACH J. (ed.): *The Coleoptera of the Seychelles Islands*. Pensoft, Sofia-Moscow, 266 pp.
- GIMMEL M. L.: Genus-level revision of the family Phalacridae (Coleoptera: Cucujoidea). *Zootaxa*, in press.
- LYUBARSKY G. Y. 1998: Phalacridae of the southern Africa (Coleoptera). *Russian Entomological Journal* **6(1-2)** (1997): 17–40.
- ŠVEC Z. 2002: Revision of the African species of the genus *Tinodemus* Guillebeau (Coleoptera, Phalacridae). Results of the entomological expeditions of the Museum of Natural History, Berlin to Africa. 76th contribution. *Mitteilungen aus dem Museum für Naturkunde in Berlin Zoologische Reihe* **78**: 217–256.
- ŠVEC Z. 2003: A review of the genera *Stilbus* Seidlitz, 1872, *Podoces* Guillebeau, 1894 and *Entomocnemus* Guillebeau, 1894 from Africa, Madagascar and the Seychelles (Coleoptera, Phalacridae). *Entomologica Basiliensia* **25**: 99–133.
- ŠVEC Z. 2005: Notes on the genus *Olibrus* Erichson, 1945 [sic] (Coleoptera: Phalacridae) with the description of a new species. *Studies and Reports of District Museum Prague-East Taxonomical Series* **1**: 133–139.
- ŠVEC Z. 2006: *Afronyrus* gen. n. (Coleoptera: Phalacridae) with descriptions of new Phalacridae from Africa and Asia. *Studies and Reports of District Museum Prague-East Taxonomical Series* **2**: 105–122.
- ŠVEC Z. 2010: Order Coleoptera, family Phalacridae. Pp. 249–252. In: HARTEN A. VAN (ed.): *Arthropod Fauna of the UAE, Volume 3*. Multiply Marketing Consultancy Services, Abu Dhabi, 700 pp.