

***Pleuraphodius arabiaefelicis* sp. nov. from Yemen  
(Coleoptera: Scarabaeidae: Aphodiinae: Aphodiini)**

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**Taxonomy, new species, Coleoptera, Scarabaeoidea, Scarabaeidae, Aphodiinae, Aphodiini, *Pleuraphodius*, Yemen, Afrotropical Region, Palearctic Region**

**Abstract.** A new species of the genus *Pleuraphodius* A. Schmidt, 1913, *Pleuraphodius arabiaefelicis* sp. nov. from Yemen, is described, illustrated and discussed, particularly in terms of its relationship to the Afrotropical fauna of the genus. The genus *Pleuraphodius* is recorded from the Arabian Peninsula for the first time.

## INTRODUCTION

In the course of examining rich material of Scarabaeidae from Yemen, we found a new species of the genus *Pleuraphodius* A. Schmidt, 1913, which was originally proposed as a subgenus of the genus *Aphodius* Hellwig, 1798 (Schmidt 1913). The description and illustrations of the new species are presented below. The authors of the work presented here adopted the concept by Dellacasa et al. (2001) considering the taxon *Pleuraphodius* as a genus.

In a monograph of world Aphodiinae (Schmidt 1922), seven species of *Pleuraphodius* (from the Afrotropical, Oriental and Palearctic Regions) are included.

Four species of *Pleuraphodius* are mentioned in a monograph dealing with species of the Palearctic and Oriental Regions (Balthasar 1964); a species from east India omitted in this monograph is listed by Schmidt (1922) and Dellacasa (1988). Further four Palearctic/Oriental species have been described later.

Species of the genus/subgenus are, however, most numerous in the Afrotropical Region. Paulian (1942) considered *Pleuraphodius* to be a genus and mentioned twelve Afrotropical species within the framework of the taxon. The monographic treatise by Endrődi (1964) comprises 40 species from there. Fifty-six Afrotropical species are listed by Dellacasa (1988, 1991, 1996) in his catalogue including addenda and corrigenda. Since then, further five Afrotropical species of *Pleuraphodius* (or *Pleuraphodius* s. lato) have been described (Bordat 1997, 2005, 2014).

The presence of *Pleuraphodius* (one species) in the Western Hemisphere is questionable (Skelley et al. 2007).

A species, which is known from the Palearctic and Oriental Regions, was also reported from Australia (Stebnicka & Howden 1995).

## MATERIAL AND METHODS

The specimens were observed by using the MBS-10 and SZP 1120-T stereoscopic microscopes. The photos published here were taken by the use of the Meopta laboratory microscope, CMOS 5 digital camera and Helicon Focus programme.

Each specimen of the newly described species is provided with a printed red label: “*Pleuraphodius arabiaefelicis* sp. nov., HOLOTYPUS ♂ [or] ALLOTYPUS ♀ [or] PARATYPUS, David Král, Miloslav Rakovič & Ladislav Mencl det. 2016” and with a pale green label specifying numbers related to a photo-documentation system by the third author (LM). Exact data (as shown on white labels) are cited for the material examined. Individual lines on each label are separated by the slash “/”; the double slash “//” stands for the separation of individual labels. Information in quotation marks indicates the original spelling. Our remarks and additional comments are found in brackets.

Morphological terminology concerning the epipharyngeal structures was adopted from Dellacasa et al. (2001).

The following acronyms identify the collections housing the material examined:

- PBCS Patrice Bordat private collection, Saint-Cirq, France;
- DKCP David Král collection (deposited in National Museum, Prague), Czech Republic;
- LMCT Ladislav Mencl private collection, Týnec nad Labem, Czech Republic;
- MRC D Miloslav Rakovič private collection, Dobřichovice, Czech Republic.

## TAXONOMY

### *Pleuraphodius arabiaefelicis* sp. nov.

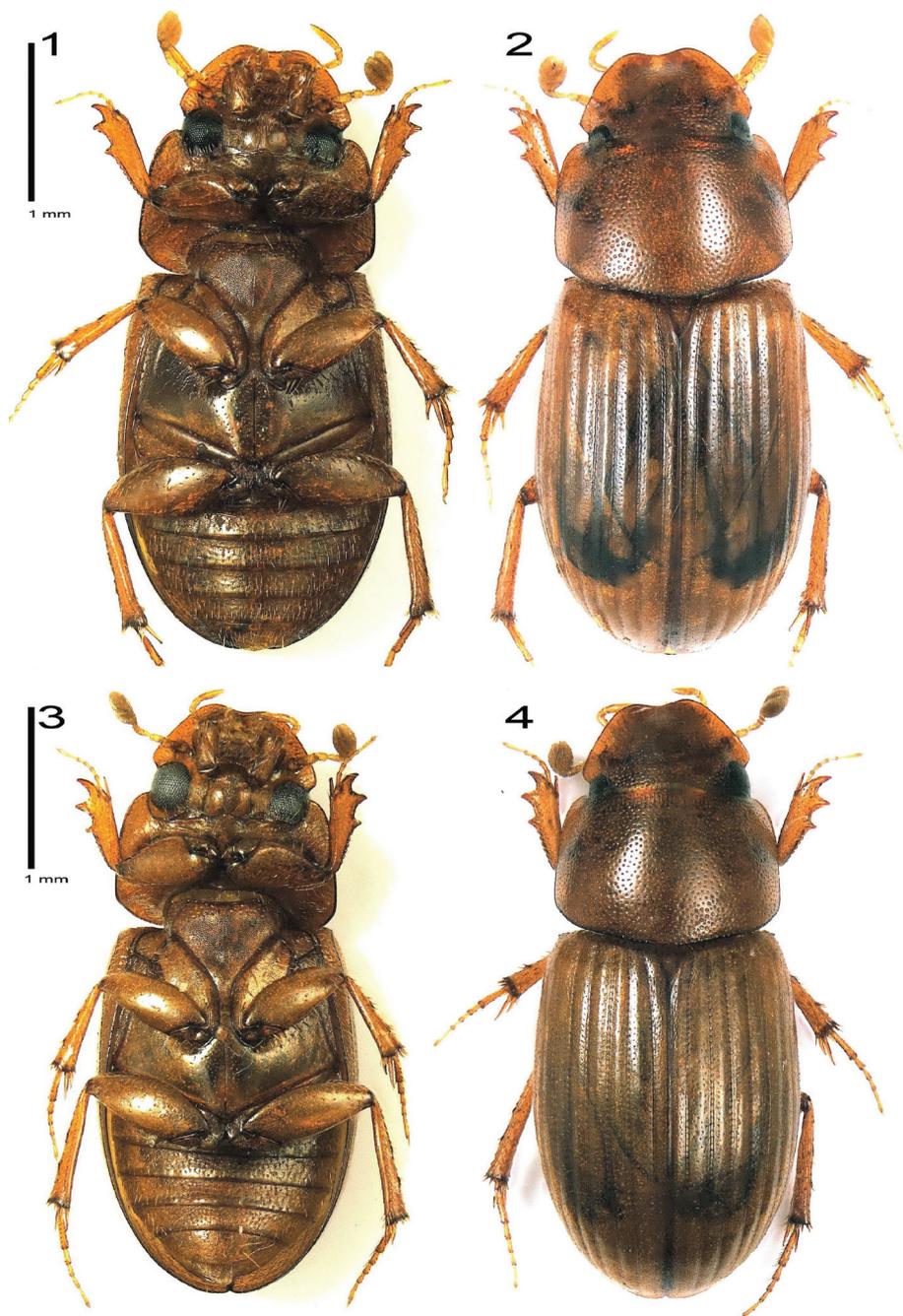
(Figs. 1-11)

**Type locality.** S. Yemen, 20 km west of Lawdar, 13°53'N 45°48'E, 1100 m a.s.l.

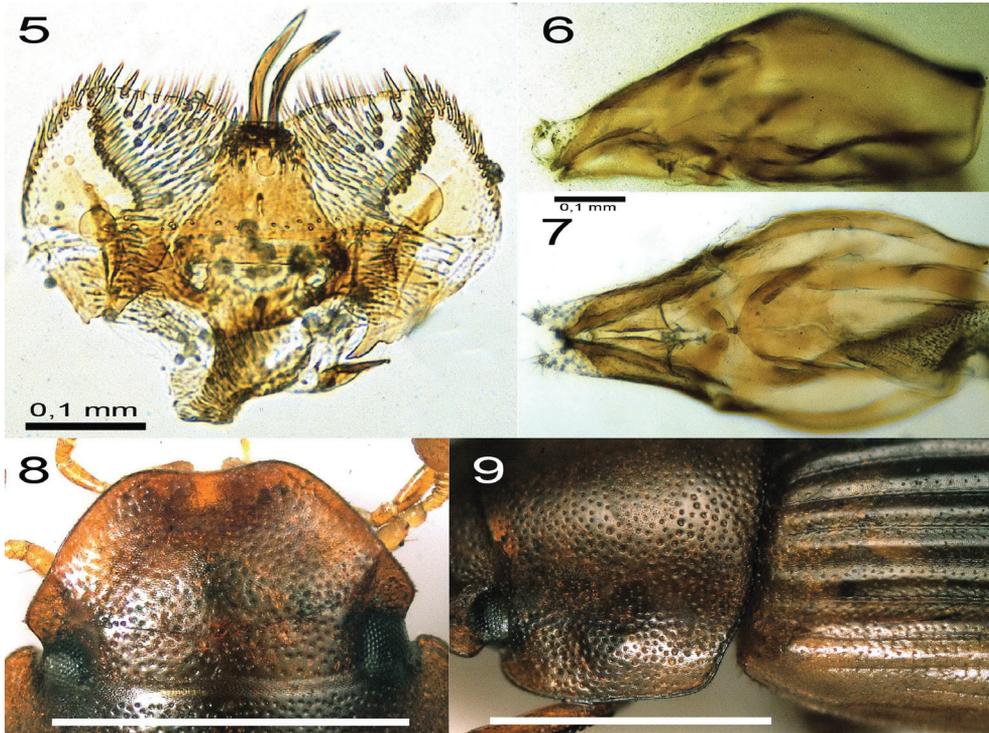
**Type material.** Holotype (♂): (DKCP), “S YEMEN, 26.-27.iii.2007 / 20 km W LAWDAR / 13°53'N 45°48'E / ca 1100 m, David Král lgt.” [white printed label] //1995 / Dok. L. Mencl, 2014 [pale green printed label]. Paratypes: allotype (♀) (DKCP), same data on white labels as with holotype, number 1994 instead of 1995 on pale green label; 1 ♂ and 3 ♀♀ (DKCP) “S YEMEN, 27.-28.iii.2007 / 20 km W LAWDAR / 13°53'N 45°48'E / ca 1100 m, David Král lgt.”; 1 ♂ (DKCP), 1 ♂, 1 ♀ (LMCT), 1 ♂, 1 ♀ (MRC D), 1 ♂, 1 ♀ (PBCS) “S YEMEN, 29.-30.iii.2007 / KHAWR SAYBAN / (NW of Al Mukalla) / 14°37'N 49°03'E / ca 570 m, David Král lgt.”.

**Description of holotype.** Oblong oval, moderately convex, broader behind, broadest at about elytra midlength (length to maximum width ratio of 2.32), 3.90 mm long, dorsum (Fig. 2) glabrous (with exception of enormously minute macrosetae on elytral apex), finely microreticulate and thus only moderately shining, reddish brown.

Head (Fig. 8) moderately convex, transversal, with fine frontoclypeal suture, with small, rather depressed area in front of epistomal gibbosity. Clypeus with round anteromedian emargination, rounded each side of it; posterior part of clypeus lateral margins nearly



Figs. 1-4. *Pleuraphodius arabiaefelicis* sp. nov., habitus: 1- holotype, ♂, ventral view; 2- holotype, ♂, dorsal view; 3- allotype, ♀, ventral view; 4- holotype, ♀, dorsal view. Scale bar 1 mm. Photos by L. Mencl.



Figs. 5-9. *Pleuraphodius arabiaefelicis* sp. nov., holotype, ♂: 5- epipharynx; 6- aedeagus, lateral view; 7- aedeagus, dorsal view; 8- head, dorsal view; 9- pronotum and basal part of elytra, dorsolateral view. Scale bars 0.1 mm for Figs. 5-7, 1 mm for Figs. 8-9. Photos by L. Mencl.

straight, almost aligned with anterior margins of genae; genae angularly rounded, protruding considerably more than eyes. Head surface with medium-sized, not very deep but quite distinct punctures nearly throughout; distances between punctures about as large as or larger than puncture diameter.

Epipharynx (Fig. 5) transversal, anterior outline distinctly emarginate, lateral outlines regularly widely rounded; tormae and nesium well sclerotised, approximately symmetrical; apotormae indistinct; epitorma subquadrate, well sclerotised; helus with single irregular rows of sensilla; corypha short with two stout and remarkably long spiculae; phobae weakly sclerotised, covered with microtrichiae; chaetoparia with row of approximately 25 long, stout, closely spaced spines; area of prophobae only weakly sclerotised, bearing longitudinal row of four short, stout, sparsely spaced spines.

Pronotum (Figs. 2 and 9) transversal, length-to-width ratio of 0.695, widest at base, continuously narrowed forward. Anterior and posterior margins not bordered, lateral margins very finely bordered (lines of lateral margins observable under high magnification only); anterior angles rounded, posterior angles only very slightly truncate/sinuate, lateral margins between anterior and posterior angles nearly straight. Pronotum surface microreticulate, with medium-sized punctures having not perfectly same diameters; distances between punctures about as large as or larger than puncture diameter.

Scutellum small, distinctly longer than wide, nearly pentagonal, microreticulate, with few very fine punctures.

Elytra (Fig. 2) widest at about midlength (length-to-width ratio of 1.38), with ten striae and ten intervals (counting sutural interval = interval 1), with very small, sideward directed humeral denticles. Punctures in striae rather indistinct, slightly crenating intervals. Intervals considerably convex, but not costate on disc, rather flat on apex, their surface microreticulate, finely but distinctly and relatively densely punctate, punctures being partially arranged in longitudinal rows; minute macrosetae tending to arrangement in short longitudinal rows present on elytral apex; discal intervals (1-5) reaching elytra base, lateral intervals being more or less reduced in length anteriorly (Fig. 9).

Legs in dorsal aspect as shown in Fig. 1. Protibia outer margin with three large teeth in apical half and eight quite distinct small denticles in basal half (decreasing gradually in size from most anterior to most posterior ones); upper face of protibiae finely but distinctly punctate; protibial apical spur distinctly hooked downward and inward apically (feature characteristic of males in some of Aphodiinae species). Meso- and metatibiae relatively slim, straight, gradually only moderately dilated from base to apex; their oblique ridges indistinct; apex of posterior tibia fringed with not numerous unequal spinulae; superior terminal spur of metatibia slightly exceeding half basal metatarsomere length, inferior spur being only slightly shorter; basal metatarsomere about as long as metatarsomeres 2-4 combined.

Ventral surfaces (Fig. 1) moderately shining, macrosetaceous and/or punctate. Femora with sparse, fine setigerous punctures; anterior margins of profemora and posterior margins of meso- and metafemora bordered by complete lines. Mesoventrum glabrous, finely, sparsely punctate, particularly around metaventral plate; metaventral plate with nearly complete, narrow midline furrow. Abdominal ventrites considerably macrosetaceous (with about three macrosetae per ventrite length).

Aedeagus as in Figs. 6-7. Relatively short and stout. Parameres shorter than phallobasis, regularly arcuate to almost acute distinctly sclerotised tips (visible mainly in lateral aspect - Fig. 6), tips bearing somewhat irregularly triangularly shaped membranous areas (visible mainly in dorsal aspect - Fig. 7).

**Sexual dimorphism.** In males, the protibial apical spur is distinctly hooked downward and inward apically; in females, it is nearly straight, only slightly continuously curved outward and narrowed from base to apex. The female allotype is depicted in Figs. 3-4.

**Variability.** There is no distinct variability in the shape, colour, structure or sculpture. The variability in the body length is as follows: all material together 3.20-4.05 mm (13 specimens, average length of 3.76 mm); males 3.20-3.95 (6 specimens, average length of 3.67 mm); females 3.70-4.05 mm (7 specimens, average length of 3.85 mm).

**Collection circumstances.** All material was collected at light, in semidesert landscape extensively grazed by large domestic herbivorous animals (cattle, camels, horses, sheep, goats) but none of the specimens examined was found in their excrements (Figs. 10-11).

**Distribution.** Abyan and Hadramawt Governorates, Yemen.

**Name derivation.** Arabia Felix (= Happy Arabia) is the Latin name previously used by



Fig. 10. Semidesert landscape near Lawdar (Abyan Governorate, Yemen), type locality of *Pleuraphodius arabiaefelicis* sp. nov. March 2007, photo by D. Král.

geographers to describe the southern part of the Arabian Peninsula, approximately covering the Yemen territory.

**Differential diagnosis.** As to features like not bordered pronotal base, convex (but not costate) elytral intervals, short superior apical spur of the metatibia (only slightly exceeding half basal metatarsomere length) and body size and colour, the new species should be compared with certain species, which are known from East Africa, particularly with *Pleuraphodius teter* (Roth, 1851) and its relatives. *Pleuraphodius arabiaefelicis* sp. nov. has relatively deep anteromedian emargination of the clypeus, very slim metatibiae with indistinct oblique ridges and basal metatarsomere as long as metatarsomeres 2-4 combined. Afrotropical species coming in question in terms of the features mentioned above, at the beginning of the present paragraph, have a shallow anteromedian emargination of the clypeus, more dilated metatibiae with distinct oblique ridges and basal metatarsomere not at all as long as metatarsomeres 2-4 combined.

## DISCUSSION

Pittino (1984) reported total of 13 subgenera (genera in the contemporary concept) of the tribe Aphodiini from Saudi Arabia and adjacent areas of the Arabian Peninsula



Fig. 11. Semidesert landscape near Khawr Sayban (Hadramawt Governorate, Yemen), habitat of *Pleuraphodius arabiaefelicis* sp. nov. March 2007, photo by D. Král.

(Oman, Yemen) as follows: *Pharaphodius* Reitter, 1892, *Coptochiroides* Balthasar, 1938, *Cinacanthus* A. Schmidt, 1913 sensu lato, *Erytus* Mulsant et Rey, 1870, *Mendidaphodius* Reitter, 1901, *Trichaphodius* A. Schmidt, 1913, *Koschantschikovius* A. Schmidt, 1913, *Mesontoplatys* Motschulsky, 1864, *Mendidius* Harold, 1868, *Bodilus* Mulsant et Rey, 1870, *Labarrus* Mulsant et Rey, 1870, *Subrinus* Mulsant et Rey, 1870, and *Calamosternus* Motschulsky, 1860. The occurrence of the genus/subgenus *Pleuraphodius* has never been published from this area. The present description of the species *Pleuraphodius arabiaefelicis* sp. nov. comprises the first record of the genus from the Arabian Peninsula.

The new species exerts its affinity rather to the Afrotropical (East African) fauna than to the Palearctic fauna. We recently encountered a similar situation in Psammodiini during the description of a new *Rhyssemus* Mulsant, 1842 species from Oman and discussed it in association with findings in different subfamilies of Scarabaeidae (Rakovič et al. 2016).

Among numerous Afrotropical species of the genus, including more than 60 species, *Pleuraphodius teter* and its allies are most similar to the new species described here, which can be characterized as mentioned above in the paragraph Differential diagnosis.

Dellacasa et al. (2001) suggested that the taxon *Pleuraphodius* is polyphyletic. If so, the generic placement of the new species adopted here is perhaps tentative. Future definitions of some new genera can be expected, but this problem can be solved only based on a thorough

revision, not only of the genus *Pleuraphodius* but also of some other possibly allied genera, which is quite beyond the scope of the work presented here.

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