

***Psammodius jordanus* sp. nov.**
(Coleoptera: Scarabaeidae: Aphodiinae: Psammodiini) from Jordan

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Abstract. A new species of the genus *Psammodius* Fallén, 1807, *Psammodius jordanus* sp. nov. from Jordan, is described, and compared with a species exerting most similar characters: *Psammodius laevipennis* Costa, 1844. The new species is characterized by its peculiar combination of colours on dorsal surfaces (the head and pronotum dark brown, elytra reddish brown with darker elytral suture), and by sculptures of pronotal furrows, elytral striae and elytral intervals.

INTRODUCTION

When studying material of Aphodiinae from Naturkundemuseum Erfurt, Germany forwarded by Matthias Hartmann, the first author of the work presented here found six specimens from Jordan, which belonged to a new species of the genus *Psammodius* Fallén, 1807. The new species is described below under the name *Psammodius jordanus* sp. nov.

The most recent work dealing with a revision of *Psammodius* was compiled by Pittino (2007). That revision comprises a key to species, in which the new species reliably keys out to point 3: *Psammodius laevipennis* Costa, 1844.

The importance of particular characters for the definition of the new species is discussed below in the Part Taxonomy (Differential diagnosis) and particularly in Table 1.

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.

Measurements of lengths and widths were carried out with the help of an ocular micrometer.

Each type specimen is equipped with printed labels as follows: a white label giving locality data; a yellow label bearing the text collection / NATURKUNDE- / MUSEUM

ERFURT; a pale green label specifying a number related to a photo-documentation system by the second author; and a red label indicating the identification and type status, name of the new species, names of the present authors and year of the examination. Individual lines of every label are separated by a slash (/).

For the explanation of terms concerning structures and sculptures of *Psammodiini* used in the present work see for example Rakovič et al (2016).

For morphological terms used in the description of epipharyngeal structures we follow Dellacasa et al. (2010).

The following acronyms stand for collections, in which the specimens studied here are kept:

LMCT Ladislav Mencl, private collection, Týnec nad Labem, Czech Republic;

MRC D Miloslav Rakovič, private collection, Dobřichovice, Czech Republic;

NMEC Naturkundemuseum Erfurt, Germany (Matthias Hartmann);

NMPC National Museum Prague, Czech Republic (Jiří Hájek).

TAXONOMY

Psammodius jordanus sp. nov.

(Figs. 1, 3, 4, 6, 8, 10-12)

Type locality. Jordanien, Ma'an governorate, N of Petra, Wadi Araba, 30°25'43.9"N 35°25'51.7"E, 980 m a.s.l.

Type material. Holotype (♀) (NMEC) equipped with the following printed labels: 1) white label: "N 30°25'43.9" E 35°25'51.7" / Jordanien, gouv. Ma'an / Petra N., Wadi Araba, JD 35 / Sandfelsen / 26. iv.2016 980 m üNN LF / leg. SCHNITTER/SHELLERHORN"; 2) yellow label see above 3) pale green label (see above): "2746 / Dok. L. Mencl 2020"; 4) red label: "HOLOTYPE (♀) / *Psammodius jordanus* / sp. nov. / M. Rakovič, L. Mencl / & D. Král det. 2021". Paratypes: (4 ♀♀): same data as holotype (LMCT, MRC D, NMEC, NMPC) labels 1) and 2) same as with holotype, label 3) with numbers 2608, 2747, 2748, and 2749 instead of 2746 and label 4) with word PARATYPE instead of HOLOTYPE.; (1 ♀): (NMEC) with label 1) bearing the text "N 30°38'28.5" E 35°36'52.22" / Jordanien, gouv. Al-Tafila / Duana Reserve, JD 30 / Juniperus/Quercus (Sandstein) / 24. iv. 2016 1165 m üNN LF / leg. SCHNITTER/SHELLERHORN"; labels 2) and 4) as with 4 paratypes above; label 3) with a different number (2750). See also Figs. 11-12 for the appearance of labels.

Additional material studied. For the comparison of the new species with the most similar species, we also studied specimens of *Psammodius laevipennis* from our collections coming from Albania, Algeria, Bulgaria, France, Georgia, Greece, Montenegro, North Macedonia, Iran, Morocco, Slovakia, Spain, Ukraine and Turkey (see also Figs. 2, 5, 7, 9).

Description of holotype. Small (body length of 3.70 mm), broader behind, maximum width (at about 0.6 elytra length) of 1.75 mm, dorsal surfaces glabrous, rather matte, head and pronotum dark brown, elytra reddish brown with darker suture; habitus in dorsal aspect as in Fig. 1.

Head (Fig. 4). Clypeus rounded each side of anteromedian emargination, its lateral sides arcuate, genae about semicircular, considerably protruding from clypeus outline, and bearing few acuminate macrosetae. Clypeus surface areas along anterior and lateral margins with

not very dense, low, mostly more or less elongate granules. Middle protuberance above granulate clypeus area only moderately elevated anteriorly and laterally, covered with larger, irregularly shaped granules, more distinctly elevated posteriorly, separated from head vertex by deep furrow. Head vertex with two pairs of oblique ridges (anterior pair distinct, posterior pair vestigial).

Epipharynx (Fig. 10) transversal, anterior outline almost straight, lateral outlines straight and divergent in approximately anterior half, regularly widely rounded posteriorly; tormae and nesium well sclerotised, approximately symmetrical, apotormae missing; epitorma almost quadrate, weakly sclerotised; helus with group of somewhat irregularly spaced sensilla and four longitudinal rows of long microtrichia anteriorly; corypha and zygum absent; phobae weakly sclerotised, glabrous; chaetoparia with row of 24 long, stout, closely spaced spines; area of prophobae well sclerotised, bearing longitudinal row of four short, stout, densely spaced spines.

Pronotum (Figs. 1, 6) narrower than head, convex, transversal (length-to-width ratio of 0.684), broadest point behind half length, with five transversal ridges, five transversal furrows, and posterior longitudinal furrow interrupting transversal ridges 4-5. Lateral margins arcuate, both anterior and posterior corners rounded, basal margin bordered; lateral margins and posterior corners finely crenulate, with acuminate macrosetae varying in length. Transversal ridges convex, wide, non-granulate, their widths comparable with widths of respective furrows; ridge 1 moderately less convex as compared to ridges 2-5, middle area of transversal pronotal ridge 1 without traces of sculpture imitating subdivision of ridge 1 into anterior and posterior parts medially. Furrows coarsely punctate. Lateral callus moderately elevated.

Scutellum small, triangular, moderately rounded apically.

Elytra (Figs. 1, 8) broader behind, widest at about 0.6 elytra length, their length-to-width ratio of 1.50, with ten striae and ten moderately convex intervals. Punctures in elytral striae longitudinal in about anterior 1/3; elsewhere, punctures rather shallower and wider, of indeterminate shapes.

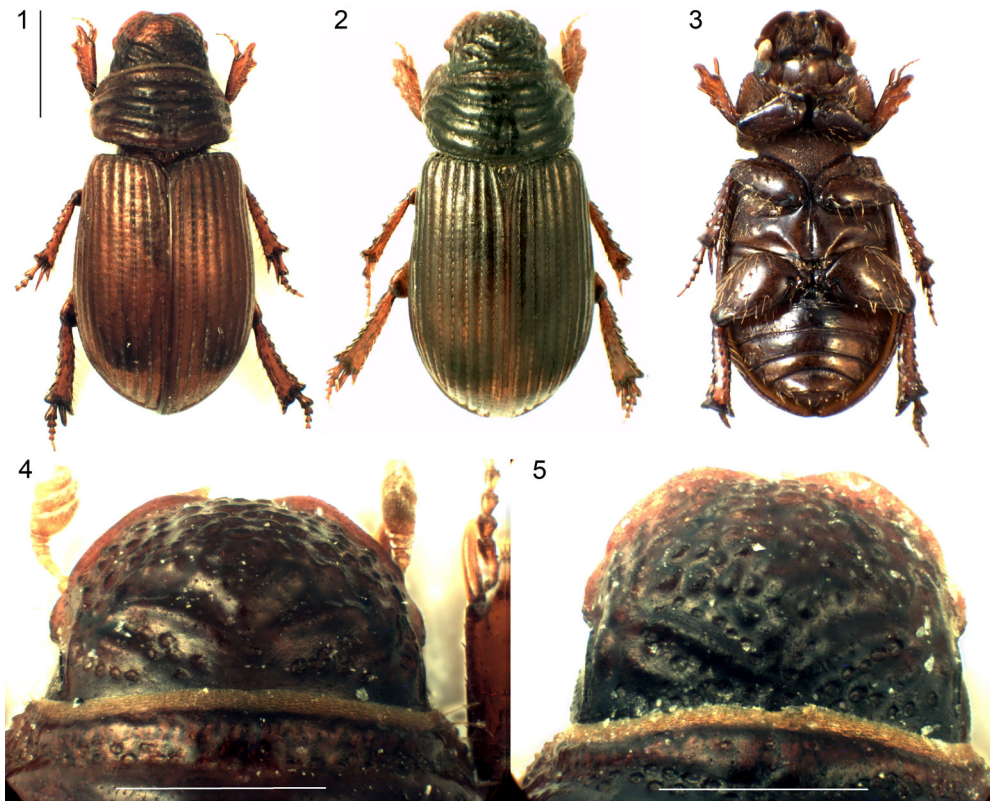
Legs also reddish brown, with darkened apical ends of meso- and metatibiae. Mesotarsomeres 1-4 moderately widened apically, metatarsomeres 1-4 strongly triangularly widened apically.

Ventrum (Fig. 3) brown, sparsely macrosetaceous. Middle longitudinal furrow of meso-metaventrum narrow just anteriorly, then dilated and moderately shortened posteriorly.

Sexual dimorphism. Not available.

Variability. The body length varies between 3.5 and 4.0 mm within the type series comprising six specimens. The peculiar colour combination on dorsal substances as well as their rather matte nature are surprisingly constant. The presence and distribution of coarse punctures in transversal furrows of the pronotum are rather variable.

Differential diagnosis. Differences between characters of the new species and those of the most similar species are summarized in Table 1. presented below. From among them,



Figs. 1-5. Habitus and detail of head, 2 species of *Psammodius* Fallén, 1807 (♀♀): 1- *P. jordanus* sp. nov., holotype, habitus, dorsal view; 2- *P. laevipennis* Costa, 1844, specimen from Bulgaria, habitus dorsal view; 3- *P. jordanus* sp. nov., habitus, holotype, ventral view; 4- *P. jordanus* sp. nov., holotype, head, dorsal view; 5- *P. laevipennis*, specimen from Bulgaria, head, dorsal view. Scale lines: 1 mm for Figs. 1-3, 0.5 mm for Figs 4-5. Photographs by L. Mencl.

the enormously characteristic and constant colour combination and matte nature of dorsal surfaces in the new species, the smoother middle area of the pronotal transversal ridge 1 and the punctation in elytral striae are of particular importance.



Figs. 6-12. Details, etiquettes, *Psammodius* Fallén, 1807 (♀♀): 6- pronotum, lateral view, paratype, *P. jordanus* sp. nov.; 7- pronotum, lateral view, specimen from Bulgaria, *P. laevipennis* Costa, 1844; 8- anterior part of elytra, lateral view, paratype, *P. jordanus* sp. nov.; 9- anterior part of elytra, lateral view, specimen from Spain, *P. laevipennis*; 10- epipharynx, paratype, *P. jordanus* sp. nov.; 11- etiquettes under holotype of *P. jordanus* sp. nov.; 12- etiquettes under paratypes of *P. jordanus* sp. nov. Scale lines: 0.5 mm for Figs. 6-9, 0.1 mm for Fig. 10 (Figs. 11-12 out of scale). Photographs by L. Mencl.

Table 1. Differences between characters of two similar species

<i>Psammodyus jordanus</i> sp. nov.	<i>Psammodyus laevipennis</i> Costa, 1844
head and pronotum dark brown, elytra reddish brown with darker elytral suture (Fig. 1)	whole dorsal surface (head, pronotum and elytra) most frequently dark, piceous (Fig. 2); less frequently elytra castaneous, but then elytral suture not darker than remaining area of elytra
furrows before and after first pair of oblique ridges on head nearly smooth (Fig. 4)	furrows before and after first pair of oblique ridges on head considerably coarsely punctate (Fig. 5) (in old worn specimens, these punctures may be indistinct or completely absent)
middle area of transversal pronotal ridge 1 smoother, without traces of sculpture imitating subdivision of ridge 1 into anterior and posterior parts medially (Fig. 1)	middle area of transversal pronotal ridge 1 sculptured in way making ridge 1 seemingly subdivided into anterior and posterior parts medially (not laterally) (Fig. 2)
elytra width - to pronotum width ratio larger: 1.282 in average (see also Discussion)	elytra width to - pronotum width ratio smaller: 1.219 in average (see also Discussion)
elytral intervals rather matte, relatively lower (Figs. 1, 8)	elytral intervals rather glossy, relatively higher (Figs. 2, 9)
punctures in elytral striae longitudinal in about anterior 1/3 only; punctures present elsewhere rather shallower and wider, of indeterminate shapes, slightly crenating intervals surface (Figs. 1, 8)	elytral striae with uniformly impressed, distinctly elongate, narrow punctures (Figs. 2, 9) not crenating intervals essentially throughout elytra surface area

Distribution. Still known from two mountainous (about 1000 m of the above sea altitude) localities in Jordan only.

Name derivation. Toponymic (adjective derived from the name of the country, in which the type location is situated).

DISCUSSION

The new species described here is most similar to *P. laevipennis*, which can be reliably supported by consideration of characters as shown in the key to species by Pittino (2007) in the most recent comprehensive work dealing with *Psammodyus*. The two species share identical morphological features as follows: the genae margins are equipped with few macrosetae (are not bare); the elytra are elongate, subparallel (are not strongly broader behind); the lateral margins of the pronotum bear long, thin, apically acuminate macrosetae (the setae are not thick, truncate or moderately dilated apically).

On the other hand, the two above mentioned species (*P. laevipennis*) and *P. jordanus* sp. nov. are distinctively different from each other, as described in the part Taxonomy, depicted in appropriate photographs and summarized in Table 1.

At the first sight, *Psammodius laevipennis* looks relatively more elongate compared to the new species. In other words, the new species looks relatively narrower anteriorly. This effect results from different relative widths as follows: in *P. laevipennis*, the elytra width - to pronotum width ratio is smaller, 1.219 in average (rounded to three decimal places, measured on 6 specimens, interval of 1.207-1.225); in the new species, the elytra width - to pronotum width ratio is larger, 1.282 in average (also rounded to three decimal places and measured on 6 specimens, interval of 1.237-1.373); it is to emphasize that the two intervals do not exert any overlap.

A possibility cannot be ruled out that in future examinations of materials from institutional and/or private collections, specimens of *P. jordanus* sp. nov. may be found under the name *P. laevipennis* particularly as to some individuals coming from sandy mountainous areas of the Near East.

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