

Two new species of the genus *Leiopsammodius* (Coleoptera: Scarabaeidae: Aphodiinae: Psammodiini) from the Afrotropical Region

Miloslav RAKOVIČ¹⁾ Ladislav MENCL²⁾ & David KRÁL³⁾

¹⁾ U Kruhárny 548, CZ-252 29 Dobřichovice, Czech Republic
e-mail: mrakovic@volny.cz

²⁾ Masarykovo náměstí 5, CZ-281 26 Týnec nad Labem, Czech Republic
e-mail: l.mencl@centrum.cz

³⁾ Charles University, Faculty of Science, Department of Zoology,
Viničná 7, CZ-128 43, Praha 2, Czech Republic
e-mail: kral@natur.cuni.cz

Taxonomy, new species, Coleoptera, Scarabaeoidea, Scarabaeidae, Aphodiinae, Psammodiini, Psammodiina, *Leiopsammodius*, Central African Republic, Kenya, Afrotropical Region

Abstract. Two new species of the genus *Leiopsammodius* Rakovič, 1981, *Leiopsammodius degallieri* sp. nov. from the Central African Republic and *Leiopsammodius malindii* sp. nov. from Kenya are described and illustrated. Appropriate differential diagnoses are presented and the most important features characterizing the two new species are discussed.

INTRODUCTION

The present study deals with descriptions of two new Afrotropical species of the genus *Leiopsammodius* Rakovič, 1981. The taxon *Leiopsammodius* was originally proposed as a subgenus of *Psammodius* Fallén, 1807 to include 20 Old World species, 12 from among them being Afrotropical species (Rakovič 1981). The subgenus was raised to genus by Pittino & Mariani (1986). A further species was described later from Somalia and an updated key to species from the Afrotropical Region was presented that time (Rakovič 1995). Therefore, the genus has still included 13 Afrotropical species. Fifteen species inhabiting the Afrotropical Region should be thus currently considered when taking into account the two new species described below.

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, CMOX 5 digital camera and the Helicon Focus programme.

The following acronyms stand for collections, in which the specimens studied here are kept (curator names in parentheses):

DKCP David Král collection (deposited in National Museum Prague, Czech Republic);

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

MNHN Muséum national d'Histoire naturelle, Paris, coll. Patrice Bordat, France;

MRCD Miloslav Rakovič, private collection, Dobřichovice, Czech Republic;
ZSMC Zoologische Staatssammlung, München, Germany (Michael Balke, Tomáš Lackner).

Each specimen of the newly described species is provided with a printed red label: “HOLOTYPE [or] ALLOTYPE [or] PARATYPE (♂) [or] (♀) / *Leiopsammodius degallieri* sp. nov. or *Leiopsammodius malindii* sp. nov. / M. Rakovič, L. Mencl & D. Král det. 2017”. Exact label data are specified below in the paragraphs Type material. Our remarks and addenda are found in brackets, separate label lines are indicated by a slash (/), separate labels by a double slash (//).

For morphological terms used in the description of epipharyngeal structures we follow Dellacasa et al. (2001).

TAXONOMY

Leiopsammodius degallieri sp. nov.

(Figs. 1-13)

Type locality. Bozo [near Bangui, the Central African Republic], 05°10'N 18°30'E.

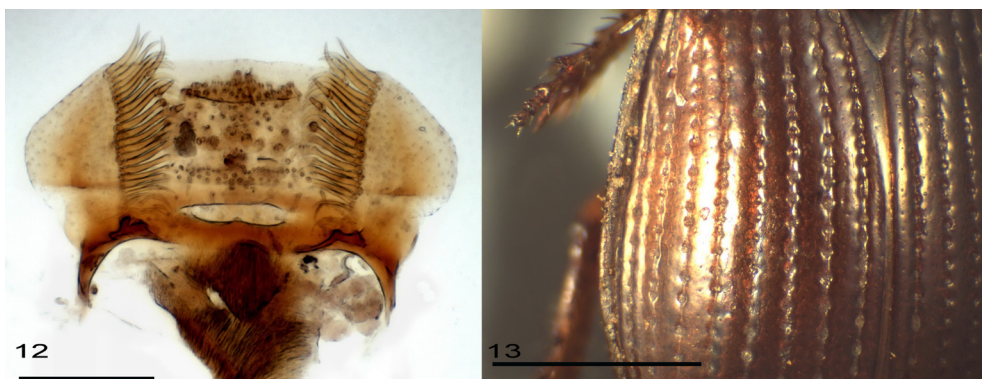
Type material. Holotype (♀) (MNHN): “Bozo [a small village in the Central African Republic near Bangui - personal communication by Patrice Bordat] 5°10'N 18°30'E / xi. [19]80 lumiere / N[icolas] Degallier leg. [white printed label] // *Leiopsammod.* sp. n. ? / det. Pittino [20]09 [white handwritten/printed label] // 2328 / Dok. L. Mencl, 2017, [pale green printed label, related to the photo-documentation system of the second author]” // red printed label giving the status of the type specimen, name of the species and names of present authors, as mentioned in the section Methods.



Figs. 1-3. *Leiopsammodius degallieri* sp. nov., habitus, holotype, ♀: 1- dorsal view; 2- dorsolateral view; 3 - ventral view. Scale line 1 mm. Photographs by L. Mencl.



Figs. 4-11. *Leiopsammodius degallieri* sp. nov., details, holotype, ♀: 4- head, dorsal view; 5- head and pronotum, dorsal view; 6- head and pronotum, dorsolateral view; 7- metaventral plate; 8- posterior part of abdomen and pygidium; 9- left protibia, ventral view; 10- left metatibia, ventral view; 11- right metatibia, dorsal view. Scale lines 0.5 mm for Figs. 4-6, 0.1 mm for Figs. 7-11. Photographs by L. Mencl.



Figs. 12-13. *Leiopsammodius degallieri* sp. nov., details, holotype, ♀: 12- epipharynx; 13- middle and lateral area of left elytron. Scale line 1 mm. Photographs by L. Mencl.

Description of holotype. Oblong oval, convex, broader behind, glabrous, relatively small (2.6 mm long), fairly shining, mostly dark brown (tibiae and narrow clypeus margin brown) (Figs. 1 and 2).

Head (Fig. 4) convex, granulate in front of frontoclypeal suture, uneven, but non-granulate behind it; granules low and rather ill-defined (moderately transversal anteriorly, round posteriorly). Clypeus, rounded each side of V-shaped anteromedian emargination; its lateral margins continuously arcuate up to genae; only small parts of eyes visible from above; genae rounded, bearing at most few very short macrosetae, protruding more than eyes, but only slightly exceeding beyond contours of clypeus lateral margins.

Epipharynx (Fig. 12) 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 21 long, stout, closely spaced spines; area of prophobae well sclerotised, bearing longitudinal row of four short, stout, densely spaced spines.

Pronotum (Figs. 5 and 6) transversal (length-to-width ratio of 0.550), with smooth (non-crenulate), glabrous lateral margins and very distinct premarginal furrow along posterior margin. Pronotal disc covered with numerous coarse (large and deep) punctures, partially, but by far not completely, arranged in transversal rows, distances between punctures being mostly smaller than puncture diameter (some neighbouring punctures even coalescent). Surfaces of lateral calli smooth, free of above mentioned coarse punctures.

Scutellum small, triangular, alutaceous.

Elytra (Figs. 1, 2 and 13) broad, broadest at about 2/3 length (ratio of elytra length to maximum elytra width of 1.36), with ten striae and ten intervals, with distinctly margined base, but without humeral denticles, with very distinct humeral calli produced by fusion of intervals 7 and 8 at elytral base. Striae quite distinct, narrower than intervals, with round punctures distinctly crenating intervals; on elytral disc, distances between punctures in striae comparable to puncture diameter. Intervals sparsely micropunctate; intervals 1-8 convex, interval 9 subcostate, interval 10 wide, flat, complete.

Legs (dorsal aspect). Protibia (Fig. 9) with three outer teeth in apical half, not denticulate in basal half; apical spur longer than protarsomeres 1 and 2 combined; dorsal face with a longitudinal row of setigerous punctures, otherwise impunctate. Mesotibiae moderately widened apically; superior terminal spur straight, acute, longer than mesotarsomeres 1 and 2 combined; inferior terminal spur blunt, about as long as basal mesotarsomere; basal mesotarsomere asymmetrical (dilated outward), remaining mesotarsomeres subconical. Metatibiae (Figs. 10 and 11) robust; both terminal spurs spatulate; superior spur about as long as metatarsomeres 1 and 2 combined; inferior terminal spur about as long as basal metatarsomere; basal metatarsomere considerably asymmetrical (markedly dilated outward), metatarsomeres 2-3 moderately dilated outward; metatarsomeres 4-5 missing in type specimen.

Ventral surfaces (Figs. 3, 7 and 8)) smooth, shining, glabrous with exception of few long, acute setae on pro- and metafemora and on abdominal ventrite 6.

Sexual dimorphism. Male unknown.

Variability. Not applicable - only the holotype was available.

Collection circumstances. Collected at light.

Distribution. The Central African Republic.

Name derivation. Patronymic, named in honour of the holotype collector, Nicolas Degallier.

Differential diagnosis. *Leiopsammodius degallieri* sp. nov. exerts an unusual sculpture of

the pronotal surface produced by densely distributed coarse punctures (Fig. 5). In the key to Afrotropical species of the genus (Rakovič 1995) the new species keys out to *L. indicus* (Harold, 1877), which is, however, considerably larger (body length of 3-3.5 mm) and the coarse punctures on the pronotal surface are few in number; the body length of the *L. degallieri* sp. nov. is of about 2.5 mm and the coarse punctures on the pronotum surface are very numerous, as already mentioned (Fig. 5).

***Leiopsammodius malindii* sp. nov.**

(Figs. 14-26)

Type locality. Surroundings of Malindi, East Kenya.

Type material. Holotype (♂) (ZSMC): “Kenya or / Umg. Malindi [Malindi is a town at the Indian Ocean coast, 120 km NE of Mombasa] / 13.-29. viii. 1983 / H. J. Bremer leg. [white printed label] // in Dunen / unter Pflanzendetritus [white printed label] // 2326, Dok. L. Mencl 2017 [pale green printed label, related to the photo-documentation system of the second author]” // red printed label giving the status of the type specimen, name of the species and names of present authors, as mentioned in the section Methods. Allotype (♀) (ZSMC): same data on white labels as mentioned above with holotype; 2356 / Dok. L. Mencl, 2017 on the pale green label. Paratypes not sexed (1x DKCP, 1x LMCT, 1x MRCD, 3x ZSMC): same data on white labels as mentioned above with holotype.

Description of holotype. Oblong oval, convex, broader behind, glabrous, relatively small (2.8 mm long), fairly shining, reddish brown, elytral suture (not the whole sutural interval) and punctures in elytral striae darkened (Figs. 14 and 15).

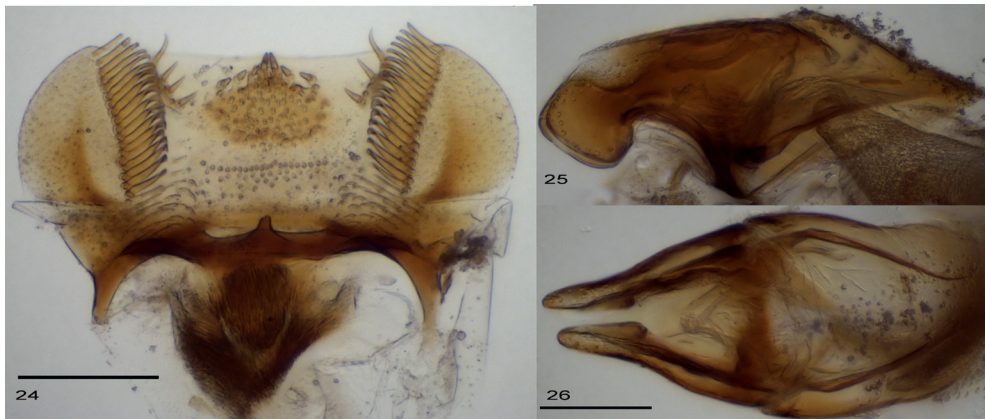
Head (Fig. 17) convex, granulate in front of frontoclypeal suture, with few small grains behind it; granules well defined, transversal, not very dense, concentrically arranged.



Figs. 14-16. *Leiopsammodius malindii* sp. nov., habitus, holotype, ♂: 14- dorsal view; 15- dorsolateral view; 16- ventral view. Scale line 1 mm. Photographs by L. Mencl.



Figs. 17-23. *Leiopsammodius malindii* sp. nov., details: 17- holotype, ♂, head, dorsal view; 18- holotype, ♂, pygidium, ventral view; 19- holotype, ♂, right metatibia, dorsal view; 20- holotype, ♂, middle and lateral part of left elytron; 21- holotype, ♂, head and pronotum, dorsal view; 22- holotype, ♂, hind body; 23- allotype, ♀, hind body. Scale lines 0.5 mm for Figs. 17-21, 1 mm for Figs. 22-23. Photographs by L. Mencl.



Figs. 24-26. *Leiopsammodius malindii* sp. nov., details, holotype, ♂: 24- epipharynx; 25- aedeagus, lateral view; 26- aedeagus, dorsal view. Scale line 0.1 mm. Photographs by L. Mencl.

Clypeus obtusely angulate, only moderately rounded each side of wide, round anteromedian emargination; its lateral margins moderately arcuate; eyes very small, not observable from above; genae rounded, separated by small notch from, but nearly aligned with clypeus lateral margins.

Epipharynx (Fig. 24) transversal, anterior outline almost straight, lateral outlines regularly widely rounded; tormae and nesium well sclerotised, approximately symmetrical, apotormae missing; epitorma almost irregularly elliptic, weakly sclerotised; helus with group of somewhat irregularly spaced sensilla (including two remarkably large ones anteromedially and two large ones anteolaterally); corypha and zygum absent; phobae weakly sclerotised, glabrous; chaetoparia with row of 18 long, stout, closely spaced spines; between chaetoparia and epitorma short longitudinal row of four stout spines; area of prophobae well sclerotised, bearing longitudinal row of four short, stout, densely spaced spines.

Pronotum transversal (length-to-width ratio of 0.605), with smooth (non-crenulate), glabrous lateral margins and very distinct premarginal furrow along posterior margin. Pronotal disc covered with not numerous large punctures, mostly arranged in transversal rows (two of them being most distinct, as shown in Fig. 21), and longitudinal row extending forward from pronotum base to a little more than pronotum middle; smooth areas between large punctures (rows of large punctures) occupied by numerous, evenly distributed micropunctures.

Scutellum small, triangular, with few micropunctures.

Elytra (Figs. 14, 15 and 20) broad, broadest at about 2/3 length (ratio of elytra length to maximum elytra width of 1.32), with ten striae and ten intervals, with distinctly margined base, but without humeral denticles, with moderate humeral calli. Striae quite distinct, considerably narrower than intervals, with elongate punctures only slightly crenating intervals. Intervals smooth; intervals 1-9 convex, interval 10 wide, flat, extending to about 3/4 elytra length.

Legs (dorsal aspect). Protibia with three outer teeth in apical half, not denticulate in basal half; apical spur moderately bent outward in apical half, about as long as protarsomeres 1 and 2 combined; dorsal face with a longitudinal row of setigerous punctures, otherwise impunctate. Mesotibiae moderately widened apically; superior terminal spur slightly bent outward, longer than mesotarsomeres 1 and 2 combined; inferior terminal spur blunt, also slightly bent outward, shorter than basal mesotarsomere; basal mesotarsomere asymmetrical (dilated outward). Metatibiae (Fig. 19) robust; both terminal spurs thicker than those of mesotibiae; superior spur slightly longer than metatarsomeres 1 and 2 combined; inferior terminal spur shorter than basal metatarsomere; basal metatarsomere considerably asymmetrical (markedly dilated outward), metatarsomere 2 moderately dilated outward (moderately asymmetrical).

Ventral surfaces (Fig. 16, 22 and 23) smooth, shining, glabrous.

Pygidium as in Fig. 18.

Aedeagus as in Figs. 25-26.

Sexual dimorphism. Without distinct differences in external characters.

Variability. In the type series (8 specimens) the body length varies between 2.25 and 2.75 mm. There is also a variability in the arrangement of pronotal punctures in rows, which are vestiges analogous to particular transversal furrows as known from *Psammodiini* having five transversal ridges and five transversal furrows: in four specimens, transversal rows analogous to furrows 1, 3 and 4 are present; in further four specimens, there are even rows corresponding to transversal furrows 1, 2, 3 and 4.

Collection circumstances. Collected on dunes, under plant detritus.

Distribution. East Kenya (surroundings of Malindi).

Name derivation. Patronymic, based on locality data of the type species.

Differential diagnosis. *Leiopsammodius malindii* sp. nov. can be characterized *inter alia* by very small eyes, not observable from above and by frequent arrangement of punctures on the pronotal surface in rows indicating vestiges of transversal furrows which are known in Psammodiini with the complete pronotal structure (five transversal ridges and five transversal furrows - for example as in *Psammodius*); the arrangement of the punctures in transversal rows is analogous to transversal furrows 1, 3, 4, and in some specimens even 1, 2, 3, 4 (Fig. 21). In the key to Afrotropical species of the genus (Rakovič 1995), the new species keys out to *L. evanidus* (Péringuey, 1901), which is, however larger (body length of 2.8-3.3 mm) and its elytra are only moderately broader behind; the body length of the *L. malindii* sp. nov. is of about 2.25-2.75 mm and the elytra are very broad.

DISCUSSION

Afrotropical members of the genus *Leiopsammodius* do not pose serious problems as to the differentiation of species one from another. In addition to the differential diagnoses presented above and to photos facilitating the identification, it is possible to point out the following features included in the descriptions above, important for each of the two new species described here, since their combination could also be sufficient for their unambiguous characterisation within the framework of the currently known 15 Afrotropical species of the genus.

Leiopsammodius degallieri sp. nov: small body size; granules on clypeus low and rather ill-defined (moderately transversal anteriorly, round posteriorly); area on the head behind frontoclypeal suture smooth (non-granulate); pronotal disc covered with coarse (large and deep) punctures, partially, but by far not completely, arranged in transversal rows, distances between punctures being mostly smaller than puncture diameter; elytra considerably broader behind.

Leiopsammodius malindii sp. nov: small body size; eyes not visible from above; granules on clypeus well defined, transversal; area on the head behind frontoclypeal suture with small grains; pronotal disc covered with not numerous large punctures, mostly arranged in transversal rows and longitudinal row extending forward from pronotum base to a little more than pronotum middle; elytra considerably broader behind.

ACKNOWLEDGEMENTS. We are indebted to our dear friend Patrice Bordat (Saint-Cirq, France), and to staff members of Zoologische Staatssammlung in München, Germany, Michael Balke and Tomáš Lackner, for making us possible to study interesting African Psammodiini including type specimens of *Leiopsammodius* species described here.

REFERENCES

- DELLACASA G., BORDAT P. & DELLACASA M. 2001: A revisional essay of world genus-group taxa of Aphodiinae. *Memorie della Società Entomologica Italiana* [2000] 79: 1-482.

- PITTINO R. & MARIANI G. 1986: A revision of the Old World species of the genus *Diastictus* Muls. and its allies (*Platytomus* Muls., *Plewophorus* Muls., *Afrodiastictus* n. gen., *Bordatius* n. gen.) (Coleoptera Aphodiidae, Psammodiini). *Giornale Italiano di Entomologia* 3: 1-165.
- RAKOVIČ M. 1981: A revision of the *Psammodius* Fallén species from Europe Asia and Africa. *Rozprawy Československé Akademie Věd* 91(1): 1-82.
- RAKOVIČ M. 1995: Description of a new species of the genus *Leiopsammodius* from Somalia and key to species of the Ethiopic Region. *Annotationes Zoologicae et Botanicae* 218: 3-8.

Received: 31.5. 2017

Accepted: 10.6. 2017

Published: 5.10.2017

