

New information about and illustrations of *Psammodiini* species (Coleoptera: Scarabaeidae: Aphodiinae). 1. *Rakovicius thailandicus*

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Abstract. The holotype of the species *Rakovicius thailandicus* (Balthasar, 1965) was studied and its detailed microphotographs are published for the first time here. Results of studying male specimens (from Thailand, Tak Province, Umphang district) are published for the first time, including photos of the aedeagus. Based on two specimens collected in central Laos, the species, which has still be known from Thailand only, is considered to be new to Laos.

INTRODUCTION

When studying material of Aphodiinae from the National Museum Praha, the authors of the work presented here encountered two specimens from central Laos, which appeared to be the species *Rakovicius thailandicus* (Balthasar, 1965). The taxa was originally described as *Psammobius* Heer, 1841 (Balthasar 1965) and subsequently treated as *Psammodius* Fallén, 1807 s. str. (Rakovič 1981) within the framework of a monographic treatise on the Old World *Psammodius* species. It was later transferred into a newly established genus *Rakovicius* Pittino, 2006 (Pittino 2006), which differs from *Psammodius* by costate elytral intervals 1-9 and only apically widened (not strongly robust like in *Psammodius*) metatibiae (compare for example Figs. 1 and 2).

Species of the genus *Rakovicius* inhabit the Palaearctic and Oriental Regions. Some species from Taiwan were also particularly dealt with (Masumoto et al. 2012). Nomenclatural changes in species occurring in the Palaearctic Region were reflected in the Catalogue of Palaearctic Coleoptera (Rakovič et al. 2016).

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, the CMEX 5 digital camera and the Helicon Focus programme.

The specimens as specified below were examined. Exact label data are cited for the type material, individual labels are indicated by a double slash (/ /), individual lines of every label by a single slash (/). Pale green labels specify numbers related to a photo-documentation system by the third author. Information in quotation marks (" ") indicates the original spelling. Our remarks and additional comments are found in brackets.

The following acronyms stand for the collection, 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;

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

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

TAXONOMY

Rakovicius thailandicus (Balthasar, 1965)

(Figs. 3-17)

Psammobius thailandicus Balthasar, 1965: 445, fig. 3.

Psammodius (Psammodius) thailandicus: Rakovič: 1981: 49 (revision of Old World *Psammodius* species).

Rakovicius thailandicus: Pittino: 2006: 16 (proposal of new genus).

Type locality. "Thailand, Umgebung von Bangkok".

Type material examined. Holotype, ♀ (NMPC), "Thai-land / Bangkok / xi. 1961 [white handwritten label] // *Psammobius / thailandicus / n. sp.* Balth. / 64 / Holotypus [pink handwritten/printed label] // 2329 / Dok.L.Mencl, 2017 [pale green printed label]".

Additional material examined. **Laos: Bolikhamsay Prov.:** 2 specimens (♀♀) in NMPC: Ban Nape vill. env., 18°20'N105°05'E, ~ 500 m, 1.-18.v.2001 [based on data from white label present with each of the two specimens], "2330, Dok.L.Mencl 2330 [data from pale green label present with one of the two specimens]". **Thailand: Tak Prov.:**

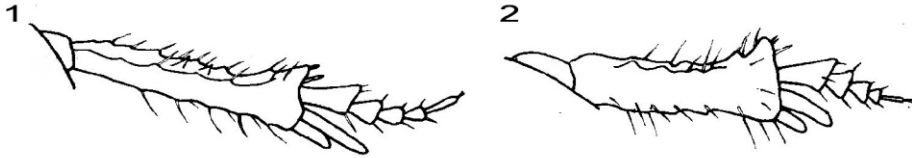
Umphang distr.: 3 specimens (LMCT), 3 specimens (MRC D) and 9 specimens (NMPC): Umphang river, 16°07'N 90°00'E, 1000 m, 28.iv.-6.v.1991, D. Král & V. Kubáň lgt.

Supplementary outline of important characters. Small (body length of 2.9-3.1 mm) broader behind species (Figs. 3 and 4), dorsal surfaces glabrous, shining, chestnut brown to dark brown.

Head (Fig. 6) convex, granulate, with two pairs of posterior oblique ridges, clypeus rounded each side of anteromedian emargination; genae distinctly differentiated from clypeus lateral margins, each gena with few acuminate macrosetae. Prevalent proportion of surface area of head (between anterior pair of oblique ridges and anterior clypeus margins) with mostly rounded, not densely distributed granules. Middle protuberance not strongly elevated above anterior and lateral areas of clypeus.

Epipharynx (Fig. 17). Transversal, anterior outline almost straight, lateral outlines regularly widely rounded; tormae and nesium well sclerotised, approximately symmetrical, apotormae missing; epitorma almost quadrate, weakly sclerotised; helus with group of somewhat irregularly spaced sensilla (including three remarkably large ones medially) and two longitudinal rows of long microtrichia anteriorly; corypha and zygon absent; phobae weakly sclerotised, glabrous; chaetoparia with row of about 20 long, stout, closely spaced spines; area of prophobae well sclerotised, bearing longitudinal row of 5 short, stout, sparsely spaced spines.

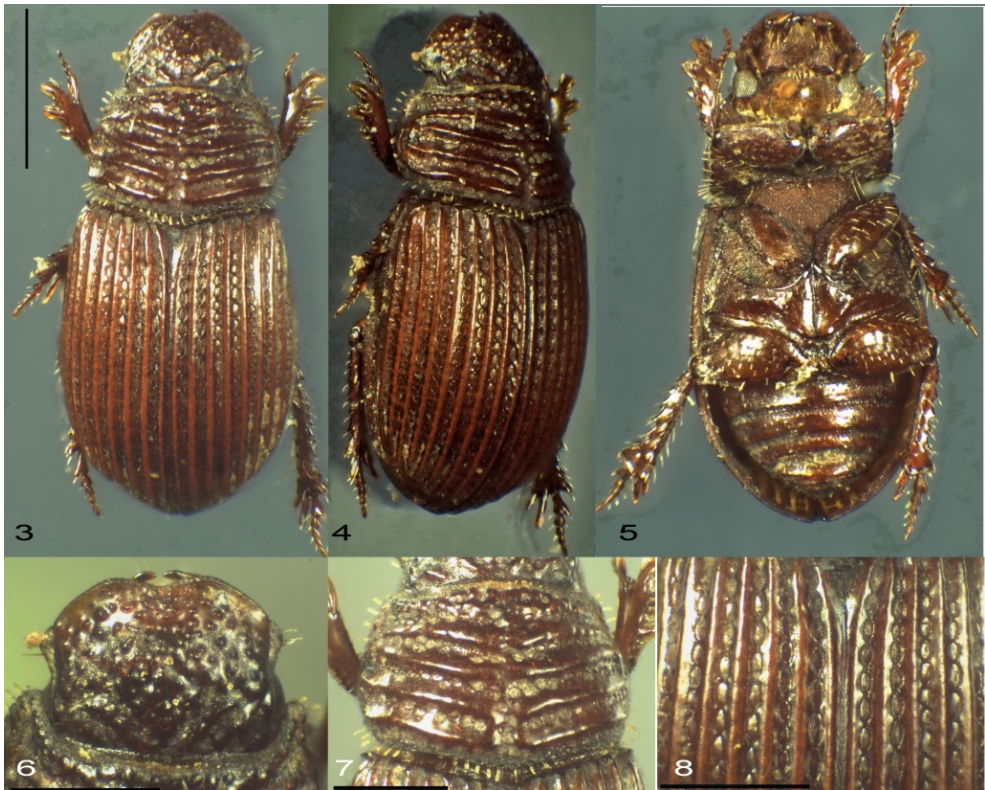
Pronotum (Fig. 7) convex, transversal, broadest posteriorly (at about 2/3 length), with five transversal ridges, five transversal furrows and posterior longitudinal furrow. Lateral margins arcuate throughout, equipped with apically distinctly widened macrosetae (Fig. 9), posterior angles rounded, base moderately sinuate on each side. Ridge 1 relatively low, with rather uneven surface medially, granulate laterally. Ridges 2-3 smooth, strongly convex. Transversal furrows as well as posterior longitudinal furrow with very large punctures.



Figs. 1-2. Exemplification of differences in metatibia shape between *Rakovicius* and *Psammodius*: 1- *Rakovicius thailandicus*; 2- *Psammodius convexus* C. O. Waterhouse, 1875. Taken over from literature (Rakovič 1981).

Scutellum small, triangular, alutaceous, darker than elytra (Fig. 1).

Elytra broader behind, broadest behind midlength, with ten striae and ten intervals, with small humeral teeth. Lateral margins arcuate throughout. Elytral intervals 1-9 costate, interval 10 flat. Elytral striae with long, oval punctures; neighbouring punctures nearly touching each other (Fig. 8).



Figs. 3-8. *Rakovicius thailandicus*, ♀ holotype, habitus and body parts : 3- habitus, dorsal aspect; 4- habitus, dorsolateral aspect; 5- habitus, ventral aspect; 6- head, dorsal aspect; 7- pronotum, dorsal aspect; 8- anterior area of elytra and scutellum, dorsal aspect. Scale line: 1 mm for Figs. 3-5, 0.5 mm for Figs. 6-8. Photographs by L. Mencl.

Tibiae and tarsi as shown in Figs. 12-14 depicting shapes of tibiae, tarsomeres and apical spines and relations between their lengths. Metatibia underside and protibia underside are also presented (in Figs. 10 and 11, respectively).

Ventrum as in Fig. 5. Femora with setigerous punctures. Metaventral plate with complete,



Figs. 9-17. *Rakovicius thailandicus*, details: 9- pronotum lateral margin, dorsolateral view; 10- right posterior leg and right half of abdomen; 11- underside of left metatibia; 12- apical right metatibia with metatarsus, ventral view; 13- apical part of metatibia and metatarsus, inner surface; 14- pygidium, caudal view; 15 - aedeagus - lateral view; 16 - aedeagus - ventral view; 17 - epipharynx. (Figs. 9, 12, 13 - ♀ holotype, Figs 10, 11, 14 - ♀ specimen from Laos, Figs. 15-17 - ♂ specimen from Thailand, Tak Prov., Umphang distr.). Scale lines: 0.5 mm for Figs. 9-14, 0.1 mm for Figs. 15-17. Photographs by L. Mencl.

narrow longitudinal furrow, moderately widened behind midlength and narrowed before end, again. Abdominal ventrite 3 (first completely visible ventrite) and 4 fluted along anterior margins; ventrites 5 and 6 (penultimate and ultimate ventrites, respectively) with uneven surfaces.

Pygidium as in Fig. 14, divided by a transverse carina into upper and lower part. Upper part macrosetaceous, with longitudinal midline swelling. Lower part with strongly uneven surface.

Aedeagus as in Figs. 15 and 16.

Sexual dimorphism. There are no considerable differences in external characters between males and females. Only the longitudinal furrow of the metaventral plate is slightly wider in males compared to females.

Variability. Quite no difference was found in external characters (shapes and sculptures) of the specimens studied. The holotype from Thailand was chestnut brown; the specimens from Laos were dark brown.

Differential diagnosis. Within the genus *Rakovicius*, the species can be characterized by the following combination of characters. Head as in Fig. 6, genae rather auriculate than semicircular, equipped with long, acuminate setae. Pronotum shape and sculpture as in Fig. 7. Shape of elytral intervals and sculpture (punctuation) of elytral striae as in Fig. 8. Superior terminal spine of metatibia longer than metatarsomeres 1 and 2 combined (Fig. 12).

Distribution. Thailand: holotype from surroundings of Bangkok, further specimens examined here from NW Thailand, but also reported from North Thailand and South Thailand (Pittino 2006). New to Laos (the Bolikhamsay Province).

Collecting events. Material from Umphang (NW Thailand) was collected from under old dry elephant excrements on sandy places near the Umphang river together with a series of *Megatelus brahminus* (Harold, 1879) (*Aphodiini*).

DISCUSSION

The genus *Rakovicius* is fairly homogeneous and currently includes five species (Pittino 2006, Masumoto et al. 2012, Rakovič et al. 2016). The species *Rakovicius thailandicus* was studied here. Only a macrophotograph of the habitus (dorsal aspect) has still been available (Rakovič 1981). Detailed microphotographs are presented here; we believe that they will be helpful to its differentiation.

The species is an only member of the genus known from the Oriental Region. The remaining four species are known from the eastern Palearct (Japan, South Korea, Taiwan) (Rakovič et al. 2016). Given the above mentioned distribution in different parts of Thailand (Pittino 2006), future finds of the species in other countries of South-East Asia can be reasonably expected.

The holotype as well as two specimens from Laos were females. They also were also unsuitable for studying the epipharynx due to their fragility. We thus took the advantage of studying these details in additional material from Thailand.

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