

**Studies on types in the genus *Rhyssemus*. 3. *Rhyssemus rothschildi* Bénard, 1909
(Coleoptera: Scarabaeidae: Aphodiinae: Psammodiini)**

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Taxonomy, redescription, Coleoptera, Scarabaeoidea, Scarabaeidae, Aphodiinae, Psammodiini, Rhyssemina, *Rhyssemus*, Afrotropical Region

Abstract. Results of studying the lectotype, paralectotype and further specimens of *Rhyssemus rothschildi* Bénard, 1909 are presented. A redescription of the species is provided with putting emphasize on the pronotal and elytral structures and sculptures, details of which are difficult to describe without appropriate illustrations. Photographs of the species are published for the first time: habitus in different aspects and details of external characters as well as internal parts (epipharynx and aedeagus).

INTRODUCTION

The work presented here is further to our two communications concerning species of the genus *Rhyssemus* Mulsant, 1842; the first one comprised general considerations of the problem of the explanation and/or understanding of details characterizing species in the genus, and dealt with the species *Rhyssemus mayeti* Clouët des Pesruches, 1901 (Rakovič et al. 2016a); the second one was focused on further two species, *R. keisseri* Bénard, 1910 and *R. rohani* Bénard, 1920 (Rakovič et al. 2016b). The present work is aimed at studying the lectotype and paralectotype from Muséum national d'Histoire naturelle, Paris and further specimens of *R. rothschildi* Bénard, 1909.

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, CMEX 5 digital camera and the Helicon Focus programme. Prior to the study and taking photos, the specimens were kept in a detergent solution for 30 to 60 min and submitted to mechanical cleaning.

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

DKCP David Král collection, deposited in the National Museum, Praha, Czech Republic;
LMCT Ladislav Mencl, private collection, Týnec nad Labem, Czech Republic;
MNHN Muséum national d'Histoire naturelle, Paris, France (Antoine Mantilleri);
MRCD Miloslav Rakovič, private collection, Dobřichovice, Czech Republic.

The description of transversal structural elements of the pronotum is based on a concept proposed by Rakovič (1987), which is also explained, justified and illustrated by a schematic drawing in our recent work (Rakovič et al. 2016a): five transversal ridges, five transversal furrows and accessory swelling present in furrow 4 each side of the posterior longitudinal furrow.

TAXONOMY

Rhyssemus rothschildi Bénard, 1909

(Figs. 1-20)

Rhyssemus rothschildi Bénard, 1909: 106.

Rhyssemus rothschildi: Schmidt 1922: 510 (monograph, key), Endrődi 1960: 235 (key), Endrődi 1964: 346 (key), Pittino 1984: 62 (taxonomical notes, lectotype designation), Dellacasa 1988: 424 (catalogue).

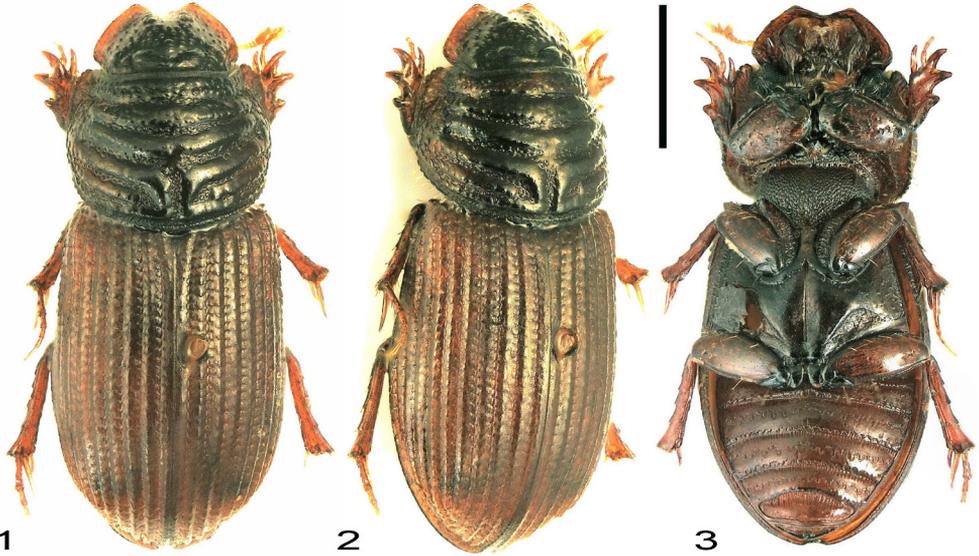
Type locality. “Rendilė [= Rendill - an area in northern Eastern Province of Kenya], Mont Karoli”.

Type material studied. **Kenya:** Female lectotype (MNHN), equipped with labels as shown in Fig. 7. Female paralectotype (MNHN), equipped with labels as shown in Fig. 17.

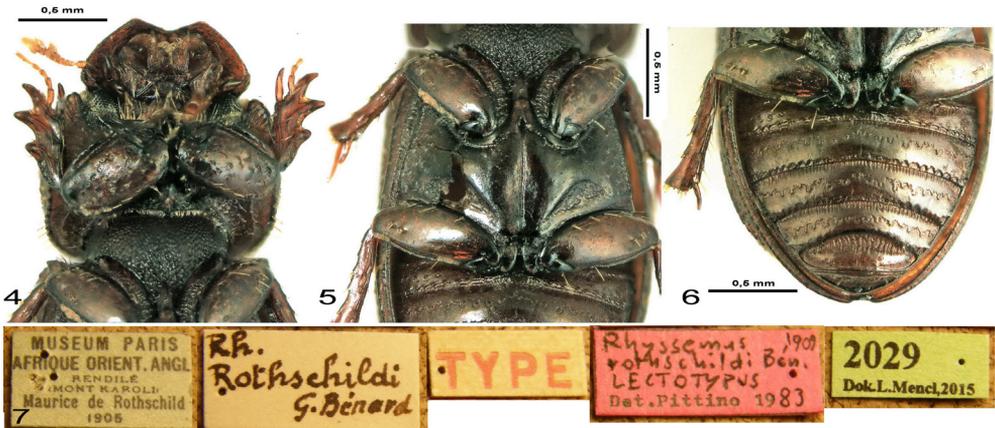
Additional material studied. **Kenya:** 76 specimens (MRCD, DKCP): E. Kenya, Mwingi, Ngumi env., 26.xi.1999, lgt. M. Snižek; 1 specimen (LMCT): Kenya bor. occ., Lodwar, 14.xii.1995, P. Smrž, lgt.; 3 specimens (LMCT): Kenya, Voi (Tsavo) bor. occ., 22.xi-2 xii.1996, Halada lgt.; 1 specimen (LMCT): Kenya bor. occ., Lodwar, 14.xii.1995, P. Smrž lgt.; 1 specimen (LMCT): Kenya, Voi (Tsavo), 22.xi-2.xii.1996, M. Snižek lgt. 2 specimens (LMCT): Kenya, Voi (Tsavo), 27.iii-4.vi.1996, M. Snižek lgt.; 3 specimens (LMCT): Kenya mer., Voi, 23.xi-2. xii.1997, M. Snižek lgt.; 9 specimens (LMCT): Kenya centr. or., eastern Mwingi env., 4.xii.1997, M. Snižek lgt.; 25 specimens (LMCT): Kenya E., Garisa env., 30.xi.1996, M. Snižek lgt.; 221 specimens (LMCT): Kenya, s. c., Mwingi, Nguni, 7.iv.2004, M. Snižek lgt.; 2 specimens (LMCT): Kenya s. c., Kangonde Kithioko, 6.iv.2004, M. Snižek lgt.; 31 specimens (LMCT): Kenya E., Nguni, N. of Ngomeni, 27.iv.2004, M. Snižek lgt.; 3 specimens (LMCT): Kenya c. s., Kangonde Kithioko, 6.v.2004, M. Snižek lgt.; 122 specimens (LMCT): Kenya c. s., Mwingi, Nguni env., 7.vi.2004, M. Snižek lgt.; 2 specimens (LMCT): Kenya Eastern, E. of Thika, Kangonde, 6.iv.2007, M. Snižek lgt.; 2 specimens (LMCT): Kenya Eastern, N. of Nguni, Ngomeni, 19.-22. iv.2007, M. Snižek lgt.; 101 specimens (LMCT): Kenya, N. of Nguni, Ngomeni, 19.-22. iv.2007, M. Snižek lgt.; 2 specimens (LMCT): Kenya Eastern, N. of Nguni, Ngomeni, 16.v. 2007, M. Snižek lgt.; 1 specimen (LMCT): Kenya, Voi (Tsavo), M. Snižek lgt.; 1 specimen (LMCT): Kenya, Voi (Tsavo), 22.xi-2. xii.1996, M. Snižek lgt.; 1 specimen (LMCT): Kenya E., Voi (Tsavo), 27.iv.2008, M. Snižek lgt. **Tanzania:** 1 specimen (MRCD): Tang. Terr., Longido, Massaai Distr., 1500m, 19.iv.1957; 1 specimen (MRCD): Tanzania, Ndarakwai, W. Kilimanjaro, S0.3°00'49", E36°59'23", 5.-7. iv.2012, light trap, leg. Smith R. and Takano H.

A redescription based on the lectotype unless otherwise mentioned. Body length of 3.7 mm. Elongate, subparallel (moderately broader behind: broadest at about elytra midlength, length-to-width ratio of 2.38), brown, forebody rather darker than elytra, shining (Fig. 1).

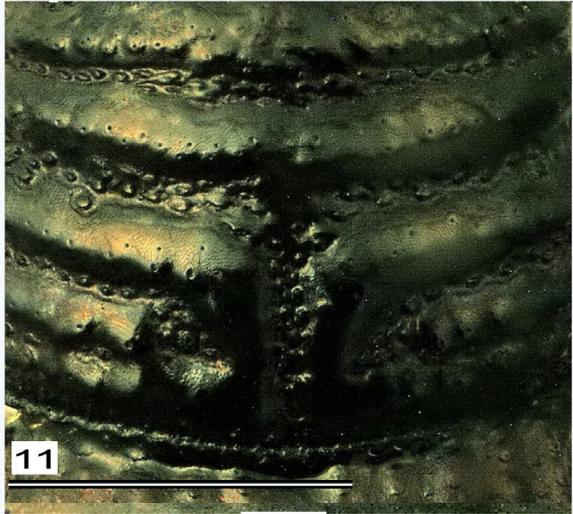
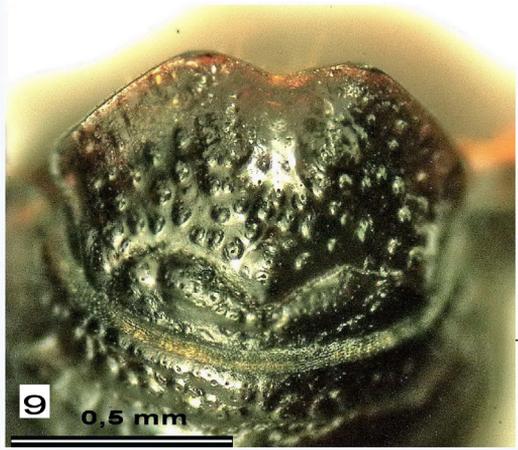
Head. Clypeus with moderately upturned, obtusely rounded angle each side of anteromedian emargination, its sides not sinuate (seemingly slightly sinuate anteriorly due to projection of upturned anterior angle, if observed not in direction strictly perpendicular to head surface), but slightly continuously arcuate and aligned with anterior margins of genae protruding more than eyes, nearly glabrous or bearing only one short macroseta each (Fig. 9). Clypeus surface rather sparsely granulate, most granules being round; density of granules



Figs. 1-3. *Rhyssesmus rothschildi*, lectotype, ♀, habitus: 1- dorsal view; 2- dorsolateral view; 3- ventral view. Scale line 1 mm. Photographs by L. Mencl.

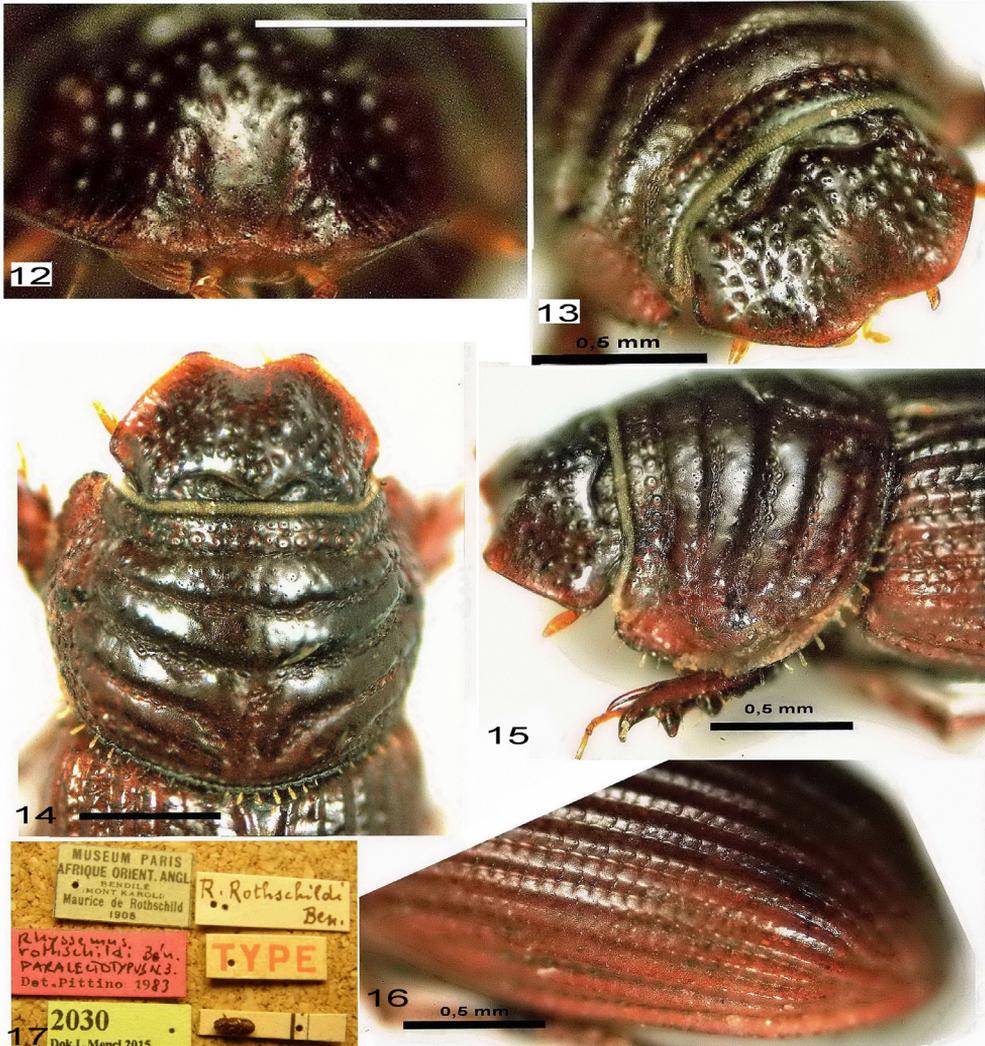


Figs. 4-7. *Rhyssesmus rothschildi*, lectotype, ♀, details: 4- ventral surface, anterior part; 5- ventral surface, intermediate part; 6- ventral surface, posterior part; 7- labels pinned under lectotype. Scale lines 0.5 mm for Figs. 4-6. Photographs by L. Mencl.



Figs. 8-11. *Rhyssemus rothschildi*, lectotype, ♀, details: 8- head and pronotum, dorsal view; 9- head, dorsal view; 10- elytra, dorsal view; 11- detailed sculpture of pronotal ridges and furrows, dorsal view. Scale lines 0.5 mm. Photographs by L. Mencl.

increasing from quite sparsely and indistinctly granulate margins to central area, distances between granules being, however, not smaller than granule size even there; characteristic smooth, depressed area present along clypeus midline (Figs. 12-15 (paralectotype)), bordered on each side by rows of granules, extending from clypeus anterior angles toward middle protuberance. Middle protuberance moderately distinct only posteriorly, due to presence of few relatively larger granules. Anterior pair of oblique ridges fused posteriorly (without interruption between left ridge and right ridge), separated by deep, V-shaped furrow from middle protuberance; area behind anterior oblique ridges with small granules, posterior pair of ridges hard to observe



Figs. 12-17. *Rhyssemus rothschildi*, paralectotype, ♀, details: 12- head, front view; 13- head, oblique view; 14- head and pronotum, dorsal view; 15- head and pronotum, dorsolateral view; 16- elytra, apical part; 17- labels pinned under paralectotype. Scale lines 0.5 mm. Photographs by L. Mencl.

Epipharynx (studied in a female species from Kenya - not in the lectotype) (Fig. 18) transversal, anterior margin shallowly emarginate, lateral outlines regularly widely rounded; tormae and nesium well sclerotised, approximately symmetrical, apotormae missing; epitorma subquadrate, weakly sclerotised; helus with group of somewhat irregularly spaced sensilla and one longitudinal row of long microtrichia anteriorly; corypha and zygom absent; phobae weakly sclerotised, glabrous; chaetoparia with row of 23 (left side) and 22 (right side) long,

stout, closely spaced spines; area of prophobae well sclerotised, bearing longitudinal row of seven (left side) and six (right side) short, stout, sparsely spaced spines.

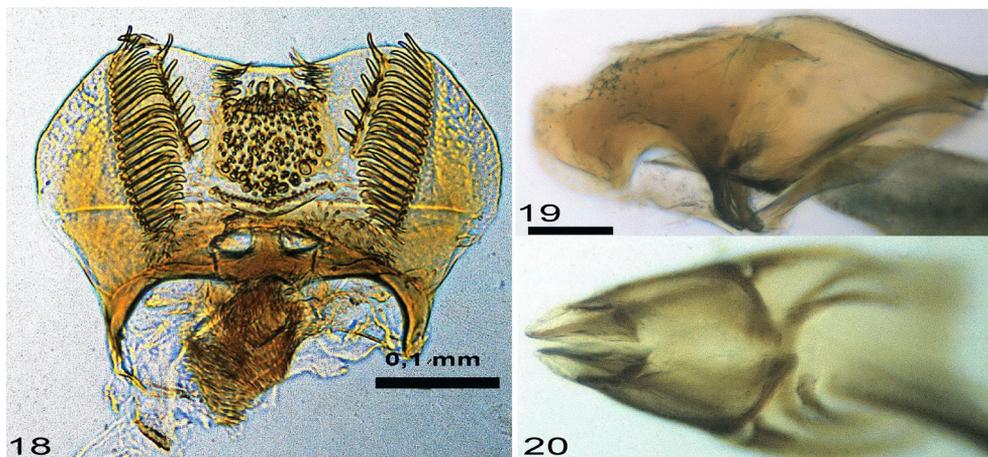
Pronotum (Fig. 8) transversal (its length-to-width ratio of 0.759), widest at middle, arcuately narrowed anteriorly, posteriorly arcuately narrowing and merging into pronotum base without any indication of posterior angle; with five transversal ridges, five transversal furrows, posterior longitudinal furrow and accessory swelling present in furrow 4 on each side of the longitudinal furrow. Lateral margins crenulate, with macrosetae short, slightly dilated and truncate at apex; basal margin with similar setae. Transversal ridge 1 prevalently consisting of 2 rows of granules, each granule having a distinct puncture. Ridges 2-4 and accessory swelling continuous, convex, wider than respective furrows, sparsely punctate (with punctures similar to those present in granules of ridge 1). Ridge 5 vestigial, narrow, granulate. Pronotal furrows with small, but distinctly delimited, moderately transversal granules (Fig. 11).

Scutellum small, triangular, alutaceous, without any important sculpture.

Elytra moderately broader behind (their length-to-width ratio of 1.50), with ten striae and ten intervals; humeral denticles not large, but well distinct, directed sideward. Striae narrow, with elongate punctures not crenating intervals. Granules in discal elytral intervals of shape not easy to recognize, arranged in two rows: outside row - elongate large granules, each having a backward directed elevation posteriorly, and inside row - similar but much smaller granules (Figs. 1, 2 and 10). Elytral intervals of equal heights on disc (Fig. 1) as well as on apex (Fig. 16 - paralectotype).

Superior terminal spurs of meso and metatibia considerably longer than basal mesotarsomere and basal metatarsomere, respectively. Most metatarsomeres lacking in the lectotype.

Ventral surface (Figs. 3-6) alutaceous, mostly glabrous and smooth, but femora with medium-sized (profemora) or fine (meso- and metafemora) setigerous punctures. Metaventral plate with narrow longitudinal furrow, complete anteriorly as well as posteriorly; area around furrow distinctly concave.



Figs. 18-20. *Rhyssemus rothschildi*, specimens (not types) from Kenya, details: 18- ♀, epipharynx; 19- ♂ aedeagus, lateral view; 20- ♂, aedeagus, ventral view. Scale lines 0.1 mm. Photographs by L. Mencl.

Abdominal ventrites 3-5 with quite distinct serrate lines (“zig-zag lines”), ventrite 3 distinctly fluted posteriorly, ventrite 4-6 distinctly longitudinally fluted anteriorly. Aedeagus (studied in a male species from Kenya - not in the lectotype) as in Figs. 19 and 20.

Sexual dimorphism. There are no important differences between external features of males and females. Slight differences can be found in protibia terminal spine shapes (the spine is rather straight, shorter and acuminate in the female and moderately bent in the male). These characters are, however, not reliable, since the spines are exposed to wearing.

Variability. The body length varies within an interval of about 3.4 to 4.5 mm. The dorsal surface colour can be dark brown, brown or (less frequently) reddish brown; the forebody can be rather darker than the elytra. The genae are really very sparingly equipped with setae as described above; they are either glabrous or bear just 1 very small seta (exceptionally 2 setae) each. The smooth triangular area extending from anterior clypeus angles to the middle protuberance is always present (it can at most have few minute grains). The shapes, structures and sculptures of body parts are fairly constant; only transversal pronotal ridge 1 can sometimes be rather irregularly granulate, but most frequently, its granules are approximately arranged in two rows as described above.

Differential diagnosis. The species *R. rothschildi* frequently occurs in collections. It can be differentiated from other Afrotropical *Rhysemus* species based on clearly defined shapes, structures and sculptures of the head, pronotum, and elytra, but in addition, it exerts a characteristic feature: the presence of a smooth, depressed area along the clypeus midline, bordered on each side by rows of granules and extending from clypeus anterior angles toward the middle protuberance.

Distribution. East Africa, but undoubtedly more widely distributed according to Endrödi (1984). Important data were presented by Pittino (1984) who studied material from the following countries: Ethiopia, Kenya, Tanzania, Mozambique, and South Rhodesia [nowadays Zimbabwe] (see also the section Discussion).

DISCUSSION

As far as the distribution area of the species is concerned, its occurrence in Zimbabwe should be perhaps verified. We have some specimens from this country, which appear to be similar, but perhaps not identical with *R. rothschildi*. We intend to study this problem in the near future.

Petrovitz (1964) published a key to Afrotropical species of the genus including five species (*R. rothschildi* and further four species described by him) sharing “... eine glatte Längsfurche zwischen Vorderrand des Clypeus und der Stirnbeule ...”. Thorough examination of types of the species described by this author is desirable to definitely solve the problem of the species distribution.

ACKNOWLEDGEMENT. The authors are indebted to Antoine Mantilleri and Olivier Montréuil (both MHNH) for the loan of the lectotypes and paralectotypes studied here.

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Received: 6.11.2017
Accepted: 10.12.2017
Printed: 31.3.2018