Koleopterologische Rundschau	79	257–266	Wien, Juli 2009

A new *Haroldius* BOUCOMONT and a new *Tesserodon* HOPE from the Moluccas (Coleoptera: Scarabaeidae: Scarabaeinae)

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Abstract

Haroldius brendelli sp.n. and *Tesserodon seramicum* sp.n. (Coleoptera: Scarabaeidae: Scarabaeinae), both from Seram (Indonesia), are described. Their joint occurrence on Seram illustrates the biogeographically composite nature of the Moluccan fauna: *Haroldius* BOUCOMONT, 1914 is an Oriental-Afrotropical, *Tesserodon* HOPE, 1837 an Australian genus.

Key words: Coleoptera, Scarabaeidae, *Haroldius*, *Tesserodon*, Indonesia, new species.

Introduction

This paper illustrates the meeting of two scarabaeine faunas in Wallacea by the example of *Haroldius* BOUCOMONT, 1914 (Oriental-Afrotropical Region), and *Tesserodon* HOPE, 1837 (Australian Region). Both genera are currently placed in the essentially Gondwanan tribe Canthonini. They were collected in Seram, and both are represented by one undescribed species. The presence of these genera in the Moluccas was first announced in HANSKI & KRIKKEN (1991), but the species were never formally described. With the recent description of a new member of *Amphistomus* LANSBERGE, 1874 from Halmaheira (HUIJBREGTS & KRIKKEN 2007), only three canthonine species have now been reported from this part of the Indonesian Archipelago. The nearest (western) records of *Haroldius* thus far are from Sulawesi (KRIKKEN & HUIJBREGTS 2006), the nearest (eastern) of *Tesserodon* are from New Guinea (PAULIAN 1985). The two new species are described and compared with their closest known relatives, in the context of our ongoing efforts to contribute to a catalogue of the laparostict scarabs of the Wallacean and other Southeast Asian islands.

Seram, although large and mountainous, is a relatively young island (reputedly Pliocene), and, consequently, one should not expect too much concerning supraspecific endemism (for geological and ecological background on Seram and the development of its biota, see EDWARDS et al. 1993, and, in a broader context, MONK et al. 1997).

The occurrence of *Haroldius* east of the Lines of Wallace & Weber is quite remarkable. However, the known presence of several *Tesserodon* species on nearby New Guinea (including Irian Jaya) makes their discovery on Seram predictable. See Fig. 1 for a rough indication of the geographic range of both genera; note that the majority of the numerous species of *Haroldius* and *Tesserodon* are based on few records and that the ranges are henceforth extrapolated. As for other groups of Scarabaeinae we have seen from Seram, these belong all to endemic Wallacean-Australasian groups of the subcosmopolitan genus *Onthophagus* LATREILLE, 1802, and will be dealt with in due course.

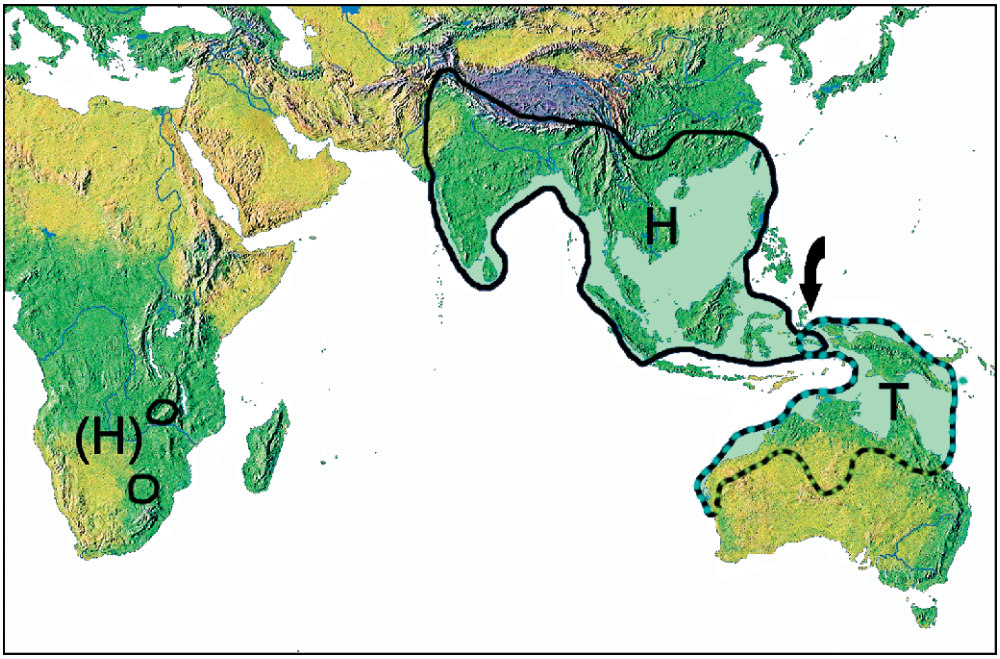


Fig. 1: Generalized ranges of *Haroldius* (H) and *Tesserodon* (T): Asia and Australia; the African records represent either *Haroldius* or some close relatives. Arrow points to Seram.

Methods

In the new *Tesserodon* integumental punctures may take the form of either rounded striolae (annulate, horseshoe-shaped), or (peripunctural) depressions with an indistinct microseta standing in a circular socket (looking ocellate, magnification 40 ×). The diameters of the punctures on the pronotum refer to the peripunctural depression where applicable. Dense = punctures 1–2 diameters apart, crowded = less than one diameter apart. The prefix "micro" refers to features distinct at 40 × and more only. Images should as much as possible represent reality "as is", with straightforward techniques. Although the glare in the photographs of *Haroldius* has been somewhat reduced, this should not produce a false impression of shape and surface features. Some elements are slightly tilted to better show particular characters. For measurements of elements depicted, see descriptions.

Haroldius Boucomont, 1914

A review of the Sundaland and Sulawesi species of this highly modified genus was published by Krikken & Huijbregts (2006); renewed access to the Seram material since Hanski & Krikken (1991) now confirms the correct placement of a distinctive new Moluccan species in *Haroldius*. The three very similar individuals available belong to a species differing from its congeners by some very straightforward characters, summarized in the diagnosis below. Looking at this Seram species, there is no reason to adapt our recent generic diagnosis. None of the five known Sulawesi species are closely related to the one from Seram.

Figs. 2–8: *Haroldius brendelli*, holotype (2–5, 7), 2) habitus, dorsolateral, 3) head, full-face, 4) pronotum, dorsal, 5) left elytron, dorsal, 6) ventral side (paratype), 7) protibia, upper side, 8) metatibia, underside.

The Seram species was collected by flight interception trapping, and, like other *Haroldius*, it is suspected to live as an inquiline in ant nests. In this connection, note what appear to be antehumeral trichomes; the globular habitus and loricate features, as befits myrmecophiles, are shared by all *Haroldius*-like scarabs (KRIKKEN & HUIJBREGTS 2006). Trichomes, i.e. hair concentrations with a supposedly exudatory function in distributing substances to communicate with ant or termite hosts, are unusual among Scarabaeinae (PHILIPS & SCHOLTZ 2000); they are common with myrmeco- resp. termitophiles of the related subfamily Aphodiinae. With the present addition the total number of described *Haroldius* species has risen to about 35, and some more – needing further study – have been noticed in material from Sundaland. The position of the four known Afrotropical *Haroldius*-like species (including *Formicdubius* PHILIPS & SCHOLTZ, 2000) needs to be reconsidered, although there can be no doubt that they are generically close to Asian *Haroldius* (KRIKKEN & HUIJBREGTS 2006; Scholtz, pers. comm.).

***Haroldius brendelli* sp.n.**
(Figs. 2–8, 17)

TYPE MATERIAL: **Holotype** ♂ (The Natural History Museum, London) with the following label data: Indonesia: N.C. Seram: Manusela NP, 25.VII–2.IX.1987, Operation Raleigh, leg. M.J.D. Brendell, primary non-alluvial lowland forest, 10.VIII.1987, flight interception trap. **Paratypes** (National Museum of Natural History, Leiden): 1 ♂ same data as holotype, but 16.VIII.1987; 1 ex. (unsexed), same data as holotype, but 4.VIII.1987.

DESCRIPTION (holotype): Body length ca. 3.0 mm (head deflexed). Dorsum strongly convex. Dorsal side of forebody generally shining black, elytra dark brown; margins, legs, other appendages and underside brown; frons, pronotum and elytra very shining. Surfaces largely smooth, glabrous, but elytra distinctly setose. Much of integumental surface with variably distinct microstriolation-reticulation and hardly distinct micropunctation.

Clypeal border generally evenly rounded, with distinct, widely U-shaped anteromedian excision, flanked by very short, projecting denticle on either side, dental tips subangular (i.e. rounded off), paradental border concave-sinuate (all in full-face view); surface of clypeal margin shallowly concave, matt. Clypeofrontal disc slightly and evenly convex, smooth; clypeogenal suture very fine. Clypeogenal edge continuous; genal tip virtually rectangular, micromarginate; general surface smooth. Eyes small, foramen (in full-face view) closed behind, narrow, slightly elliptic; maximum number of facet rows (transversely) across foramen ca. 6.0. Ratio transverse interocular distance/maximum (transverse, single) foramen width ca. 10.5.

Pronotum with disc evenly and strongly convex, basal surface rather steeply declivous; midline and base not impressed, no line-delimited basomedian area; anterior border virtually immarginate, section behind vertex slightly convex-curvilinear; lateral border of pronotum entirely finely marginate, anterolateral angle obsolete, widely rounded; major section of lateral border very widely evenly rounded, in full face view almost semicircular; posterolateral angle obsolete; pronotal base slightly sinuate (medially convex-curvilinear, in dorsal view), immarginate. Pronotal surface smooth, impunctate; basolateral surface on either side with 25–30 more or less parallel, very fine, short striolae, starting from (slightly crenulate) basal edge.

Elytra broad, strongly and evenly convex, with eight striae; humeral area (in dorsal view) produced, angular, surface hardly raised; apicosutural angle of elytron virtually rectangular. Striae very fine, well defined, on disc curved outward near base; corresponding interstriae not equidistant at base (interstria 1 and 3 wider than 2 and 4, respectively); strial punctures indistinct. Interstrial surface transversely virtually flat, with very long, pale, upright, subserially arranged setae (two rows from interstria 2 on); setae very fine, distally more or less curved, all issuing from simple, fine micropuncture (their length mostly exceeding half interstrial width). Epipleuron very wide, surface smooth, vaguely irregularly undulate; epipleural base with expansion curved downward (lateral view), like a “rim” under anterior (normally invisible) concave trichomatose surface (trichome hairs fine, very dense, yellow brown).

Antenna brown. Eye development on underside very limited. Prothoracic underside largely smooth; postocular surface concave; postprosternal border not particularly modified. Mesoventral surface smooth, impunctate. Mesometaventral suture very distinct, widely arcuate, as usual in the genus. Metaventral disc smooth, with abundant, though hardly distinct micropunctation. Abdominal ventrites laterally nearly flat, surface smooth, ventrites 1–5 distinctly microreticulate, sericeous. Surface of pygidium very slightly convex, densely micropunctate, shining; general shape strongly transverse, height/width ratio distinctly over 0.5; apex marginate.

Protibia dilated-complanate, with two distinct, short external denticles, their tips subacute; proximal section of external side very slightly convex-curvilinear, serration obsolescent; underside of apex slightly protruding to receive tarsus, edge of protrusion with transverse downward comb of stiff setae; upper side of protibia with fine longitudinal external ridge; terminal spur very fine, elongate-acuminate. Protarsus slender, segments 1–5 subcylindrical, 1–4 short, compact, 5 longer, with very fine claws. Mesotibia dilated-complanate, strongly dilated distad, external-distal edge convex-curvilinear to distinct, rounded, apico-external lobe; internal edge slightly curved, distally straight to fine terminal spurs; mesotibial underside with low internal-medial and external ridge; surface microreticulate, matt; edges with fine setae;

mesotarsus with segments 1–4 short, slightly complanate, decreasingly lobate from underside; segment 5 longer, subcylindrical, with fine sickle-shaped claws. Metatibia dilated-complanate, with external-distal edge convex-curvilinear to distinctly rounded apico-external lobe; internal edge proximally curving to slight notch, thence straight to fine terminal spur; surfaces and edges with fine setae, microreticulate, matt; underside with low internal-medial and external ridge; metatarsus with segments 1–4 short, slightly complanate, and strongly, distally decreasingly lobate from underside; segment 5 longer, subcylindrical, with fine sickle-shaped claws; approximate length proportions of metatibial spur//metatarsal segments 1–5: 12//6/6/6/8/18 (estimated medial length, lobes disregarded). Profemur robust, underside with slight longitudinal ridge; other femora relatively slender, elongate, marginate on anterior and posterior sides, lacking projections, surface generally shining, with numerous micropunctures.

Parameres (Fig. 17): symmetrical, parameral tip somewhat dilated-angular in outline.

Measurements in mm. Maximum width of head 1.6. Pronotal dorsal median length 1.2, maximum width 2.3. Dorsal sutural length of elytra 1.7, maximum width combined 2.7.

VARIATION: The three specimens available are almost identical, so this may be a very uniform species.

DIAGNOSIS and COMMENTS: Using the list of characters published by KRIKKEN & HUIJBREGTS (2006), the combined characters of *H. brendelli* do not fit any of the included species, although the strongly lobate shape of the meso- and metatarsal segments 1–4 and the notch halfway the internal edge of the broadened metatibia point to *H. rugatulus* BOUCOMONT, 1914 (the type species of *Haroldius*), originally described from Singapore. We would place *H. brendelli* at the beginning of the key in the review mentioned, on account of the evenly and strongly rounded lateral edge of the pronotum (i.e. with lateral declivity in full-face view), the numerous very long, fine elytral setae, and the modified epipleural base, not present in Sulawesi and Sundaland species. The following additional characters listed below are useful to distinguish *H. brendelli* from its Southeast Asian congeners.

Clypeus with median U-shaped excision and shortly projecting paramedian denticles, no deeper adjacent emargination. Genal lobe with rectangular tip. Lateral edge of pronotum rounded (in full-face view) to obsolete anterolateral and posterolateral angles. Pronotal disc strongly convex, lacking any basomedian impression(s); base (in dorsal view) sinuate, with slight, widely rounded basomedian declivity, dipping down to elytral base (lateral view). Basolateral striolae of pronotum numerous, dense, but fine and very short, not extending far onto pronotal surface, which is largely smooth. Body in profile with deep pronoto-elytral dip, not (sub)collinear. Elytral surface with eight fine striae, interstriae very shining, with very long, fine setae. Antehumeral declivity with (normally concealed) heavily trichomatose patch above downward-projecting transverse rim on epipleural base. Protibia distally with two external denticles, apex slightly expanded into transverse ridge. Meso- and metatibia strongly dilated-expanded distad, with short spurs; internal edge of metatibia with shallow, though distinct notch at midlength. Parameres symmetrical, curved downward, with angular tips (in full-face view, Fig. 17). Length 3.0–3.5 mm. Habitus very globular, colour generally black, non-metallic, very shining, legs brown.

ETYMOLOGY: Dedicated to the collector, our sympathetic colleague Martin J.D. Brendell, who took part in Operation Raleigh (see his portrait in EDWARDS et al. 1993: plate 21b).

Tesserodon HOPE, 1837

This first generic record from the Moluccas is here provided by the description of a single variable species. The genus herewith includes 19 described species from Australia (STOREY

1991), New Guinea (PAULIAN 1985), and now the Moluccas, and we anticipate more. For a modern generic diagnosis of *Tesserodon* see MATTHEWS (1974), which may have to be slightly modified considering the New Guinea-Moluccan species diversity. *Tesserodon* belongs to the canthonines with a sharp pseudepipleural crest and short meso- and metatarsal first segments. Biogeographically interesting is the recent description and discussion of the supposedly related *Tesserodoniella*, described by VAZ-DE-MELLO & HALFFTER (2006), with two species in Chile. The biology of *Tesserodon* is poorly known; the species of this genus appear to be tunnellers, associated with dung and carrion, and are sometimes collected at light. Our material was collected by baited pitfall trapping, at around 1000 m altitude. The species described here is definitely close to *T. setulosum* BALTHASAR, 1965, which was originally based on a single female from eastern Papua New Guinea (BALTHASAR 1965) (we saw the holotype from "Sattelberg", 6°29'S 147°46'E, Morobe Province, kept in the National Museum, Prague).

Tesserodon seramicum **sp.n.**
(Figs. 9–16, 18)

TYPE MATERIAL: **Holotype** ♂ (The Natural History Museum, London) with the following label data: Indonesia: Seram: Manusela NP: Wae Mual Plain, VIII.1987, leg. M.J.D. Brendell, pitfall, dung. Originally crudely mounted on pin, now mounted on card, left protibia lost. **Paratypes** (National Museum of Natural History, Leiden): 2 ♀♀, same data as holotype; 1 ♂, same data, somewhat disarticulated, reconstructed.

DESCRIPTION (holotype): Body length ca. 4.5 mm (with head forward). Colour generally brown, moderately shining due to dense punctation. Many punctures with microsetae and microstubbles, locally with bristles, setae and spinules, much of the punctation is (sub)ocellate and (sub)annulate, locally horseshoe-shaped; elytra with rows of fine bristles.

Clypeal border with anteromedian, widely U-shaped excision, flanked by acute denticle on either side; paradental border sinuate, generally widely rounded to slightly angularly protruding clypeogenal transition. Clypeofrontal surface generally slightly convex, moderately shining, apparently glabrous, with dense subocellate punctation, most punctures with pale, indistinct microstubble. Genal tip laterally subangular, rounded off, finely marginate; clypeogenal suture straight, vague, genal edge slightly angulate at suture. Eyes large, foramen (in full-face view) open behind, medium-sized, semielliptic; maximum number of facet rows (transversely) across foramen ca. 18. Ratio transverse interocular distance/maximum (transverse, single) foramen width 4.0–4.5.

Pronotum generally evenly convex, disc somewhat deplanate, surface of apex and base unmodified; dorsal outline virtually parallel-sided, rounded rostrad. Anterior border of pronotum immarginate, widely and evenly concave-curvilinear; anterolateral angle (in full-face view) distinctly rectangular, lateral border abruptly rounded at ca. 0.2 behind this angle, widely curvilinear to rounded posterolateral angle; lateral sides of pronotum simply declivous, finely marginate over posterior 0.8; base of pronotum immarginate, simply widely rounded. Pronotum generally with dense to crowded, subocellate punctation, more crowded laterally; most punctures with pale, indistinct microseta. Estimated punctural diameters 0.03–0.05 mm; narrow interpunctural spaces shining.

Elytral disc elongate, widest halfway, with seven punctate geminate striae between suture and pseudepipleural crest; surface generally shining, with long, fine, curved bristles issuing from fine punctures, from interstria 2 in two juxtastrial rows; interstria 1 with single row; length of setae increasing laterad, and more recurved; humeral umbone hardly raised, apicosutural elytral angle rectangular. Strial punctures three or more diameters apart, very slightly but distinctly crenulate (undulating) interstrial edges. Interstrial surface almost flat, generally smooth, except for scattered punctures on basodiscal surface; pseudepipleural crest distinct, curved downward at

base, not reaching apex; pseudepipleural surface even (no impression near base), with numerous scattered punctures bearing microstubbles, shining, with single fine longitudinal stria; epipleuron broad, matt (microstriolate) in front.

Antenna light-brown. Propectus with deep, virtually glabrous, shining postocular cavity; other propectoral surfaces densely subocellate; distinct ridge running from base to near postocular cavity, parallel to pronotal border (generic character). Mesoventrite shining, densely to crowdedly annulate-punctate. Metaventral intercoxal lobe and disc densely to crowdedly annulate-punctate, punctures with indistinct microseta, punctural size increasing caudad and laterad. Mesometaventral suture almost straight, sides of intercoxal lobe with paracoxal line. Alae present. Abdominal ventrites 1–4 with posterior margin microstriolate, matt, base with row of punctures; distal ventrites (5–6) connate, more or less shining, with numerous annulate punctures only. Pygidium generally slightly convex, deeply transversely sulcate along base; apex finely marginate; surface densely and finely punctate-microsetose.

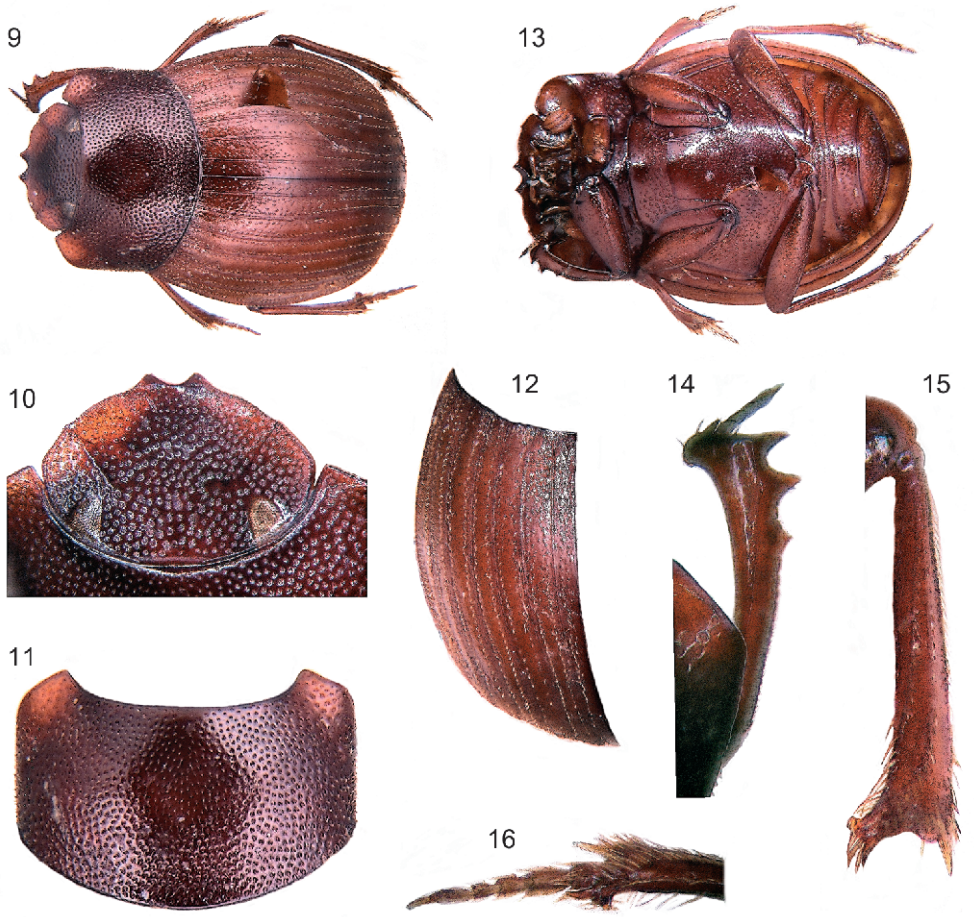
Protibia long, with three distinct acute external denticles, and with short proximal serration (at least eight distinct, small teeth), some small teeth interposed between proximal and medial external denticle; tibial apex straight, transverse from apico-internal knob to tip of apico-external denticle; short, broad, curved, acuminate (claw-like) terminal spur sitting on distal side of knob; tibial upper side with longitudinal ridge, underside with distinct medial and slight internal-longitudinal ridge; apex of knob lined with comb of spinules. Protarsus long, slender, with five short, subcomplanate segments, and reduced claws. Mesotibia slightly curved, strongly dilated in distal 0.3, with inferior-internal ridge ending in comb of densely packed yellowish setae; apex with circumferal spinules; terminal spurs short, curved-acuminate, and long, straight-acuminate, respectively. Metatibia almost straight, slightly dilated distad, with short angular apico-internal projection; apex with some spinules and with single short, curved acuminate spur. Meso- and metatarsi all long, slender, (sub)complanate, setose, consisting of five short segments, segment 1 slightly shorter than 2; claws reduced; approximate length proportions of metatibial spur//metatarsal segments 1–5: 10//12/14/11/9/13. Profemur robust, elongate, with slight longitudinal ridge on underside, which is abundantly, finely punctate-microsetose; anterior and posterior side of femur marginate. Meso- and metafemora elongate-elliptic, slender, underside abundantly, finely punctate-microsetose, anterior and posterior sides finely marginate, lacking any protrusions.

Parameres (Fig. 18): asymmetrical, left side with rounded, ventrally expanded lobe.

Measurements in mm. Maximum width of head 1.9. Pronotal dorsal median length 1.4, maximum width 2.4. Dorsal sutural length of elytra 2.3, maximum width combined 2.1.

VARIATION and SEXUAL DIMORPHISM: Although only four specimens are available, there is notable variation in both colour (legs brown, body unicoloured brown or black) and body length (3.0–4.5 mm). Females lack the apico-internal protibial knob and the apico-internal metatibial hook of the male; the female protibial apex is virtually straight, transverse, as in other *Tesserodon* species.

DIAGNOSIS and COMMENTS: In the key to the New Guinea species published by PAULIAN (1985), *T. seramicum* runs straight to *T. setulosum* from eastern New Guinea, on account of its size, the two rows of interstrial setae (from interstria 2 on, one row on interstria 1), and more. The holotype of *T. setulosum* is a female, and *T. seramicum* is undoubtedly close, judging from the comparison of the females of both species. Several of the continental Australian species also have paired rows of interstrial setae (STOREY 1991), but, after reaching couplet 9, the cephalic outline, including the eye proportions, the shape the male tibiae and metafemora, and microsculptural and pilosity details of *T. seramicum* do not match information provided by STOREY (1991).



Figs. 9–16: *Tesserodon seramicum*, holotype, 9) habitus, dorsal, 10) head, full-face, 11) pronotum, dorsal, 12) left elytron, dorsal, 13) ventral side, 14) protibia, upper side, 15) metatibia, underside, 16) setose metatarsus and tibial apex, enlarged.

Tesserodon setulosum is at least different from *T. seramicum* in the presence of a basal pseudepipleural pit, a shining (non-microstriolate) epipleural base, much shorter elytral setae, rectilinear (non-undulate) strial edges, non-microstriolate abdominal ventrites 1–4, and strongly convex (bulbous) pygidium. The following set of additional characters may help to distinguish *T. seramicum* from all known *Tesserodon* species.

Clypeus anteromedially with U-shaped excision and projecting, acute paramedian denticles, lacking deeper adjacent lateral emargination. Genal lobe short, lateral tip rounded, clypeogenal transition abrupt. Ocular foramen large, separated by 4–5 eye widths. Lateral edge of pronotum very widely, evenly rounded (full-face view), both anterolateral and posterolateral angle of pronotum rounded (dorsal view). Punctation of head and pronotum densely to crowdedly subocellate-microsetose. Elytra elongate, disc laterally limited by pseudepipleural crest, with seven fine, punctate, geminate discal striae. Interstriae virtually flat, shiny, on either side, along striae, with bristles each issuing from their own simple micropuncture. Alae present. Abdominal

sternites 1–4 posteriorly distinctly microstriolate. Pygidium slightly convex. Protibia of male with strong apico-internal knob, anteriorly carrying comb-like row of spinules; spur claw-like. Meso- and metatibia nearly straight, only slightly dilated distad, with fine spurs; internal edge of male metatibia with distinct distal-internal brush of packed yellowish setae. Femora and trochanters unmodified, lacking the projections seen in many congeners. Parameres asymmetrical as in all *Tesserodon* (Fig. 18); rounded distal lobe on left side different from all Australian species pictured (PAULIAN 1985 gave no information about parameres). Length 3.0–4.5 mm. Habitus elongate-oval. Colour generally brown or black, moderately shining, legs brown. Forebody dorsally, and pectoral surface, densely to crowdedly covered with more or less distinct, ocellate, annulate, and horseshoe-shaped punctures.

ETYMOLOGY: Named after the island of Seram.

Figs. 17–18: Male genitalia, lateral views (17a, all parts, 18a, parameres), upper sides (17b, enlarged tip, full-face, 18b, upper side, parameres); scale-lines with 17a and 18a = 0.5 mm, 17) *Haroldius brendelli* (holotype), 18) *Tesserodon seramicum* (paratype).

Acknowledgements

Thanks are due to Martin J.D. Brendell and Peter M. Hammond (The Natural History Museum, London), for submitting this interesting material. Our colleague Jiří Hájek (National Museum, Prague), kindly sent the type of *Tesserodon setulosum* on loan. We are indebted to our colleagues Jan van Tol and Rienk de Jong for useful advice.

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