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Two new genera of apterous Carventinae from New Guinea

(Heteroptera, Aradidae)*

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Abstract

Two new genera of apterous Carventinae, *Riedelaptera* gen.n. with the species *R. jiwikana* from high altitudes in Central Irian Jaya and *Papuaptera* gen.n. with the species *P. microsoma* from the Sepik lowlands in Papua New Guinea are described and figured. Their body stuctures are highly modified and both genera show no close relationship to other genera occurring in New Guinea and adjacent islands.

Introduction

The flat bug family Aradidae recorded to date from New Guinea is very diverse in genera and species and shows a high degree of endemism. The subfamily Carventinae is represented by ten genera of which five are apterous and about 50 species, one third of them sharing the apterous condition (Kormilev 1957, Usinger & Matsuda 1957, Bloete 1965, Monteith 1982, Kormilev & Froeschner 1987). In correlation with the loss of wings, in most of the flightless species, protruding structures on the dorsal surface by inflation and fusion of thoracic and abdominal segments have evolved. Particularly in Carventinae, this evolutionary trend resulted in highly modified body structures and the two new genera described below are peculiar examples. Monteith (1982), regards apterous Carventinae as old relicts of the ancient rainforest fauna, which are represented today by a high number of monotypical genera, most of them endemic.

Material and Methods

The specimens upon which this study is based were collected by Alexander Riedel (Munich) during his expeditions to the island of New Guinea between 1990 and 1996, and presented to the author.

Holotypes are deposited at the Tiroler Landesmuseum Ferdinandeum, Innsbruck (TLMI), incorporated as a permanent loan in the authors collection (cEH).

Measurements were taken with a micrometer eyepiece, 40 units = 1 mm unless otherwise stated.

Description of genera and species

Riedelaptera gen.n.

Figs 1-6, 10, 11

Diagnosis: *Riedelaptera* is a very distinctive genus with no close relatives in New Guinea. It can be distinguished from the other apterous genera so far recorded from New Guinea (*Biroana* Kormilev, 1957; *Eurycoris* Kormilev, 1957; *Libiocoris* Kormilev, 1957; *Sibilocoris* Bloete, 1965 and *Trigonaptera* Usinger & Matsuda, 1957) by its general appearance and the strongly elevated structures of thorax and abdomen. It

* Results of the entomological explorations of Alexander Riedel in New Guinea from 1990-1996.

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resembles somewhat the genera *Signocoris* from India (Hoberlandt 1958) and *Glyptoaptera* from Australia (Kormilev 1965), both not present in New Guinea.

Description.
Body form subrectangular. Surface shiny, beneath incrustation granular and irregularly rugose, partly with smooth areas. Legs and antennae with fine setigerous granulation.

Head. Slightly shorter than wide; vertex and clypeus together forming a high median ridge. Genae slightly exceeding apex of clypeus. Antenniferous tubercles blunt, slightly divergent. Eyes large, not protruding; postocular tubercles small, not reaching outer margin of eyes. Antennae slender, antennal segment I thickest, distinctly longer than clypeus.

Thorax. Pronotum trapezoidal, much wider than long, lateral margins weakly rounded and humeral angles raised; collar distinct, ring like. Disk depressed medially with a deep Y-shaped sulcus, between the arms of which rises a pair of granulate tubercles. Lateral portions irregularly rugose.

Mesonotum, metanotum and first two abdominal tergites fused and inflated medially into prominent granular lobes. These lobes are separated by a deep longitudinal groove and by transverse sutures marking the original segmentation. Lateral portions sloping towards the connexival suture, partly smooth with sublateral granular ridges and projections.

Abdomen. Tergal plate likewise strongly elevated, highest on mediotergite (Mtg) IV bearing the abdominal scent gland openings; laterally and posteriorly sloped with smooth round depressions bordered by granular ridges. Dorsal external laterotergites (Deltg) about as long as wide, surface rogose, their lateral margin with triangular projections bearing the spiracles of segments III to VII. Deltg I+II fused and extending forward to pronotal humeral lobes. Mtg VII strongly raised medially in male, moderately elevated with two conical tubercles in female.

Venter. Acetabulae prominent and convex, thoracic pleura granulate. Pro-, meso- and metasternum fused, flat and smooth medially, their segmental borders only laterally marked by deep sulci. Prosternum narrow with a granulate, posteriorly enlarged ridge, posterolateral angles of propleura with a finger like projection which is visible from above. Meso- and metasternum each with a pair of processes laterally opposing the coxae. Completely fused mediosternites (Mst) I + II fused to sternum but separated by a transverse sulcus. Mst III to V smooth with deep transversal sulci; ventral laterotergites (Vltg) irregularly rugose. Sternites VI + VII fused medially in male, with smooth surface, and 2 (1+1) round blunt protuberances at middle. Spiracles II ventral, III to VII lateral or subdorsal and visble from above, VIII terminal. In female sternite VII is devided into two triangular plates with longitudinal ridges.

Genital structures. Male pygophore globose, dorsal portion flat, rugose. Parameres with reflexed anterolateral portion, inner face densely pilose.

Legs. Slender with distinct trochanters, femora and tibiae unarmed. Tarsi two- segmented, claws with curved pseudopulvilli; preapical comb on fore tibiae present.

Type species: *Riedelaptera jiwikana* sp.n.
Etymology: Dedicated to my friend Alexander Riedel, who collected these and many other interesting Aradidae in New Guinea and referring to the apterous condition.
Distribution: Known only by the type specimens from Irian Jaya, New Guinea.

Riedelaptera jiwikana sp.n.

Figs 1-6, 10, 11

Material examined. **Holotype** ♂: Indonesia, Irian Jaya, Jayawijaya Prov., Wamena-Jiwika 2300 m, 29.9.1992 leg. A. Riedel (TLMI-cEH). Paratypes 1♂, 1♀, 1 nymph, Irian Jaya, Jayawijaya Prov., Jiwika trail to Wandanku 1900-2150 m, 28.-29.9.1996 leg. A. Riedel (TLMI-cEH).
Diagnosis: Being the only species included to date, it can be recognized by the characters given in the generic diagnosis.

Description.
Male, apterous. Colour black beneath brownish incrustation which usually conceales the surface.

Head. Shorter than width across eyes (35/36), genae exceeding clypeus which bears a subapical tubercle, reaching ½ of antennal segment I. Antennae with segment I clavate, II and III thinner, IV fusiform.

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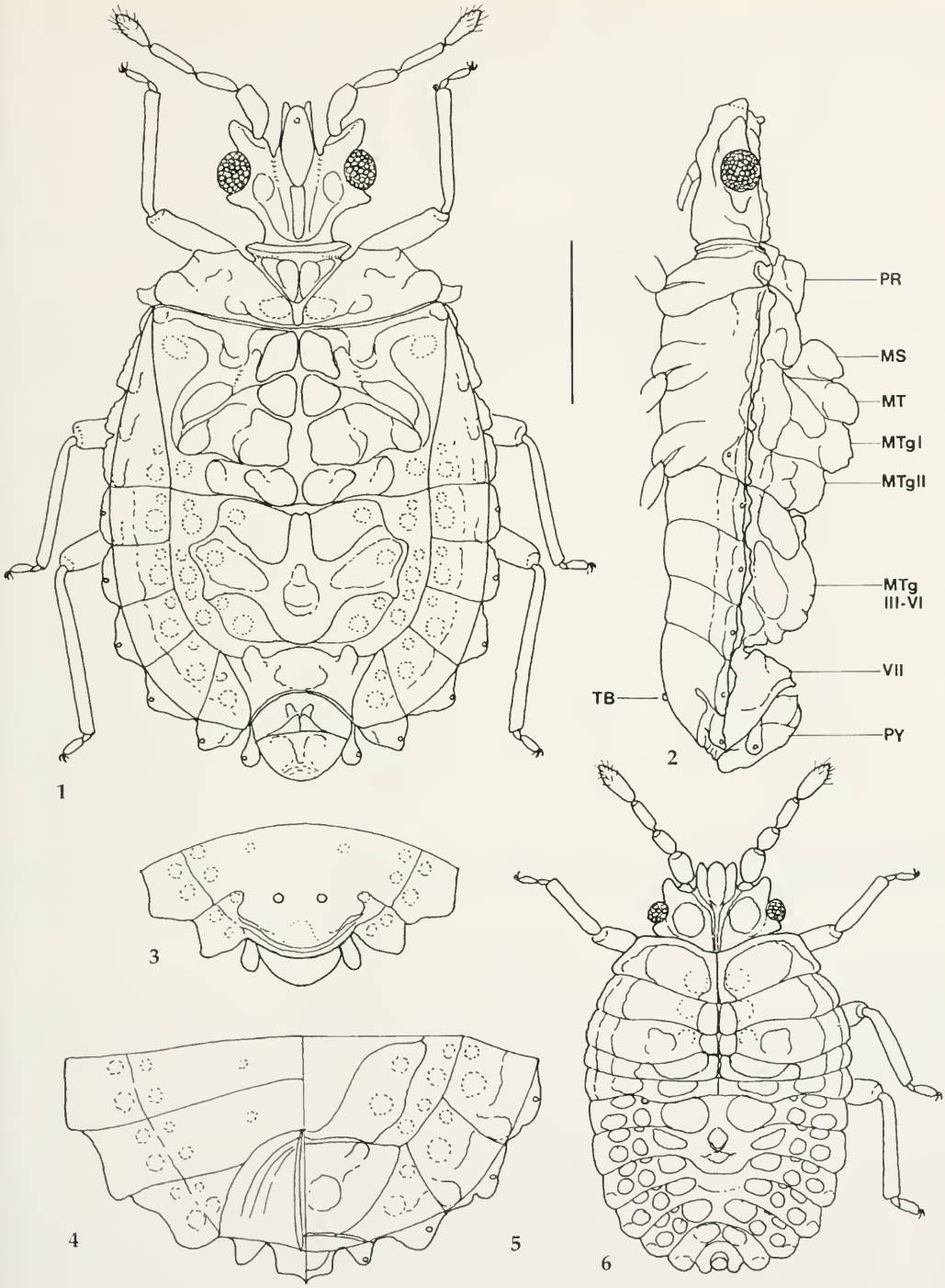

Figs 1-6: *Riedelaptera jiwikana* gen.n., sp.n. 1. Paratype ♂, habitus dorsal view; 2. ditto lateral view; 3. ditto pregenital segments, ventral view; 4. Paratype ♀ terminal segments, ventral view; 5. ditto dorsal view; 6. nymph. MS = Mesonotum; MT = Metanotum; MTg I (II etc.) = Mediotergite I etc.; PR = Pronotum; PY = Pygophore; TB = Ventral tubercles. Scale 1 mm

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Relative length of I:II:III:IV = 13/10/12.5/12. Eyes semiglobose, whitish. Postocular tubercles small with blunt apex, not reaching outer margin of eyes. Neck region strongly converging posteriorly. Rostrum shorter than head, arising from a slit like atrium, rostral groove laterally bordered by elevated ridges, closed posteriorly.

Thorax. Pronotum about 4× as wide as long (72/18), collar formed as a prominent ring. Lateral margins convex, granulate, humeral angles raised. Disk sloped towards median Y-shaped deep sulcus, with smooth callosities followed by irregular rugosities laterad; triangular part between anterior sulci and collar with a pair of granulate tubercles.

Meso- and metathorax and Mtg I+II fused, forming an elevated median ridge which is divided into four granulate humps on either side of the deep longitudinal groove by transversal sutures. Lateral portions of meso- and metanotum sloping towards base, fused but separated by a deep groove from fused Deltg I+II which bear round, elevated, granular lobes sublaterally.

Abdomen. Tergal plate subrectangular, strongly raised medially, highest at Mtg IV with dorsal scent gland openings. Surface of connexivum (Deltg II to VII) with glabrous round callosities on inner side, granular and irregularly rugose elsewhere. Lateral projections formed by reflexed ventral laterotergites triangular on Deltg III to VII bearing the spiracles and subrectangular along lateral margin of fused Deltg I+II which extends forward to pronotum. Spiracles II ventral on a prominent tubercle.

Venter. In male sternite VII is fused to sternite VI and bears a pair of striking flat tubercles medially.

Genital stuctures. Male parameres as figs 10-11

Female. Generally as male but larger.

Nymph (probably L4) Fig 6. Body oval, surface mat with dense rugose granulation between the smooth ridges which border the thoracal segments and the characteristically arranged apodemal impressions of the abdomen. Colour of ridges and legs ochraceous, granulated areas are dark brown.

Head short and transverse, antennae stout, subequal in length. Thorax with well defined segments, flat, except the median callosities on meso- and metanotum which are slightly raised. Mtg I forming a transverse ridge, which is the highest structure. Mtg II separated from Mtg I and tergal plate by a transverse suture. Tergal plate flat, with a median elevation bearing the dorsal scent gland openings. Tergite VIII U-shaped, Tg IX bilobate posteriorly.

Measurements. Holotype male: Length 3.85 mm; width of abdomen across Mtg III 2.175 mm; ratio length of antennae / width of head 1.32. Paratype male: Length 4.15 mm; width across Mtg III 2.40 mm; ratio length of antennae/width of head 1.27. Paratype female: Length 4.55 mm; width across Mtg III 2.90 mm, ratio antennae/width of head 1.27. Nymph. Length 2.3 mm; width across Mtg I 1.5 mm.

Etymology: Named after Jiwika, the main village of the area where the type material was found.
Ecology: All specimens were collected by sieving forest litter of high altitude montane forests in Central Irian Jaya. The species is most probably endemic to this area as its dispersal potential seems very limited.

Papuaptera gen.n.

Figs 7-9, 12

Diagnosis: *Papuaptera* is another apterous genus with no close ralatives in New Guinea, resembling only superficially *Riedelaptera* and *Biroana*, but can be distinguished by the different shape of head, body and fusion of inflated thoracal segments.

Description.

Apterous. Body broadly oval, attenuated posteriorly. Surface with ochraceous incrustation, granulate beneath.

Head. Shorter than width of head across eyes; vertex and clypeus together forming a high median ridge. Genae rounded, as long as clypeus. Antenniferous tubercles small and curved.Eyes small. Postocular portion forming a flattened lobe directed posteriorly, as wide as outer margin of eye. Antennae thin, all segments subequal in length, I thickest, curved and shorter than clypeus.

Thorax. Pronotum trapezoidal with distinct collar ring which is separated from pronotal disk by a transverse groove. Margins slightly concave, humeral angles marked by a pair of tubercles. Disk sloping anteriorly, medially depressed, with 2 (1+1) small ridges. Surface coarsely granular.

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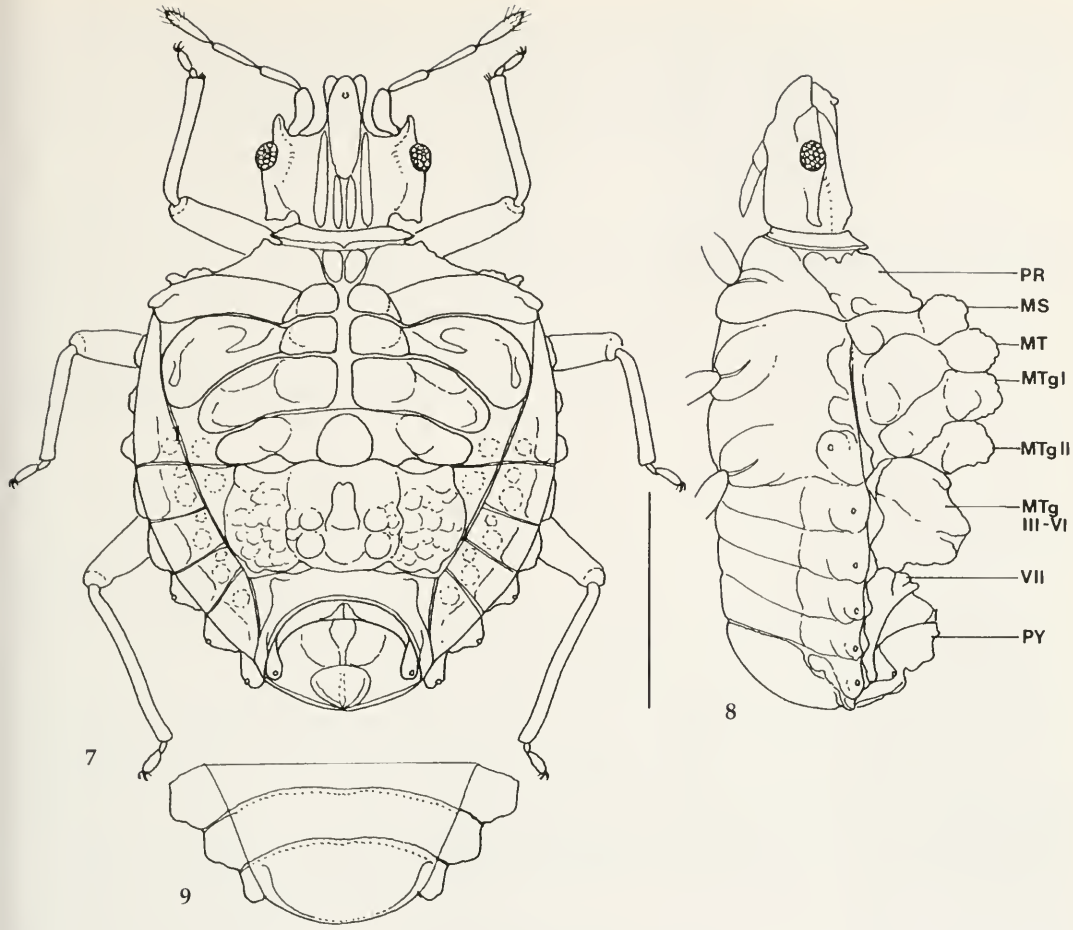

Figs 7-9: *Papuaptera microsoma* gen. n.,sp.n. 7. Paratype ♂, habitus dorsal view; 8. ditto lateral view; 9. ditto pregenital segments, ventral view. Abbreviations as Fig. 2. Scale 1 mm

Meso- and metanotum and first two abdominal tergites fused into a single complex, strongly inflated structure. The median ridge is formed by pairs of rounded granular humps on pro-, meso- and metanotum and Mtg I which are separated by deep transverse sutures and a longitudinal median groove. This groove meets posteriorly the transverse suture between Mtg I and Mtg II, the latter bearing a single round granular elevation medially. Lateral portions of median thoracic ridge rounded and sloping towards connexival suture, surface granulate with transverse ridges.

Abdomen. Tergal disk very short, more than three times wider than long, medially raised into a rounded lobe which bears two pairs of prominent tubercles sublaterally. Lateral portions sloped with irregular rugosities. Suture between Mtg II and tergal plate deeply excavated laterad of lowered median ridge. Deltg´s subrectangular, the posteroexterior angles raised by a longitudinal ridge. Deltg I+II fused and extending forward to mesonotal lobes. Lateral margins with triangular projections bearing the spiracles of segments V to VII. Mtg VII strongly elevated in male for the reception of the pygophore.

Venter. Acetabulae prominent and convex. Pleura irregularly rugose. Prosternum narrow with an inverted T-shaped median ridge. Mesosternum fused with pro- and metasternum but marked by deep transverse sutures; medially flat, smooth, with a pair of laterally projecting tubercles. Metasternum also medially flattened with a round depression and a pair of laterally projecting tubercles. Completely fused mediosternites I+II fused to metasternum but separated from the latter and Mst III by a transverse sulcus.

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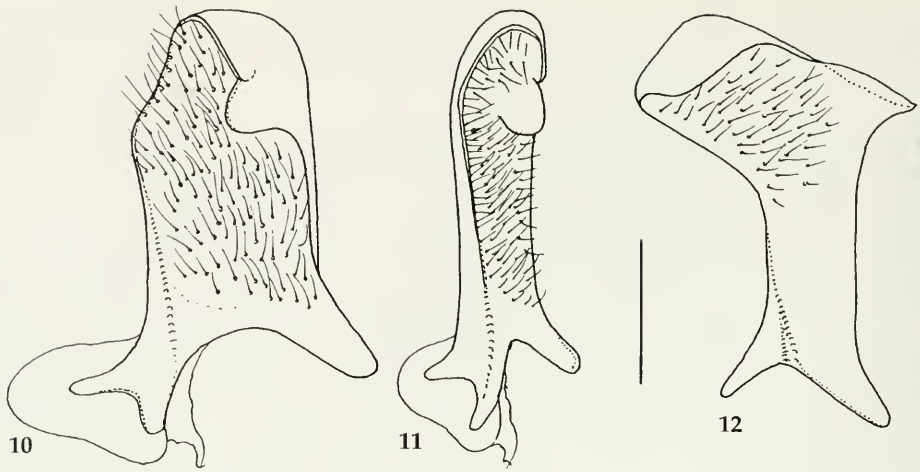

Figs 10-12: Parameres. 10, 11. Holotype ♂, *Ridelaptera jiwikana* sp.n.; 12. Holotype ♂ *Papuaptera microsoma* sp.n. Scale 0.1 mm

Mst III to VI mat with deep sulci marking the segment borders, Mst VII subglobular and smooth, Vltg III to VII granulate with lateral projections. Spiracles II to IV ventral, V to VII lateral and visible from above, VIII terminal. Male sternite VII without tubercles.

Genital structures. Male pygophore globose with an oval elevation dorsally. Parameres with pilose inner face and reflexed anterior margin.

Legs. Slender with fine granulation bearing short setae. Femora slender with distinct trochanters.

Type species: *Papuaptera microsoma* sp.n.
Etymology: Name referring to Papua, the indigenous people.
Distribution: Known to date only from the type specimens from Papua New Guinea.

Papuaptera microsoma sp.n.

Figs 7-9, 12

Material examined: Holotype ♂, Papua New Guinea, West Sepik Prov., Vanimo-Denake-Range 500 m, 29.10.1992 leg. A. Riedel. Paratype ♂, same data as holotype. (TLMI-cEH)
Diagnosis: The only species of the genus can be recognized by its generic characters.

Description.
Male, apterous. Colour of body beneath incrustation dark brown, appendages ochraceous. Surface mat and sculptured by granules and irregular ridges.

Head. Distinctly wider than long (31.5/29), appearing strongly transverse; genae rounded at apex, as long as clypeus, the latter with a subapical conical tubercle. Vertex with 2 longer and 2 shorter longitudinal ridges, flattened laterally towards eyes. Antenniferous tubercles small, curved inward. Antennae 1.20 times as long as width across eyes, with short segment I which is thickest, II and III spindle shaped and widest near apex, IV fusiform. Relative length of segments I:II:III:IV = 9/8/10/11. Eyes small, inserted in the lateral margin of head. Postocular lateral margins as wide as across eyes, straight, slightly converging and angularly produced posteriorly. Rostrum nearly reaching posterior border of head. Rostral atrium slit like, rostral groove deep with elevated lateral margins, closed posteriorly.

Thorax. Pronotum strongly transverse and converging anteriorly, separated from ring like collar by a deep transversal sulcus. Structure of fused meso- and metanotum, Mtg I and Mtg II as decribed for the genus.

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Abdomen. The short and transverse tergal plate is strongly raised medially into a rounded hump, which is lower than the inflated thoracic structure, bearing the dorsal scent gland openings which are flanked on top by two pairs of round tubercles laterally. Surface of Deltg's with round callosities on inner half and longitudinal ridges along lateral margin. Reflexed ventral laterotergites (Vltg) forming triangular projections bear the spiracles of segment V to VII, those of segments II to IV are ventral and not visible from above.

Genital structures. Parameres as fig. 12.

Female. Unknown.

Measurements. Holotype ♂: Length 2.80 mm; width of abdomen across Mtg III 1.85 mm, widest across Mtg II 2.0 mm; ratio length of antennae/width of head across eyes 1.20; width of pronotum 1.57 mm. Paratype ♂: Length 2.85 mm; abdomen across Mtg III 1.85 mm, widest across Mtg II 2.0 mm; ratio antennae/width of head 1.20; width of pronotum 1.57 mm.

Etymology: Refers to the small size and the apterous condition, greek micros = small, soma = body.
Distribution: To date only known from the type locality.
Ecology: Collected in lowland rainforest in hilly country north of the Sepik river system sifting floor litter.

Acknowledgements

I wish to express my sincere gratitude to Alexander Riedel who collected and made available for study this interesting material.

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