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ORIBATID MITES FROM THE VOHIMANA RESERVE (MADAGASCAR) (ACARI: ORIBATIDA) I.

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During a study of a small sample from the Vohimana Reserve (Madagascar) 26 oribatid species are recorded. Among them 11 are new for science, the other species are already known from the other parts of the island. Some notes and drawings on little known species as well as identification keys for the Madagascarian members of the genera *Austrocarabodes* HAMMER, 1966 and *Hymenozetes* BALOGH, 1962 are also given. With 56 figures.

Key words: taxonomical studies, new species, new distributional data, Republic of Madagascar

INTRODUCTION

The first findings on the oribatids of Madagascar were published in the 1960-ies by BALOGH (1960, 1962). Later the researchers of the Museum d'Histoire Geneva, Switzerland (Dr. B. HAUSER and Dr. C. LIENHARD), and a colleague from the Hungarian Natural History Museum (Dr. T. PÓCS, bryologist) carried out thorough collecting activities on the island.

The samples collected were elaborated by MAHUNKA (1993, 1994, 1997, 2002) in several publications. The taxonomic results known till then were reviewed by MAHUNKA (2002), and he also gave a check-list on the known species. Meanwhile Polish researchers also visited Madagascar, whose collecting activities were described, and also the samples were investigated by NIEDBAŁA (2004).

The acarological elaboration of these materials are still far from complete, besides the oribatid material the thorough study of Uropodina mites has just started by WIŚNIEWSKI (1993), and later by KONTSCHÁN (2007).

After the previous collecting activities of the Hungarian scientists (MAHUNKA 2002) recently an another Hungarian taxonomist, Dr. CS. CSUZDI, a well-known earthworm specialist, also visited Madagascar. He carried out soil-zoology collecting activities on the northern part of the island in the Vohimana Nature Reserve, in an area from where formerly there was no any data available. Hereby I describe a part the oribatid mites found in his material. These constitute a significant increase in our present knowledge on the Oribatida fauna of Madagascar. Altogether data on 26 species are given, among them 11 are new for science, while the others were already recorded for the fauna of Madagascar.

The new investigation of the Madagascan fauna – besides the taxonomic results – again proved the very high ratio of endemism of the Madagascan oribatids mites. Most of the species belong to genera formerly known either from Madagascar or from circumtropical areas. I found numerous till now quite poorly-known and rare species, and in the case of some of them new morphological and taxonomic notes and novelties are given. I would like to emphasise that from a single soil sample five *Austrocarabodes* species were described, all new for science, and this proves the extraordinary species-richness of the oribatid fauna of Madagascar. It is also worth mentioning that from the Ethiopian Region only one species was found (*Suctobelbella spirochaeta* MAHUNKA, 1983), and some representatives of genera living there (MAHUNKA & MAHUNKA-PAPP 2007).

As in my earlier papers, I follow the system of MARSHALL *et al*. (1987), based on that of GRANDJEAN (1954, 1965), with some modifications introduced by BALOGH and BALOGH (1992), SUBÍAS (2004, 2008), WEIGMANN (2006). In the descriptions the morphological terminology of GRANDJEAN (1965 and in several publications) was used with some modifications concerning the studied groups or organs (e.g. MAHUNKA & ZOMBORI 1985, NORTON *et al*. 1997, MAHUNKA & MAHUNKA-PAPP 2001, WOAS 2002, NIEDBAŁA 2001, 2004) and in the mentioned taxonomical publications before.

All material examined is deposited in the Hungarian Natural History Museum, Budapest (HNHM) and some paratypes and also some voucher specimens in the Muséum d'Histoire Naturelle de Genève (MHNG).

Locality – Afr–996: Malagasy Republic (Madagascar), Vohimana Reserve, primary forest. 17. 04. 2008. Leg. CS. CSUZDI.

LIST OF THE IDENTIFIED SPECIES

STEGANACARIDAE NIEDBAŁA, 1986

Notophthiracarus zebra (BALOGH, 1962)

ORIBOTRITIIDAE GRANDJEAN, 1954

Oribotritia striata sp. n.

NANHERMANNIIDAE SELLNICK, 1928

Nanhermannia milloti BALOGH, 1960

MICROTEGEIDAE BALOGH, 1972

Microtegeus paracervus MAHUNKA, 1997

CERATOPPIIDAE KUNST, 1971

Trichoppia longiseta BALOGH, 1960

TECTOCEPHEIDAE GRANDJEAN, 1954

Tegeocranellus hungarorum sp. n.

CARABODIDAE C. L. KOCH, 1843

Austrocarabodes armatus sp. n.
Austrocarabodes blancharti sp. n.
Austrocarabodes lateoalveolatus sp. n.
Austrocarabodes parapustulatus sp. n.
Austrocarabodes pustuloreticulatus sp. n.
Carabodes andasibe MAHUNKA, 1993
Tuberocepheus longus BALOGH, 1962

OPPIIDAE SELLNICK, 1937

Rugoppia boraha (MAHUNKA, 1994)
Lancelalmoppia ravenala (MAHUNKA, 1994)
Lemuroppia helleri MAHUNKA, 1994
Microppia minus (PAOLI, 1908)

SUCTOBELBIDAE JACOT, 1938

Parasuctobelba vohimana sp. n.
Suctobelbella duplicondyla sp. n.
Suctobelbella spirochaeta MAHUNKA, 1983

MICROZETIDAE GRANDJEAN, 1936

Comorozetes corrugatus MAHUNKA, 1997
Hymenozetes csuzdii sp. n.
Rhopalozetes madecassus MAHUNKA, 1993
Vermacarus armatus MAHUNKA, 1997

HAPLOZETIDAE GRANDJEAN, 1936

Trachyoribates (*Rostrozetes*) *pulcherrimus* (BALOGH, 1960)
Vilhenabates dissecatus sp. n.

DESCRIPTIONS OF THE NEW AND NOTES ON LITTLE KNOWN SPECIES

Notophthiracarus zebra (BALOGH, 1962) (Figs 1–5)

Neither BALOGH in his original description, nor NIEDBAŁA (2004) in his re-description gave precisely the characteristic details of special sculptura, and hence the given figures are somewhat misleading. Therefore I think the following notes are necessary:

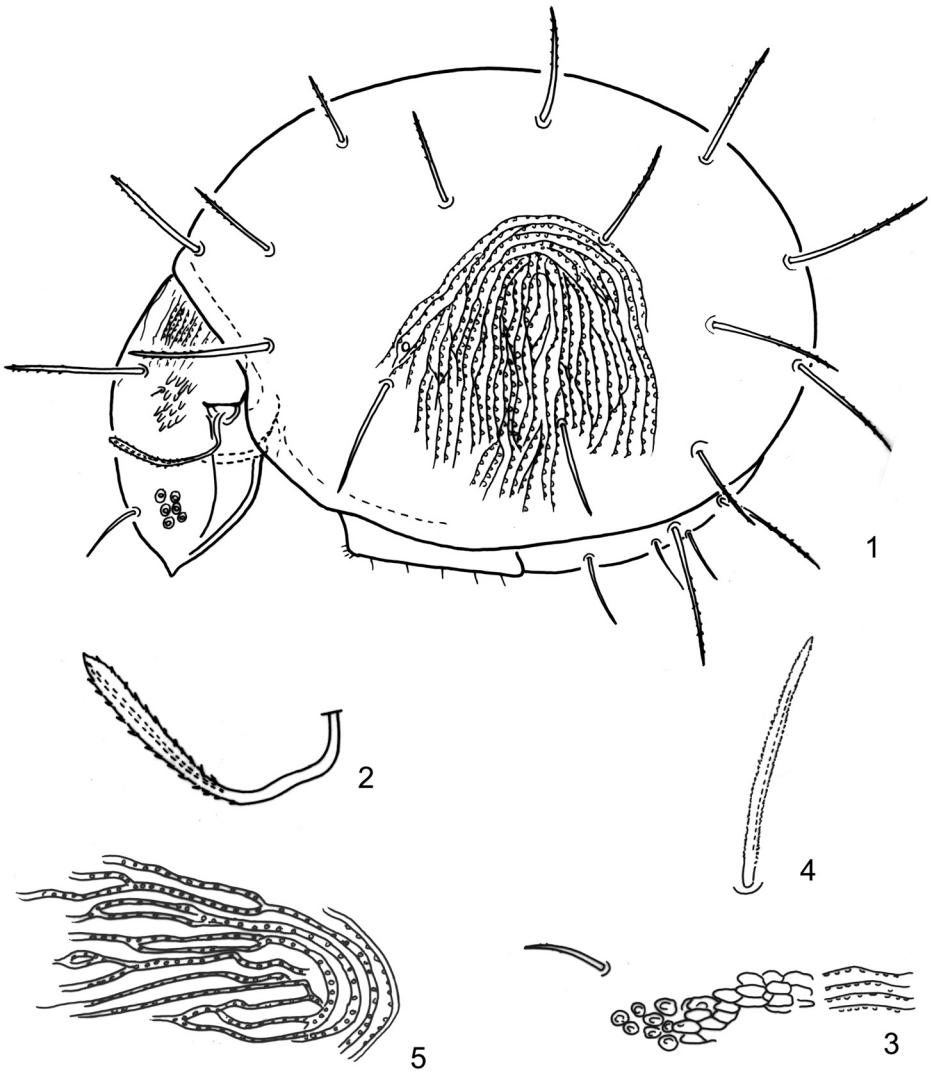
Behind the lateral carina the surface of the prodorsum is smooth, while the rostral area is ornamented by polygonal sculpture. In the strongly outlined cell-like fields oval or polygonal areas differentiate. In the middle field there are longitudinal polygonal fields, they possess thin margins, while the basal surface is ornamented by longitudinal wrinkles, and there are small alveolies in them. The surface of the notogaster is ornamented by parallel lines, and these form a fingerprint-like pattern in lateral view. Among the parallel lines there are small alveolies, and their shape is very discernible on the dorsal surface.

The prodorsal setae – with the exception of minute lamellar setae – are rod-shaped, their distal end is narrowing, and their distal half is sparsely aciculate. The stalk of the sensillus is long and arched, its distal quater is widened, its border is scalpel-like, and the border is also aciculate.

On the basis of genital setae the placement of the species is rather problematic (whether it belongs to the genus *Hoplophorella* BERLESE, 1923 or *Notophthiracarus* RAMSAY, 1966), to solve this problem further investigations are necessary.

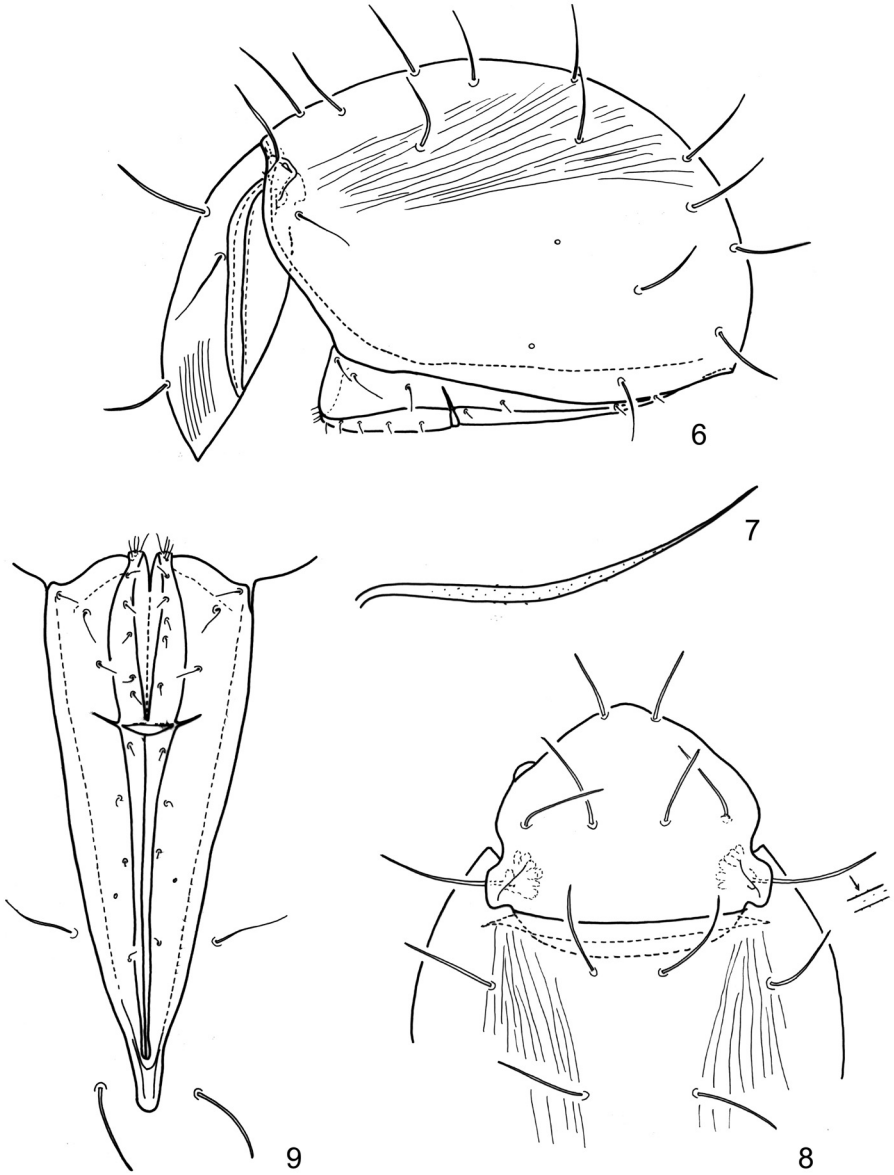
Oribotritia striata sp. n.
(Figs 6–9)

Material examined. Holotype: Malagasy Republic, Vohimana Reserve, primary forest. 17. 04. 2008. Leg. Cs. CSUZDI (Afr-996). Holotype (1768-HO-09) in HNHM.



Figs 1–5. *Notophthiracarus zebra* (BALOGH, 1962): 1 = body in lateral view, 2 = sensillus, 3 = sculpture of the prodorsum with rostral seta, 4 = interlamellar seta, 5 = sculpture of the notogaster medially

Diagnosis. Aspis and notogaster with longitudinal striation. Two pairs of long and distinct lateral carinae. Sensillus dilated medially, setiform, roughened. Prodorsal setae long, rostral and interlamellar setae with spiniform, lamellar ones



Figs 6–9. *Oribotritia striata* sp. n.: 6 = body in lateral view, 7 = sensillus, 8 = anterior part of body in dorsal view, 9 = anogenital region

with filiform distal part. Three pairs of aggenital, one pair of anal and three pairs of adanal setae. Legs tridactylous, setae *u* on tarsi II–IV short, dilated, spiniform. Femora I with distal spur.

Measurements. Length of aspis: 357 μm, length of notogaster: 670 μm, height of notogaster: 455 μm.

Prodorsum. Rostral part of aspis striated. Median crista absent, two pairs of long and well sclerotised lateral carinae present (Fig. 6). Both pairs reaching to the lateral margin of aspis. Median and basal part of the aspis without pattern. Ratio of prodorsal setae *in* > *le* > *ro*, setae *le* much thinner than the others, filiform. Setae *ro* and *in* with spiniform distal end. Sensillus (Fig. 7) longer than the prodorsal and notogastral setae, spiniform, roughened, but slightly dilated medially.

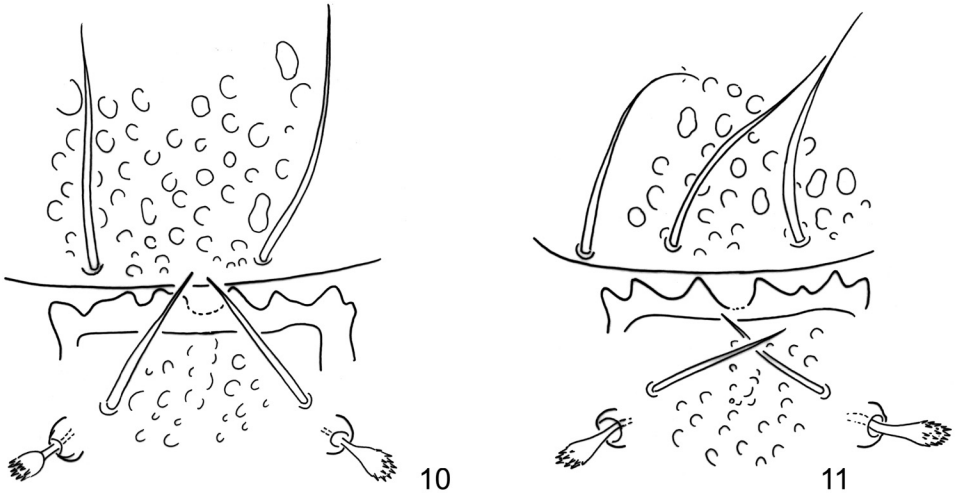
Notogaster. Dorsomedian surface smooth, lateral part partly striated (Fig. 8). Notogastral setae long, not shorter than rostral setae. Some of them (c_3 and p_3) thin, filiform, all others much thicker and blunter. All setae smooth.

Lateral part of podosoma. Bothridial squama well-developed, with a distinct dorsal line.

Ventral parts (Fig. 9). Nine pairs of genital setae present, among them 4 pairs in *kag* position. Three pairs of aggenital setae longer than the preceding genital ones. Anal plates each with one short setae, adanal plates each with three similar setae. All setae in anal region shorter than the aggenital setae. Lyrifissures *iad* located between the ad_2 and ad_3 setae.

Legs. All legs triheterodactylous. Femur I with sharply pointed dorsal spur. Setae *u* on the tarsi II–IV short and wide.

Remarks. The new species belongs to the *O. paraspinosa*-group. It can be distinguished from its related species by the sculpture of the notogaster and by the



Figs 10–11. *Nanhermannia milloti* (BALOGH, 1960) – variation of the prodorsal condyles

three pairs of aggenital setae (see the key of Ethiopian *Oribotritia* taxons by NIEDBAŁA 1998, 2004, 2008).

Etymology. Named after the characteristic prodorsal and notogastral ornamentation.

Nanhermannia milloti BALOGH, 1960
(Figs 10–11)

The newly found and examined specimens surely belong to the species described by BALOGH. But the interlamellar setae are considerably longer and thicker than the one given in the figure of Balogh. At the same time the sensillus possesses a slightly shorter and thicker head. The species is also charecterised by the extraordinarily large basal tubercles (usually 3–4) and the variable foveoles of the notogaster (Figs 10–171).

Tegeocranellus hungarorum sp. n.
(Figs 12–14)

Material examined. Holotype: Malagasy Republic, Vohimana Reserve, primary forest. 17. 04. 2008. Leg. Cs. CSUZDI (Afr-996). Three paratypes from the same sample. Holotype (1769-HO-09) and 2 paratypes (1769-PO–09) in HNHM, 1 paratype in MHNG.

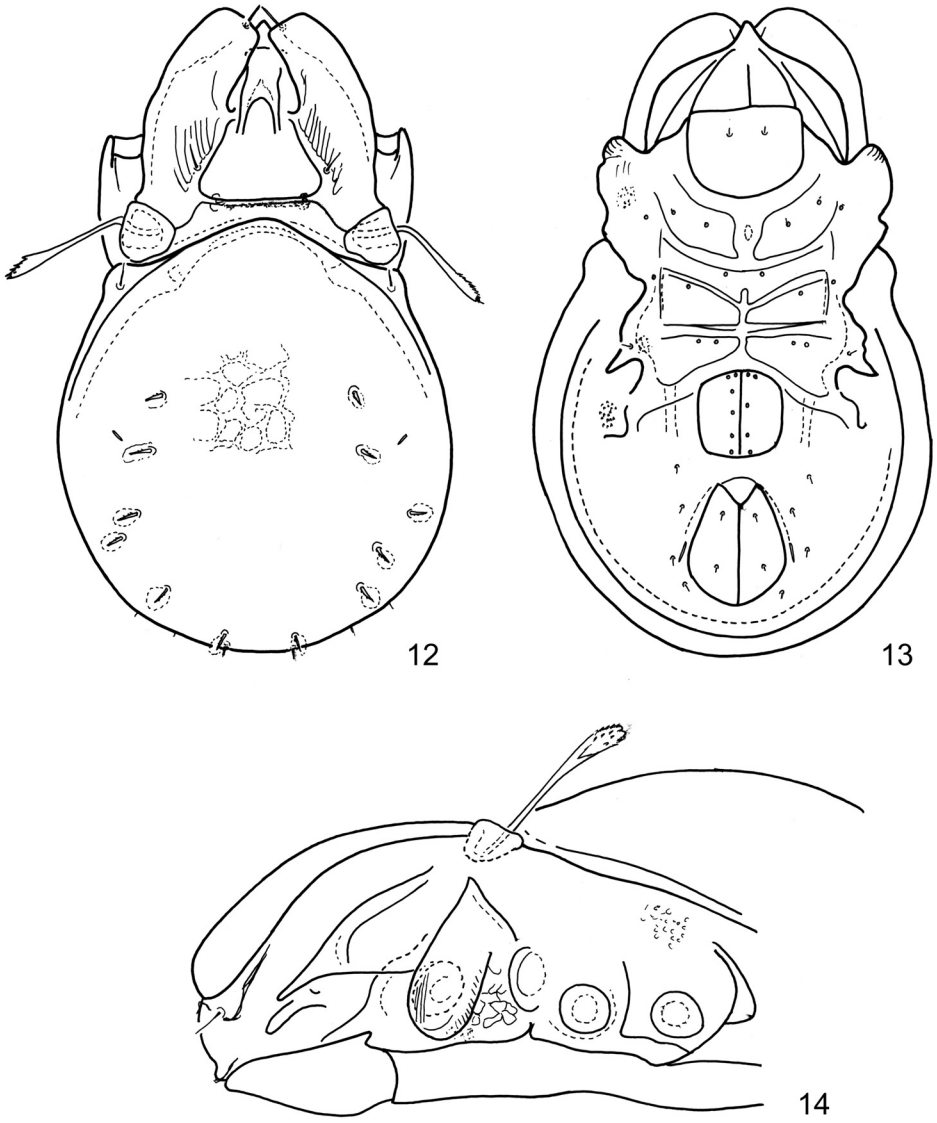
Diagnosis. Rostrum triangular, rostral setae minute, arising laterally. Lamellae wide, located in lateral position, without true cusp. Inner part concave anteriorly, a short part of a translamella present here, a long, transversal costula basally well observable. Between the anterior part of lamellae a characteristic, median, angulate formation also observable. Interlamellar setae arising on lamellar surface. Sensillus fusiform, with long peduncle and short hardly dilated head, directed posteriorly. Anterior notogastral margin convex, a pair of short, rounded humeral processes present. Notogastral surface covered by irregularly polygonated secretion layer. Ten pairs of short notogastral setae, seven pairs of them spiniform, covered by secretion. Three posteromarginal pairs minute. All epimeral setae minute or represent by their alveoli. Apodemes and borders except the sternal one, composing a closed network.

Measurements. Length of body: 227–244 μm, width of body: 151–156 μm.

Prodorsum. Rostral part wide, rostral apex narrow, sharply pointed. Lamellae large, not touching medially, basally connected by a narrow transversal lath, bearing one pair of small tubercles laterally. Lamellar apex absent, its inner margin of the anterior part convex. Lamellar setae arising on the obliquely cut anterior margin. Between the anterior part of the lamellae a peculiar, angular (chair shaped) formation present, with two longitudinal lath ("legs") basally (Fig. 12) running posteriorly. Lamellar surface with longitudinal ribs, interlamellar setae short, arising near to their inner margins

of lamellae. Bothridium large, well framed, sensillus long, directed laterally and posteriorly, with small but distinct head. Surface of head aciculate or barbed.

Notogaster. Anterior notogastral margin convex, behind the bothridia slightly concave. A pair of small humeral apophyses present, setae c_2 arising on its surface. Surface of the notogaster with secretion layer composing an irregular cellular pattern. Ten pairs of short, mostly spiniform, aciculate



Figs 12–14. *Tegeocranellus hungarorum* sp. n.: 12 = body in dorsal view, 13 = body in ventral view, 14 = podosoma in lateral view

notogastral setae, three pairs of them in posteromarginal position thinner and smaller than the others. Median setae covered with secretion like a bulb.

Lateral part of podosoma. Tutorium large, well sclerotised, with long, triangular apex (Fig. 14). A short lath along its apex also present. Pedotecta 1 very large, with sharply pointed spur at its dorsal end, surface with parallel lines. A small field between leg I and II with polygonate ornamentation. Pedotecta 2–3 small, discidium with long process directed backwards.

Ventral parts (Fig. 13). Apodemes and epimeral borders well developed, sternal one interrupted medially, not reaching to the *ap. 2*. *Ap. 4.* very thick, strongly sclerotised, a pair of weaker developed longitudinal laths directed from it posteriorly. A distinct longitudinal lath present laterally framing the 2. and 3. epimeres. All epimeral setae minute, hardly observable, epimeral setal formula 3–1–3–3. Shape of the anogenital region typical for the genus, genital aperture very large. Anogenital setal formula 5 (6)–1–2–3. All setae minute. Lyrifissures *iad* conspicuously long, in adanal position.

Legs. All legs monodactylous. Claws thin, conspicuously long. Tibia of leg III and IV peculiarly curved. Solenidium of φ_1 of leg I and II long, directed backwards. Some dilated setae on genu and femora of legs also observable.

Remarks. The new species is primarily characterised by the presence of interlamellar chair shaped formation and by the irregular polygonal ornamentation of secretion layer on the notogaster. On this basis of these characters the new species is unique among the species of the genus *Tegeocranellus* BERLESE, 1913.

Etymology. Named after the Hungarian researchers working in Madagascar.

Austrocarabodes armatus sp. n.
(Figs 15–21)

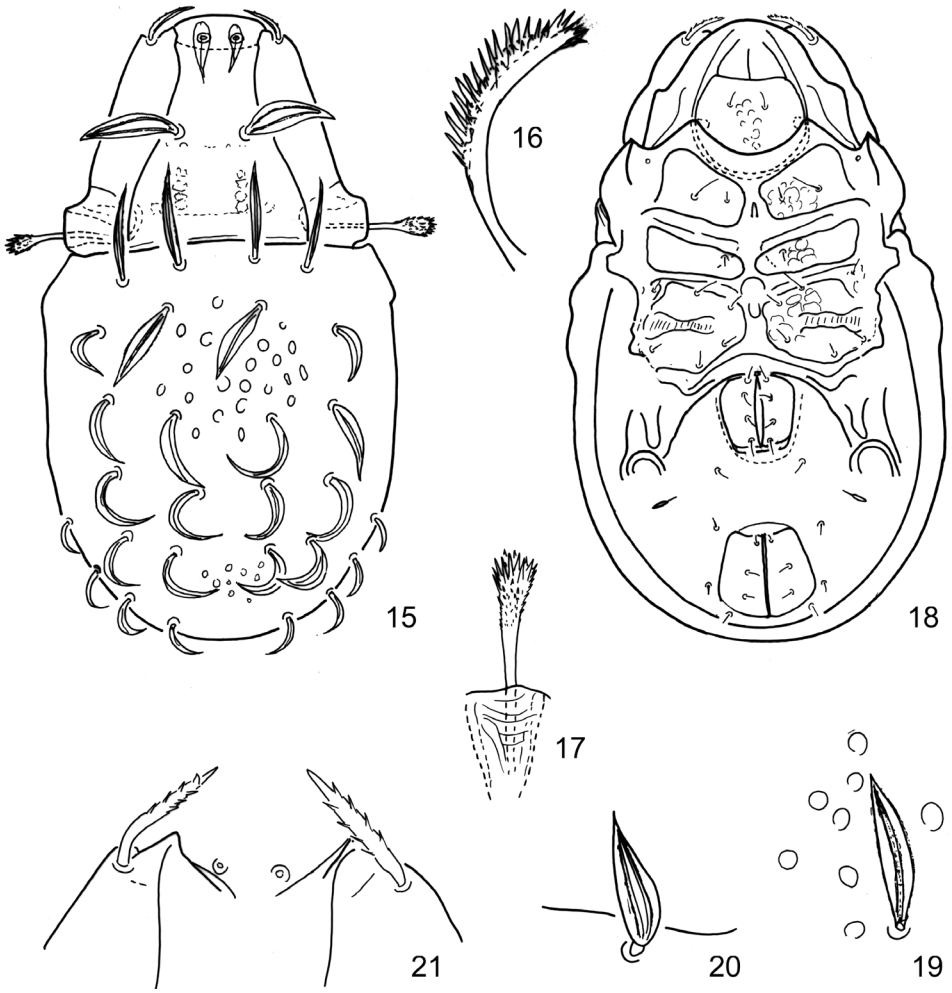
Material examined. Holotype: Malagasy Republic, Vohimana Reserve, primary forest. 17. 04. 2008. Leg. Cs. CSUZDI (Afr-996). 1 paratype from the same sample. Holotype (1770-HO-09) and 1 paratype (1770-PO-09) in HNHM.

Diagnosis. Rostrum widely rounded. Lamellae normal, their cusps slightly rounded, dilated anteriorly bearing spiniform lamellar setae (Fig. 21). Rostral setae also spiniform, directed anteriorly. Interlamellar setae large, phylliform, with 3 veins. Sensillus short, with dilated head, covered by short spines, directed laterally. Notogaster with fourteen pairs of phylliform, large setae, anterior two pairs longer than others and directed forwards. All epimeral setae simple, short. Epimeral borders and apodemes well developed, sejugal borders composing a transversal band. A pair of longitudinal ribs and border running posteriorly along the genital aperture. Anogenital setal formula 4–1–2–3. Lyrifissures *iad* located far from the anal aperture, well observable.

Measurements. Length of body: 373–451 μm, width of body: 208–264 μm.

Prodorsum. Rostrum rounded, lamellae slightly dilated anteriorly, with small obtuse apices. Translamella absent. Interlamellar surface covered by torn secretion layer. Some large maculae present in basal part ordered in two longitudinal rows (Fig. 15). Lamellar setae spiniform, rostral setae phylliform, curved backwards, interlamellar setae (Fig. 18) wide, phylliform, with two veins. Sensillus (Figs 16–17) dilated distally, slightly curved backwards, distinctly barbed.

Notogaster. Anterior notogastral margin hardly convex. Humeral apophyses small, not projected forwards. Notogastral surface ornamented by large, round alveoli, in irregular position. Some of them compose a group posteromedially (Fig.15). Fourteen pairs of phylliform notogastral setae present, all with one veins, their margin roughened or finely aciculate, surface also covered with



Figs 15–21. *Austrocarabodes armatus* sp. n.: 15 = body in dorsal view, 16–17 = sensillus, 18 = body in ventral view, 19 = seta *in*, 20 = seta *da*, 21 = podosoma in anterodorsal view

same aciculae medially. Two pairs of anterior setae (c_1, c_2) directed anteriorly, one pair of them (*da*) longer, four posteromarginal pairs p_1-p_3, h_3 shorter than the median ones.

Lateral part of podosoma. Lamellae with small lateral cusps. Tutorium bifurcate, one crest reaching to the lamellae. Pedotectum I large, with some foveolae.

Ventral parts (Fig. 17). Apodemes and borders typical for the genus, well sclerotised and observable. Sternal region wide, with a punctate field anteriorly and a well-framed, a semicircle field in the sejugal region also punctate. Behind the epimeral borders IV a pair of well-developed longitudinal laths directed backwards, ending in a semicircle formation. Inner surface of the notogaster ornamented by large and irregular polygonal foveolae. All setae in the ventral region conspicuously thin, fine, setiform. All anal and adanal setae also fine and short. Lyrifissures *iad* well-observable, located far from the anal aperture.

Legs: Surface of all segments smooth. Femora of legs III with ventrodistal spur, legs IV with blade-like crest ventrally.

Remarks: The genus *Austrocarabodes* HAMMER, 1966, similarly to the other genera of Carabodidae, can be divided into many species-groups. This division is difficult, however, and will most probably be performed by characteristics other than the ones used now. This idea is backed by the fact that both in the *Carabodes* C. L. KOCH, 1835 and *Austrocarabodes* genera the same characters are used for the separation of subgenera and species-groups. The significance of sculpture is not yet fully discovered, though it can fairly well characterise certain species. As very often the not fully detachable or not adequately torn secretions layer makes its study impossible.

The previously described species is well characterised by the two pairs of anteriorly directed notogastral setae (c_1, c_2), a character which also appears in the genus *Carabodes* (naturally here only one pair composing as a species-group.)

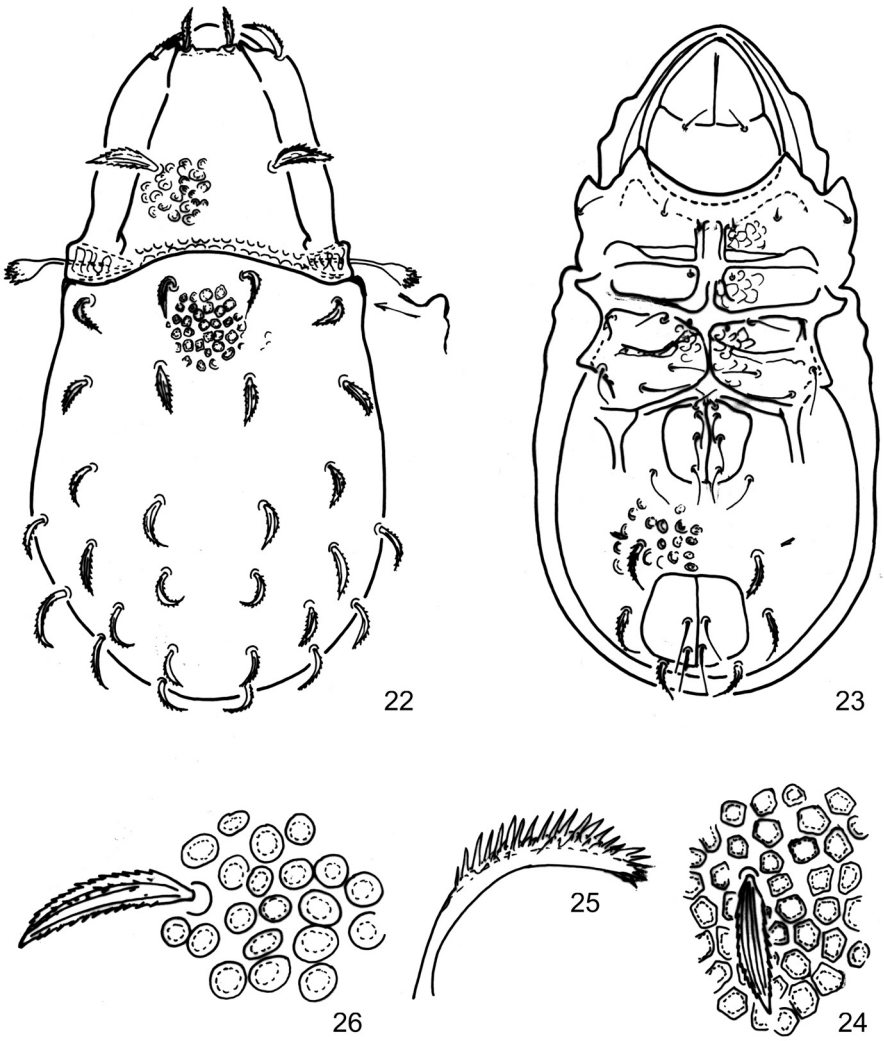
Among the known *Austrocarabodes* species three are similar to the one described here: *A. agressor* BALOGH et MAHUNKA, 1978, *A. erectus* MAHUNKA, 1984, and *A. bellicosus* P. BALOGH, 1988. The new species is distinguishing from all three heretofore ones by the sculpture of the notogaster consisting of rare and irregularly located large foveolae and the form of the dilated sensillus. See also the key of the *Austrocarabodes* species of Madagascar.

Etymology. Named after the two pairs forward directed, pike-like notogastral setae.

Austrocarabodes blancharti sp. n.
(Figs 22–26)

Material examined. Holotype: Malagasy Republic, Vohimana Reserve, primary forest. 17. 04. 2008. Leg. CS. CSUZDI (Afr-996). 1 paratype from the same sample. Holotype (1771-HO-09) and 1 paratype (1771-PO-09) in HNHM.

Diagnosis. Rostrum convex. Lamellae narrow, with distinct inner cusp. A weak translamella present, bearing rostral setae on small tubercles. Rostral and lamellar setae spiniform or slightly phylliform. Interlamellar surface with round pustules covering the whole surface. Interlamellar setae wide, phylliform, with 3 veins. Sensillus short, with dilated, curved head, covered by short spines, directed laterally. Notogaster with fourteen pairs of phylliform, setae, all equal in length. Epimeral borders and apodemes normally developed, bo. 3 not reaching to sternal



Figs 22–26. *Austrocarabodes blancharti* sp. n.: 22 = body in dorsal view, 23 = body in ventral view, 24 = seta *in*, 25 = sensillus, 26 = seta *da*

one. Epimeral setae simple, thin, some of them (*3b, 4a, 4c*) conspicuously long. Anogenital setal formula 4–1–2–3. Anterior adanal setae arising in front of the anterior corner of anal aperture, lyrifissures *iad* located near to them, also anteriorly.

Measurements. Length of body: 400–434 μm, width of body: 200–212 μm.

Prodorsum. Rostrum slightly conical, convex (Fig. 22). Lamellae narrow with long inner cusps. Translamella present, its tubercles bearing narrowed phylliform setae. Rostral and lamellar setae spiniform or phylliform, both pairs well pilose. Whole interlamellar surface covered by distinct, rounded pustules (Fig. 26). Interlamellar setae ciliate, much wider than the rostral ones, arising on the interlamellar surface, directed outwards. Sensillus dilated distally, slightly curved backwards, its head distinctly barbed (Fig. 25).

Notogaster. Anterior notogastral margin slightly convex medially. Humeral apophyses small, directed forwards. Whole surface covered by pustules, which are smaller than the prodorsal ones, and slightly angular (Fig. 24). Fourteen pairs of phylliform notogastral setae present, setae c_1 longer than the posterior ones. All setae well pilose and with three veins.

Lateral part of podosoma. Tutorium weak, simple. Pedotectum I large, with some foveolae.

Ventral parts (Fig. 23). Sternal apodema weakly developed, between the epimeres I likewise between the epimeres II absent or partly reduced. Transversal apodemes and borders, except *bo. 4*, normally developed, *bo. 4* not reaching the sternal apodema. A pair of short longitudinal borders running posteriorly along the genital aperture. Inner part of all epimeral surface ornamented with polygonal sculpture. Epimeral setae thin and simple, their length differing considerably. Setae *1a, 2a, 3a* minute, setae *1b, 3b, 4a, 4b* conspicuously long. Ventral plate with pustules similarly to the notogastral ones. Genital, aggenital setae thin, conspicuously long, anal setae also long, slightly dilated basally. All adanal setae phylliform, well ciliate like to the notogastral setae. Lyrifissures *iad* well visible.

Legs: Surface of all segments smooth. Femora of legs III and IV with ventrodistal spur.

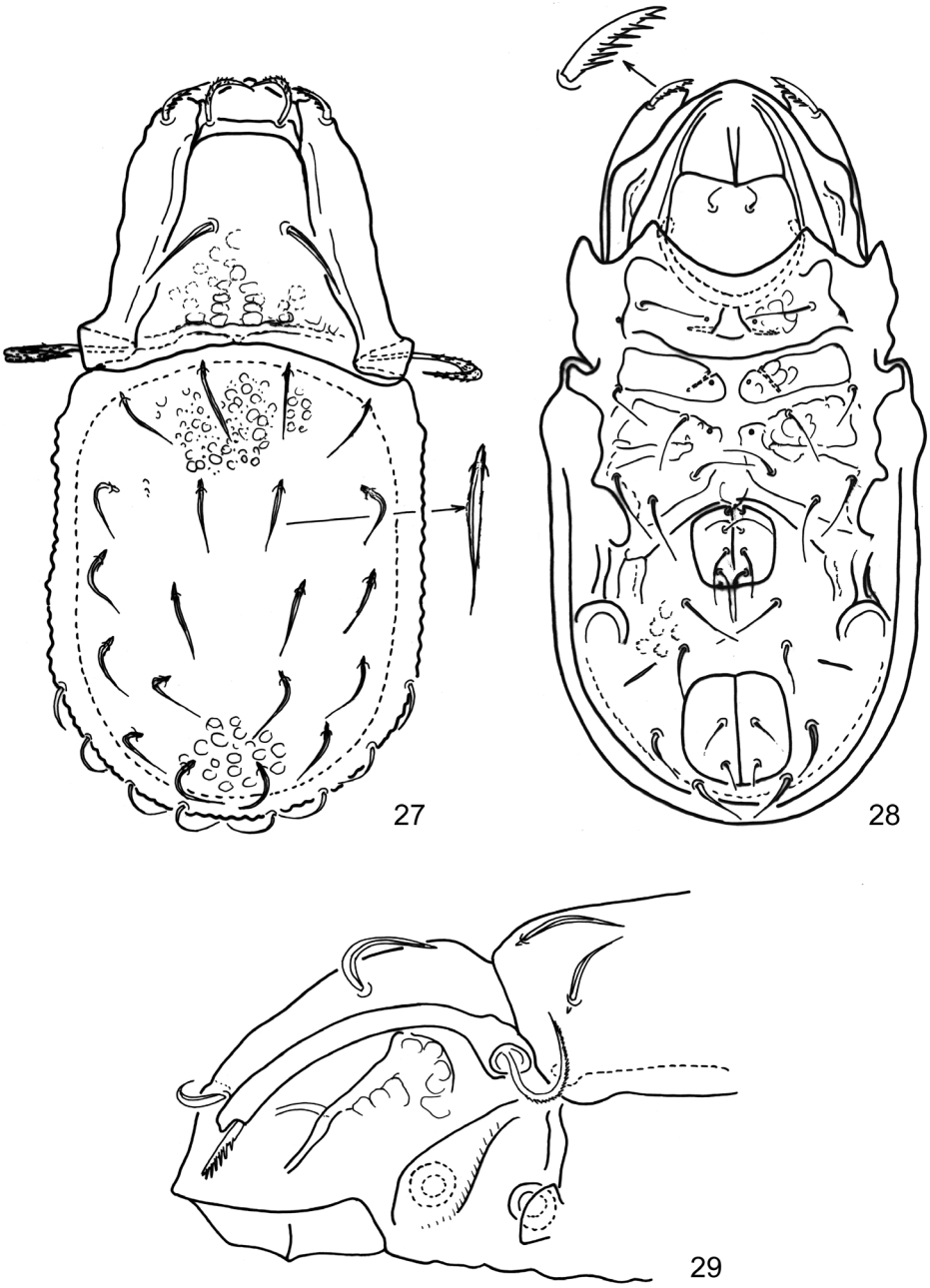
Remarks. The new species is well characterised by the prodorsal and notogastral sculpture and the lamellar apex. These characters were unknown in the heretofore described *Austrocarabodes* species. See also the key of the *Austrocarabodes* species of Madagascar.

Etymology. I dedicate the new species to Dr. ERIC BLANCHART, IRD, Montpellier, organiser of the soil-zoological collection in Madagascar.

Austrocarabodes lateoalveolatus sp. n.
(Figs 27–29)

Material examined. Holotype: Malagasy Republic, Vohimana Reserve, primary forest. 17. 04. 2008. Leg. CS. CSUZDI (Afr-996). Holotype (1772-HO-09) in HNHM.

Diagnosis. Rostrum widely conical. Lamellae normal, their cusps wide, bearing spiniform, serrated lamellar setae. Rostral setae narrow, saliciform, curved medially. Interlamellar setae long, saliciform. Interlamellar region with indistinct pat-



Figs 27–29. *Austrocarabodes lateoalveolatus* sp. n.: 27 = body in dorsal view, 28 = body in ventral view, 29 = podosoma in lateral view

tern, covered by secretion layer. Sensillus long, setiform, with recurved distal end, covered by short barbs. Notogaster surface covered by irregular secretion layer and granules. Under this layer some larger alveoli, composing a posteromarginal group, medially. Fourteen pairs of long, phylliform, narrow setae, except setae on posteromarginal position, all long and asymmetrically T-shaped. Apodemes mostly well-developed, longitudinal and semicircle ribs present along the genital aperture. Epimeral setae, except inner ones, long, setiform. Anogenital setal formula 4–1–2–3. Genital setae very long, simple, aggenital setae similar to them. Adanal setae slightly dilated, like notogastral ones. Anterior adanal setae in preanal position, lyrifissures *iad* located very near to them, also anteriorly.

Measurements. Length of body: 450 μm, width of body: 231 μm.

Prodorsum. Covered by irregular, partly torn secretion layer. Rostral part widely conical, lamellae narrow, with wide, blunt apices bearing spiniform, unilaterally spinose lamellar setae. Translamella present, well-developed, rostral setae phylliform, curved inwards, arising in front of translamella. Interlamellar surface with irregular pattern may consists of secretion. Under secretions layer light spots (maculae) observable (Fig. 27). A transversal crest present basally. Interlamellar setae long, narrowly-phylliform, with one median vein, directed backwards and outwards. Sensillus long, setiform, distinctly pilose, recurved dorsally.

Notogaster. Whole part covered by secretion layer consisting of large and small granules, under this layer a group of large alveoli observable in the posteromedian surface. Fourteen pairs of narrow, phylliform notogastral setae present, their basal part bearing a short, elongate extension, reaching over their insertion (Fig. 27). Among them ten pairs of setae much longer than remaining ones in posteromarginal position. All setae with one median vein, their margin finely roughened.

Lateral part of podosoma (Fig. 29). Tutorium bifurcate, its upper ribs directed to the sensillus. Surface of the pedotectum I smooth.

Ventral parts (Fig. 28). Apodemes and epimeral borders except sternal one, well-developed, sternal apodema reduced anteriorly. Connecting with *bo. 4* a pair of well sclerotised ribs running longitudinally, ending in semicircle transversal crest. Epimeral surface partly ornamented by irregular pattern consisting of mostly rounded fields. Epimeral setae different in length, setae *1a, 1c, 2a* and *3a* minute or represent only their alveoli, others conspicuously long and thin, setiform. Setae *1b* longest of all. Ventral plate with hardly observable, irregular pattern, consisting of round alveoli. Genital and anal plates smooth, genital setae conspicuously long and fine, aggenital setae very long, setiform, anal setae much shorter than aggenital ones. Aggenital setae leaf shaped, similar to notogastral ones, setae ad_3 located in preanal position, near to the very long lyrifissures *iad.*

Remarks. The new species is well characterised by the setiform, recurved sensillus, the form of the setae and the notogastral sculpture. The covered posteromedian alveoli on the notogaster are unique in this species group. See also the key of the Madagascarian species of the genus *Austrocarabodes* HAMMER, 1966.

Etymology. Named after the group of the concealed alveoli in posteromedian position of the notogaster.

Austrocarabodes parapustulatus sp. n.
(Figs 30–32)

Material examined. Holotype: Malagasy Republic, Vohimana Reserve, primary forest. 17. 04. 2008. Leg. Cs. Csuzdi (Afr-996). 8 paratypes from the same sample. Holotype (1773-HO-09) and 6 paratypes (1773-PO-09) deposited in HNHM, 2 paratypes in MHNG.

Diagnosis. Body narrow, much longer than wide. All dorsal setae small, widely-phylliform, covered by long spines. Sensillus gradually dilate, with unilaterally, distinctly barbed distal end. Anterior part of notogaster smooth, posterior part distinctly pustulate, notogastral surface ornamented by small pustules, in irregular position, sometimes the pustules composing a polygonal sculpture. Epimeral setal formula: 3–1–3–3. Setae *1a*, *2a* and *3a* very short or minute. Apodemes and epimeral border strongly sclerotised. Sternal border with ring-shaped formation. Genitoanal setal formula: 4–1–2–3. All ventral setae fine, short, setiform. Lyrifissures *iad* located far anteriorly.

Measurements. Length of body: 439–478 μm, width of body: 208–226 μm.

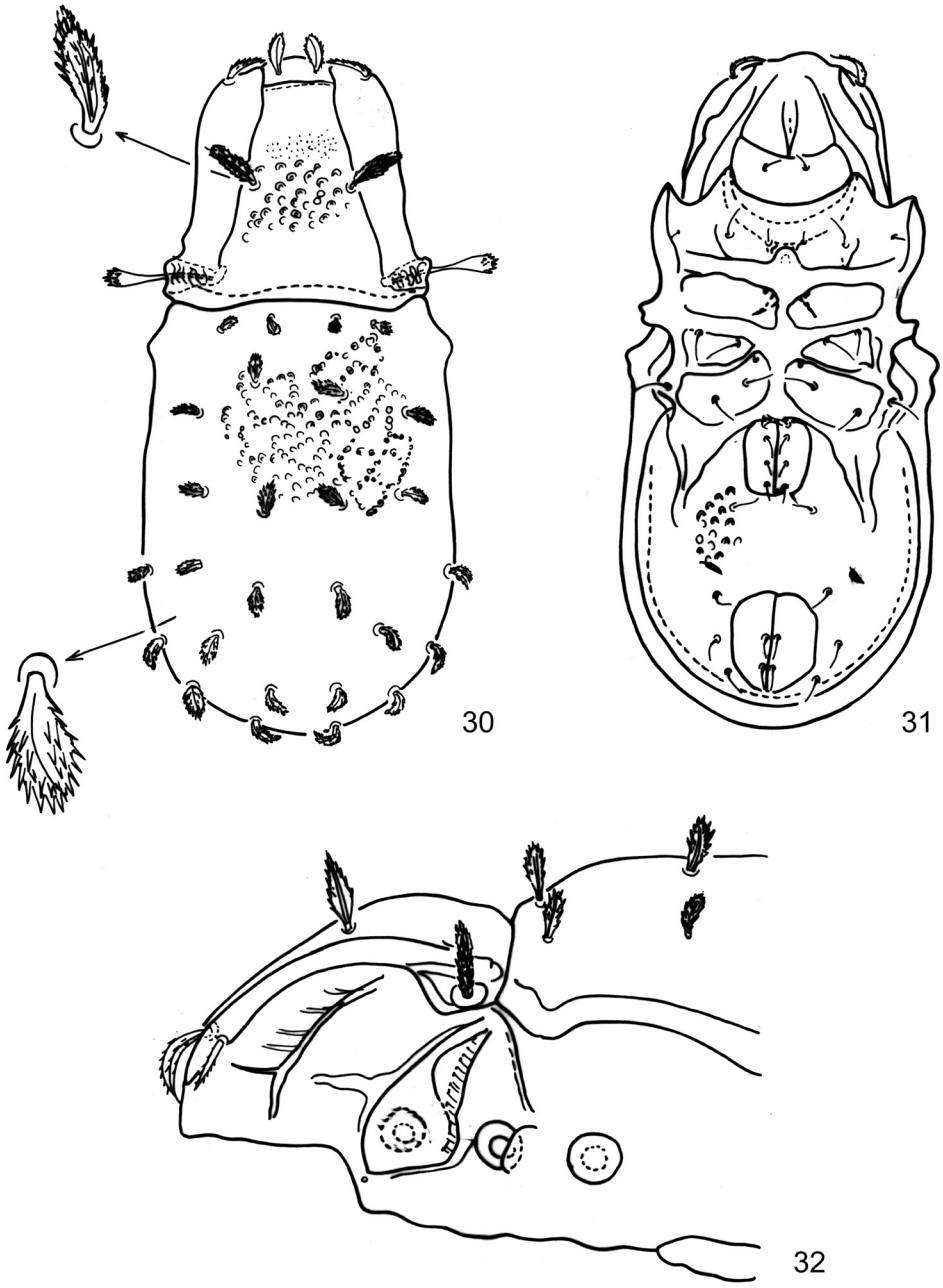
Prodorsum. Rostrum wide, rounded. Lamellae also wide, with small apices laterally, bearing ciliated and dilated lamellar setae. An indistinct translamella present. Rostral setae phylliform, with distinct vein, arising near to translamella. Lamellar surface smooth, prodorsal surface finely punctuate or smooth anteriorly, covered with ring-shaped pustules in basal part. Interlamellar setae widely-phylliform, aciculate, directed outwards, located on the prodorsal surface, near to the lamellae. Sensillus short, with dilate, slightly curved backwards, densely barbed head.

Notogaster. Elongate. Anterior notogastral margin slightly convex, a pair of small humeral process present. Notogastral surface covered by sparsely pustules in irregular, polygonate pattern. Pustules much smaller than the similar ones in notogaster surface. Fourteen pairs of short, well dilate notogastral setae, all nearly equal in size covered with long and strong spiniform aciculae bearing one median vein each (Fig. 31).

Lateral part of podosoma (Fig. 32). Tutorium narrow, without true apex, with some irregular crests directed to the lamellae. Pedotecta I large, acetabulum of leg I completely covered, strongly excavated basally. Pedotectum II–III small, rounded.

Ventral parts (Fig. 31). Epimeral region with well sclerotised structure, apodemes and borders composing a closed network. Sternal apodema well-developed. Behind the epimeral borders IV a pair of well-developed longitudinal laths directed backwards. Semicircle ribs absent. Surface of the subcapitulum smooth, epimeral surface with hardly observable polygonal pattern. Ventral, genital and anal plates smooth. Epimeral setae conspicuously varying in length, setae *1a*, *1c*, *2a* and *3a* very short or minute, setae *1b* longest of all, setae *3b*, *3c, 4a – 4c* nearly equal in length. All setae thin and smooth. Genital, anal and adanal setae normal. Lyrifissures *iad* located far anteriorly from the anal openings.

Remarks. The new species is well characterised by the prodorsal or notogastral sculpture, by the semicircle formation on sternal borders and the shape of dorsal setae. This combination of characters was hitherto unknown in the genus



Figs 30–32. *Austrocarabodes lateoalveolatus* sp. n.: 30 = body in dorsal view, 31 = body in ventral view, 32 = podosoma in lateral view

Austrocarabodes HAMMER, 1966. See also the key of the *Austrocarabodes* species of Madagascar.

Etymology. Named after the pustulate posterior part of prodorsum and the indistinct postulate notogaster.

Austrocarabodes pustuloreticulatus sp. n.
(Figs 33–39)

Material examined. Holotype: Malagasy Republic, Vohimana reserve, primary forest. 17. 04. 2008. Leg. Cs. CSUZDI (Afr-996). 8 paratypes from the same sample. Holotype (1774-HO-09) and 6 paratypes (1774-PO-09) deposited in HNHM, 2 paratypes in MHNG.

Diagnosis. Narrow, elongated body. All dorsal setae short, widely-phylliform. Sensillus gradually dilate, with distinctly barbed, curved distal end. Interlamellar surface pustulate, notogastral surface reticulate. Light spot on humeral region. Epimeral setal formula: 3–1–3–3. Setae *1b* conspicuously long. Sternal border with ring-shaped formation. Genitoanal setal formula: 4–1–2–3. Genital, aggenital and anal setae setiform, simple, adanal setae slightly widened, its margin roughened or finely aciculate.

Measurements. Length of body: 439–478 μm, width of body: 208–226 μm.

Prodorsum. Rostrum wide, rounded. Its apical part projecting anteriorly. Lamellae also wide, with small apices laterally, bearing serrate and ciliate, dilated lamellar setae. An indistinct translamella present. Rostral setae phylliform, with 2 veins, arising near to translamella, on the rostral part of prodorsum. Lamellar surface smooth, interlamellar surface covered with ring-shaped alveoli (Fig. 34). Interlamellar setae located clearly on the interbothridial surface, near to the lamellae. They are long, saliciform, aciculate, directed outwards. Sensillus (Fig. 36) short, with distinct asymmetrically curved head. They are also covered with thick barbs asymmetrically.

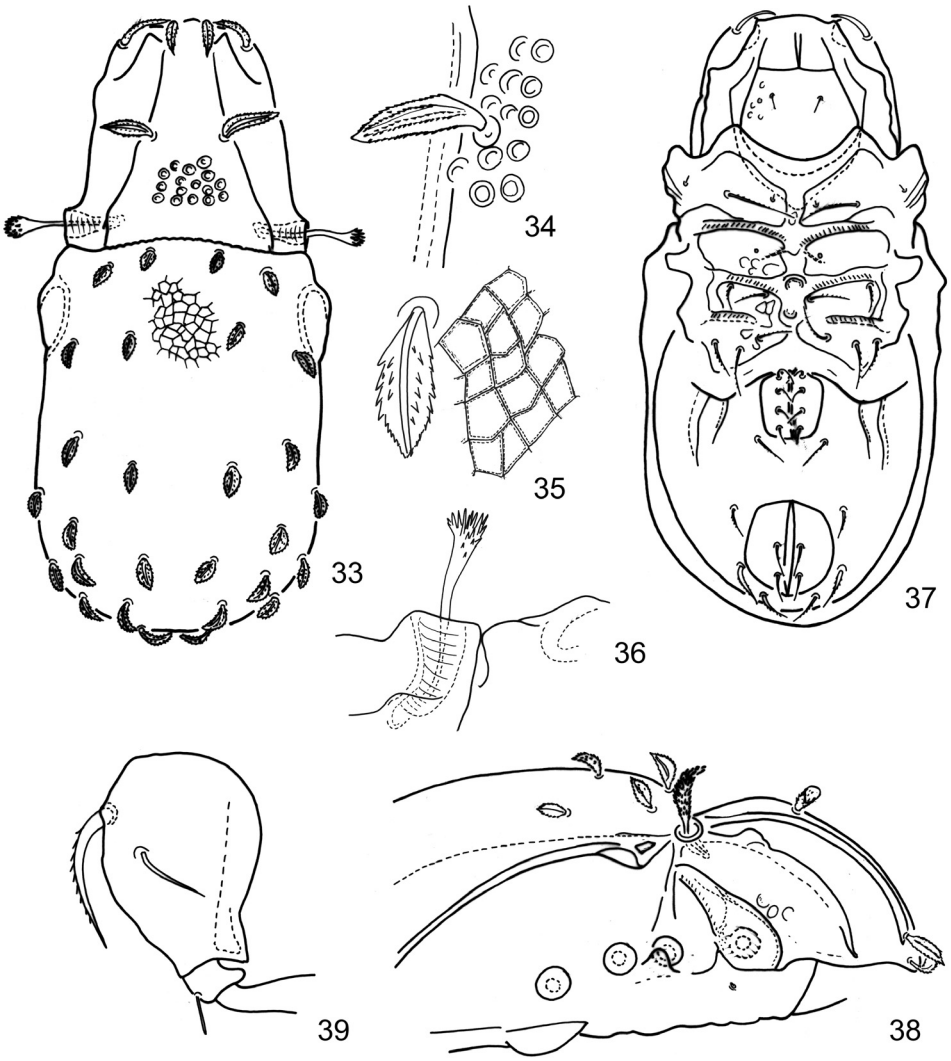
Notogaster. Elongate. Anterior notogastral margin convex, a pair of very visible, triangle humeral process and a pair of light field visible behind them present. Notogastral surface, except sejugal part, covered by distinct polygonate pattern (Fig. 35). Its lines distinct, thin and simple, composing a closed network. Fourteen pairs of short, well dilate notogastral setae, all nearly equal in size covered with acicules, bearing two veins each.

Lateral part of podosoma (Fig. 38). Tutorium narrow, without true apex. Lateral surface of the prodorsum with 3–4 large spots. Pedotecta I also large, completely covered acetabulum of leg I. Pedotectum II–III small, rounded.

Ventral parts (Fig. 37). Epimeral region with well sclerotised structure, apodemes and borders compose nearly a closed network. Sternal apodema with semicircle formation in the sejugal region. Behind the epimeral borders IV a pair of well-developed longitudinal laths directed backwards, semicircle crests absent. Subcapitulum distinctly foveolate, epimeral surface with weak polygonal pattern. Ventral, genital and anal plates smooth. Epimeral setae conspicuously varying in length, setae *1a, 1c, 2a* very short or minute, setae *1b* longest of all, setae *3a, 3b, 4a – 4c* nearly equal in length. All

setae, except the minute ones, well pilose or aciculate. Genital, anal and aggenital setae normal, setiform, adanal ones slightly dilate.

Remarks. The new species is well characterised by the prodorsal and notogastral sculpture, the semicircle formation on sternal borders and the shape of dorsal setae. This combination of characters was hitherto unknown in the genus *Austro-*



Figs 33–39. *Austrocarabodes pustuloreticulatus* sp. n.: 33 = body in dorsal view, 34 = setae *in,* 35 = seta *da*, 36= sensillus, 37 = body in ventral view, 38 = podosoma in lateral view, 39 = femur III

carabodes HAMMER, 1966. A similar polygonate pattern is known in *A. lunaris* (BALOGH, 1962), however, the sensillus is in *lunaris* is setiform and long (short and dilated in the new species). See also the key of the *Austrocarabodes* species of Madagascar.

Etymology. Named after the different prodorsal and notogastral sculpture.

IDENTIFICATION KEY TO THE MADAGASCARIAN *AUSTROCARABODES* HAMMER, 1966 SPECIES

1 (8) Sensillus with well dilated, asymmetrically curved, unilaterally barbed, distinct head

2 (3) Notogastral surface with polygonate sculpture. – Prodorsal surface with pustules **A. pustuloreticulatus** sp. n.

3 (2) Notogastral surface with small tubercles, pustules or other rounded features

4 (5) Whole notogastral surface covered with pustules. – Anogenital setae large, phylliform, like the notogastral ones **A. blancharti** sp. n.

5 (4) Notogastral surface covered by pustules or small tubercles ordered in polygonal pattern

6 (7) Two anterior pairs (c_1, c_2) of notogastral setae directed anteriorly. – Notogastral surface with large alveoli located in irregularly positions. Notogastral setae large, phylliform, curved **A. armatus** sp. n.

7 (6) All notogastral setae equal in direction and shape. – Notogastral surface covered by irregular tubercles and pustules, notogastral setae short and wide **A. parapustulatus** sp. n.

8 (1) Sensillus long, setiform or hardly dilated medially, symmetrical, recurved dorsally and distinctly pilose

9 (10) Notogastral surface with small tubercles, ordered in polygonal pattern. – Notogastral setae very wide *A. mixtus* MAHUNKA, 1996

10 (9) Notogastral surface with other ornamentation. Notogastral setae thin

11 (12) Notogastral surface with distinct polygonal pattern. – Anterior notogastral margin strongly convex. Notogastral setae saliciform *A. lunaris* (BALOGH, 1962)

12 (11) Notogastral surface pustulate or punctate. – Notogastral setae bacilliform

13 (14) Notogastral surface distinctly tuberculate or pustulate. – Ventral plate with angular crest *A. cellularis* (BALOGH, 1962)

14 (13) Notogastral surface punctulate. – Notogastral setae thin. Ventral plate without angular crest *A. albidus* (BALOGH, 1960)

Rugoppia boraha MAHUNKA, 1994
(Figs 40–42)

Material examined. Holotype: Malagasy Republic, Vohimana Reserve, primary forest. 17. 04. 2008. Leg. Cs. CSUZDI (Afr-996).

Among the specimens found in a single sample there are considerable differences regarding the length of setae (first of all in the notogastral setae), and also in the strength of the epimeral-ventral sculpture. The number of the branches of the pectinate sensillus is also different. On the more sclerotised specimens more (6–7), on the less sclerotized specimens only 5 side-branches are visible.

Measurements. Length of body: 305–357 μm, width of body: 162–186 μm.

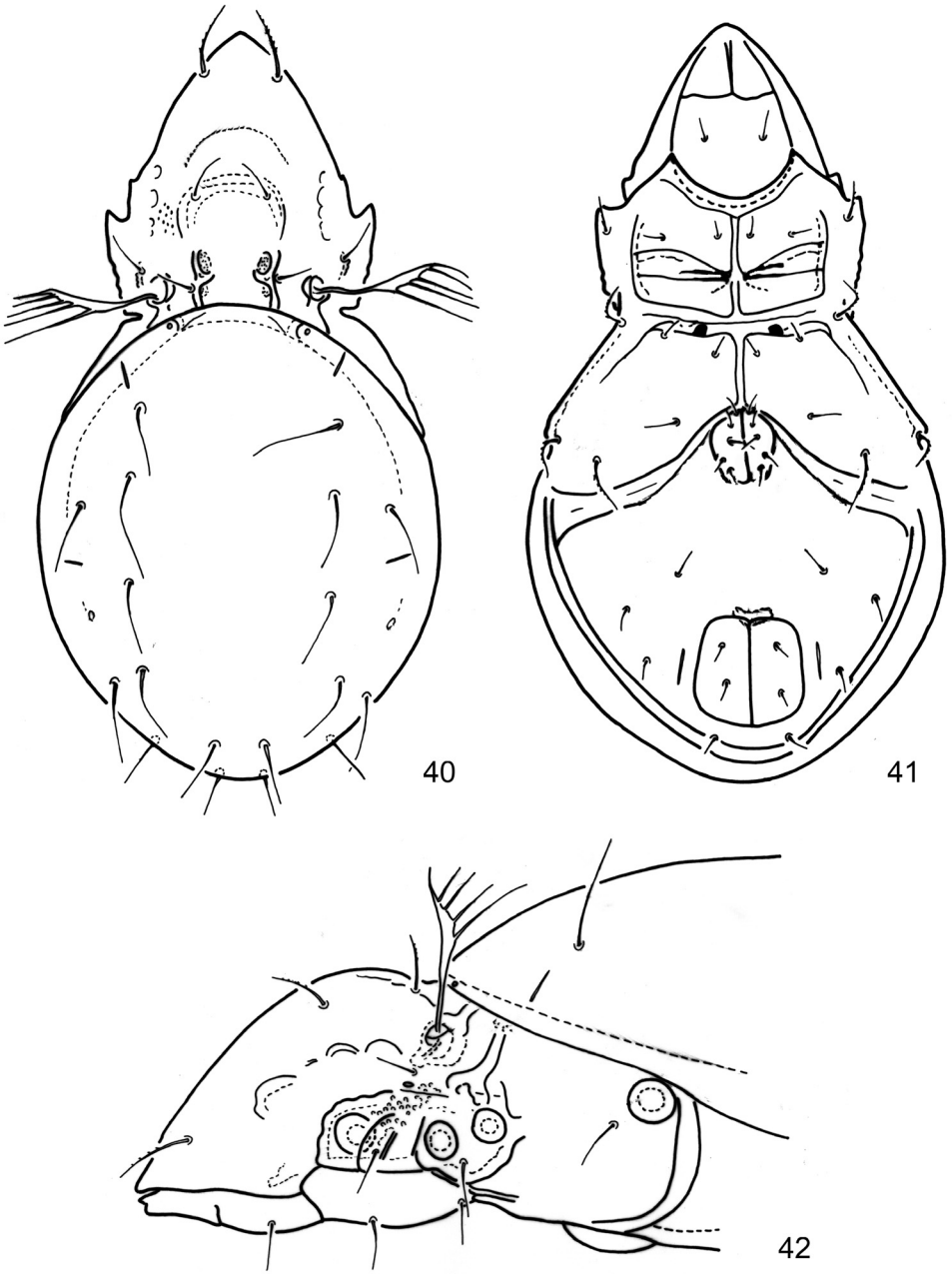
Parasuctobelba vohimana sp. n.
(Figs 43–45)

Material examined. Holotype: Malagasy Republic, Vohimana Reserve, primary forest. 17. 04. 2008. Leg. Cs. CSUZDI (Afr-996). 1 paratype from the same sample. Holotype (1775-HO-09) and paratype (1775-PO-09) deposited in HNHM.

Diagnosis. Rostrum elongated, rostral margin smooth. Tectopedial field indistinct, lamellar knob small, narrow, oblong. Interbothridial field very large, bothridial lobe distinct. Sensillus with large, aciculate head. Two pairs of conspicuously large notogastral condyles present. Notogastral sigillum finely punctuate, indistinct. Ten pairs of notogastral setae present. Epimeral region strongly sclerotised, epimeres well framed, but not touching medially. Two pairs of strong tubercles present on the posterior borders. Epimeral setal formula: 3–1–3–3, Genito-anal setal formula: 5–1–2–3.

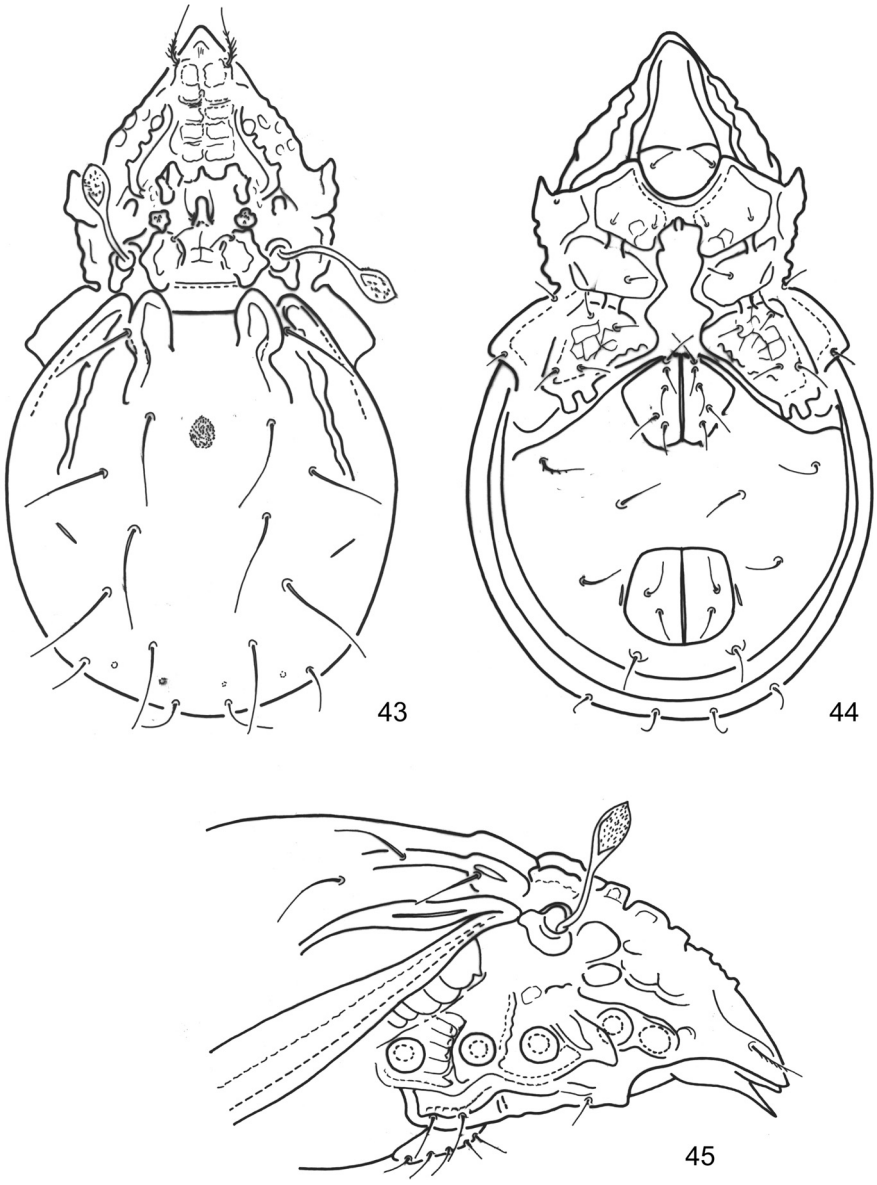
Measurements. Length of body: 236–247 μm, width of body: 134–140 μm.

Prodorsum. Rostral apex elongate, conical. Dorsal surface of the whole prodorsum strongly sclerotised. Lateral margin of prodorsum smooth, lateroprodorsal pattern observable. Rostral setae setiform, well pilose. Behind them 5 pairs of angular field present (Fig. 43), lateral margin of



Figs 40–42. *Rugoppia boraha* MAHUNKA, 1994: 40 = body in dorsal view, 41 = body in ventral view, 42 = podosoma in lateral view

tectopedial field distinct, median ones indistinct. Along the lamellar knob two pairs of tubercles present, both in opposite position. Lamellar knob narrow, small, oblong, lamellar setae arising at its basis. Interbothridial field very large, bearing interlamellar setae. Bothridium large with large bothridial lobe. Sensillus long, its head large, well dilate, surface aciculate.



Figs 43–45. *Parasuctobelba vohimana* sp. n.: 43 = body in dorsal view, 44 = body in ventral view, 45 = podosoma in lateral view

Notogaster. Dorsosejugal region with two pairs of conspicuously large condyles (Fig. 43). Median pair larger than lateral one, well dilated, rounded anteriorly. Lateral one slightly smaller, both pairs with long laths directed posteriorly. Lateral ones waved, an unpaired oval sigillum present between them. Its surface finely punctuate. Ten pairs of notogastral setae, among them six anterior pair much longer than the others.

Lateral part of podosoma (Fig. 45). Lateral margin of prodorsum smooth. Both pairs of notogastral condyles with loop, including a slit-shaped formation medially.

Ventral parts (Fig. 44). Epimeral region strongly and conspicuously sclerotised. All apodemes and borders, as well as secondary laths in lateral part of epimeres visible. Epimeres not touching medially, ending far from each other, therefore sternal apodema absent, sternal field wide. *Bo. 2*, *bo. sej.* with transversal, bridge-like crests. Last epimeral borders (*bo. 4*) wide, double, with two pairs of large, angular tubercles directed posteriorly. Surface of epimeres 3–4 ornamented with very fine polygonal pattern. Epimeral setae short, simple. Five pairs of long genital setae present, all nearly equal in length and arising in two longitudinal rows. Adanal setae slightly longer than the anal ones, setae ad_1 arising on small tubercles, setae ad_3 located far anteriorly. All three pairs with some fine cilia.

Legs. All normal suctobelboid type.

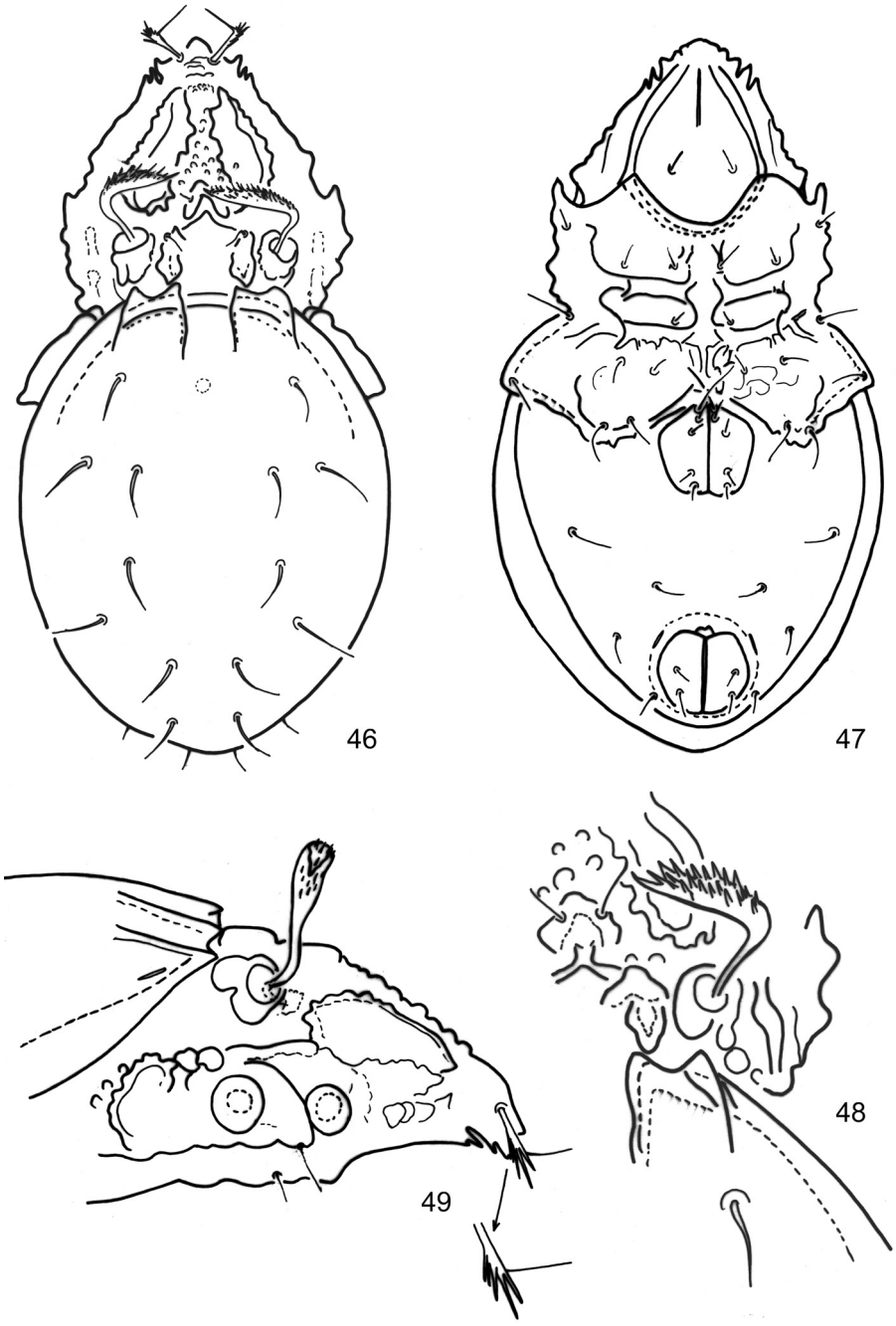
Remarks. The system of the family Suctobelbidae JACOT, 1938 is not well elaborated, nearly confuse, therefore the ranging of a new species sometimes is very problematic. In this case we relegate the new species to the genus *Parasuctobelba* HAMMER, 1977, however, this genus is not related to *Fenestrobelba* BALOGH, 1970, as indicated by SUBÍAS (2008). The new species is primarily characterised by the prodorsal sculpture, by the rounded form of the notogastral condyles, and by the punctuate notogastral sigillum. On this basis is closely related to *Parasuctobelba tricornuta* (MAHUNKA, 1989). However, in the form of its rostral setae and sensillus, in its longer posterior lath of the notogastral condyles and in the two pairs of large tubercles on the posterior epimeral borders the new species is distinct from its relatives.

Etymology. Named after its origin in Madagascar.

Suctobelbella duplicondyla sp. n.
(Figs 46–49)

Material examined. Holotype: Malagasy Republic, Vohimana Reserve, primary forest. 17. 04. 2008. Leg. CS. CSUZDI (Afr–996). Holotype (1776-HO-09) and paratype (1776-PO-09) deposited in HNHM.

Diagnosis. Rostrum wide medially, slightly convex. Tectopedial fields well framed, their inner margin conspicuously serrate, some distinct tubercles present between them. Lamellar knob triangular. Interbothridial field large, bothridial lobe distinct. Sensillus with large, asymmetrical barbed head. Two equal in length and



Figs 46–49. *Suctobelbella duplicondyla* sp. n.: 46 = body in dorsal view, 47 = body in ventral view, 48 = lateral part of prodorsum, 49 = podosoma in lateral view

wide notogastral condyles present. Nine pairs short and thick notogastral setae present. Epimeral region well sclerotised, epimeres well framed, not touching medially. Two or three large tubercles present on the posterior borders. Epimeral setal formula: 3–1–3–3, genito-anal setal formula: 5–1–2–3.

Measurements: Length of body: 181 μm, width of body: 98 μm.

Prodorsum. Rostral apex widely rounded, slightly convex. Rostral teeth large, triangular, their anterior margin concave. Rostral incisure wide, behind them two sharply pointed accessory teeth present. Rostral rib indistinct, some transversal ribs present in this position. Dorsal surface well sclerotised. Lateral margin of prodorsum smooth, lateroprodorsal pattern not observable. Lateral margin of tectopedial field distinct, wide, median ones narrower and conspicuously serrate. Lamellar knob triangular, wide, in front of it, some tubercles present between the tectopedial fields. Lamellar setae short, arising at its basis. Rostral setae geniculate, their basal part with 3, conspicuously large, spiniform bristles. Interbothridial field very large, bearing interlamellar setae. Bothridium also large with elongated bothridial lobe. Sensillus short, its head large, asymmetrically dilate, its dorsal surface distinctly aciculate (Fig. 48).

Notogaster. Anterior margin of notogaster with two pairs of conspicuously large condyles, lateral and median ones connected with each other (Fig. 46) and both pairs bearing two longitudinal ribs in their median and lateral margin, directed posteriorly. All condyles sharply pointed anteriorly. Median sigillum not observable. Nine pairs of notogastral setae, among them seven anterior pair much longer and stronger than the two posteromarginal ones.

Lateral part of podosoma (Fig. 49). Lateral margin of prodorsum smooth, some polygonal fields on lateral part. Two large tubercles and a longitudinal crest also present.

Ventral parts. Epimeral region well sclerotised. Conspicuously wide, with some short ridges on sejugal borders, which are directed posteriorly. Epimeres partly touching medially, sternal apodemes absent. Epimeres I and II ending far from each other, sternal field wide. Epimeral borders of *bo. 2* with transversal, bridge-like crests. Last epimeral borders (*bo. 4*) wide, with two to three of large, tubercles directed posteriorly. Surface of epimeres 3–4 ornamented with very fine polygonal pattern. Epimeral setae short, simple. Five pairs of genital setae present, anterior ones longest of all, others nearly equal in length. Aggenital setae longer than the anal and adanal ones, setae ad_1 arising at the posterior corner of the anal plates. Setae ad_3 located far anteriorly.

Remarks. The new species is primarily characterised by the form of the characteristically connected, equally large sejugal condyles with two marginal ribs directed posteriorly. It is also well characterised by the notogastral setae, the tubercles between the tectopedial fields and the shape of the sejugal and posterior borders of the epimeral region. These and some other characteristics are unique in the genus *Suctobelbella* and in the related genera.

Etymology. Named after it's peculiarly, connected sejugal condyles.

Hymenozetes csuzdii sp. n.
(Figs 50–52)

Material examined. Holotype: Malagasy Republic, Vohimana Reserve, primary forest. 17. 04. 2008. Leg. Cs. CSUZDI (Afr-996). Holotype (1777-HO-09) in HNHM.

Diagnosis. Rostrum straight, without apex, rostral setae arising laterally. Lamellae wide, with sharp lateral cusp, its median part thin, framed by a curved transversal lath basally. All prodorsal setae flagellate. Sensillus setiform, directed posteriorly. Anterior notogastral margin convex, pteromorphae tongue-shaped, rounded. Seven pairs of notogastral setae short, wide with strong spines. Sejugal apodemes well, all other much weaker developed. Epimeral and genital setae simple, mostly smooth. Shape of the adanal setae similar to the notogastral ones.

Measurements. Length of body: 385 µm, width of body: 330 µm.

Prodorsum. Rostral part very wide, without apex, straight anteriorly. Rostral setae arising on small tubercles, very far from each other. Lamellae very wide, with overlapping two parts, covering the whole prodorsal surface. Its inner apex absent, straight anteriorly, outer apex well-developed, curved inwards (Fig. 50). A small basal part of the prodorsum behind transversal band seems to be free. Insertion of lamellar setae covered by the lamellae, interlamellar setae flagellate, arise on transversal band. Sensillus directed outwards and backwards, its distal end slightly dilated, unilaterally distinctly barbed.

Notogaster. Anterior notogastral margin convex, pteromorphs without teeth laterally. Dorsal surface of notogaster smooth. Nine pairs of notogastral setae present, eight pairs of them very thick, only setae *la* thinner than the others. All setae spiniform covered by long spines or barbs, like a Christmas-tree (Fig. 50). Posteromarginal setae very short, hardly observable.

Lateral part of podosoma. Tutorium very large, with rounded apex (Fig. 52). Its surface with short wrinkles or ribs anteriorly. Pedotecta I and discidium very large. Pteromorpha linguliform, long, rounded distally.

Ventral parts (Fig. 51). Epimeral region except the posterior border (*bo. 4*) without typical apodemes or borders. Epimeral borders (*bo. 4*) a wide transversal band, in front of the genital aperture, bearing a pair of well-developed protuberances near to the genital plates. All epimeral setae thin and simple, their length varying, setae *1a, 1c, 2a* and *4c* very short, all others much longer.

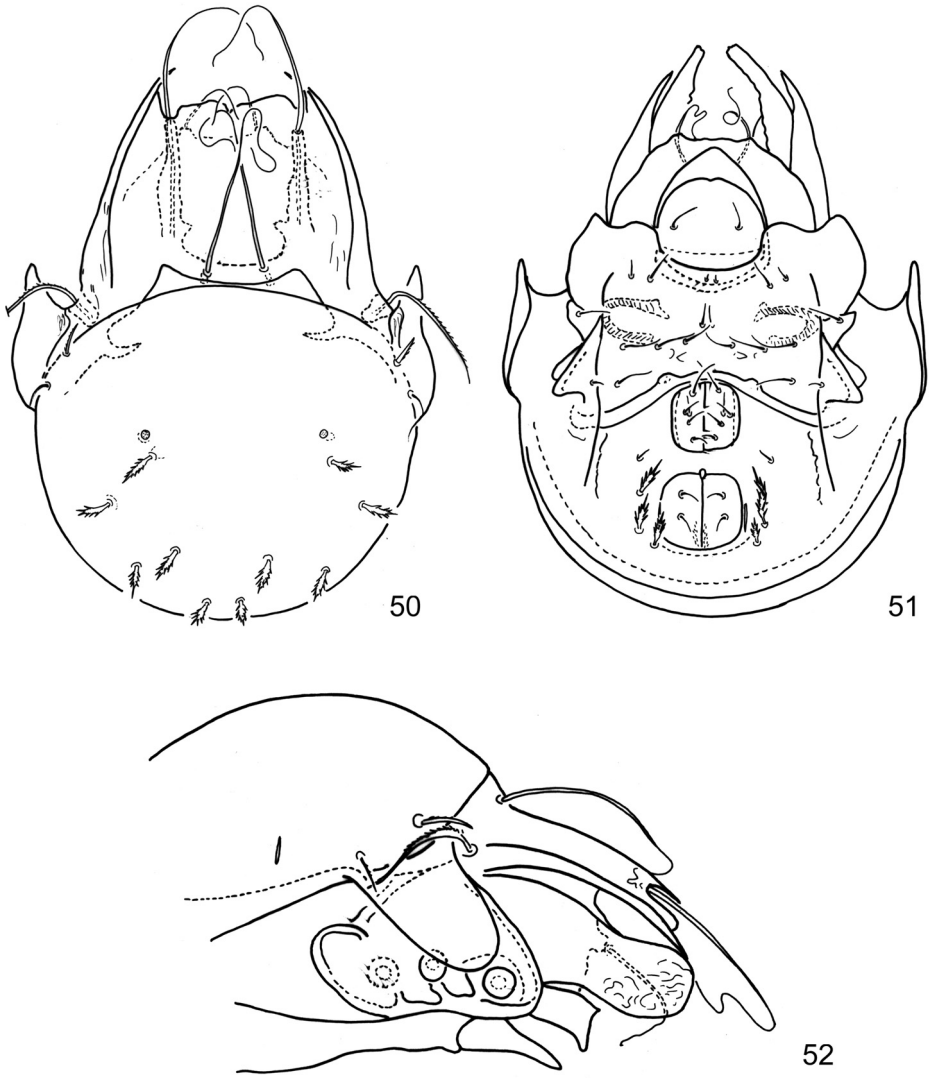
Remarks. The new species is well characterised first of all by the shape of the notogastral setae and by the absence of the median apex of lamellae. On the basis of the Christmas-tree-shaped notogastral setae, the new species is closest to *Hymenozetes verticillatus* MAHUNKA, 1997, however, the notogastral setae of the new species are much shorter than in *H. verticillatus*. See also the key for *Hymenozetes* BALOGH, 1962 species.

Etymology. I dedicate the new species to my friend Dr. CSABA CSUZDI, the curator of the earthworm collection of the Hungarian Natural History Museum and professor of the Eötvös Loránd University, Budapest, who collected many very interesting soil samples over the world.

IDENTIFICATION KEY FOR THE HYMENOZETES SPECIES

1 (6) Median lamellar apex absent or short, straight anteriorly. Outer lamellar apices spiniform or setiform

2 (3) Notogastral setae short, simple, setiform. Rostral setae stellate
H. stellifer MAHUNKA, 1999



Figs 50–52. *Hymenozetes csuzdii* sp. n.: 50 = body in dorsal view, 51 = body in ventral view, 52 = podosoma in lateral view

3 (2) Notogastral setae with long cilia, Christmas-tree-shaped. Rostral setae simple, flagellate

4 (5) Notogastral setae short, thick. Adanal setae similar in shape
H. csuzdii sp. n.

5 (4) Notogastral setae much longer, spiniform. Adanal setae simple
H. verticillatus MAHUNKA, 1997

6 (1) Median lamellar apex present, longer than the outer one or widely spiniform

7 (8) Median and outer lamellar apex long, nearly equal in length
H. mirabilis BALOGH, 1962

8 (7) Median lamellar apex short, much shorter than the lamellar one

9 (10) Interlamellar region reticulate. Tutorium widely rounded
H. reticulatus MAHUNKA, 1996

10 (9) Interlamellar region smooth. Tutorium sharply pointed
H. quadricornutus MAHUNKA, 1993

Vilhenabates dissecatus sp. n.
(Figs 53–56)

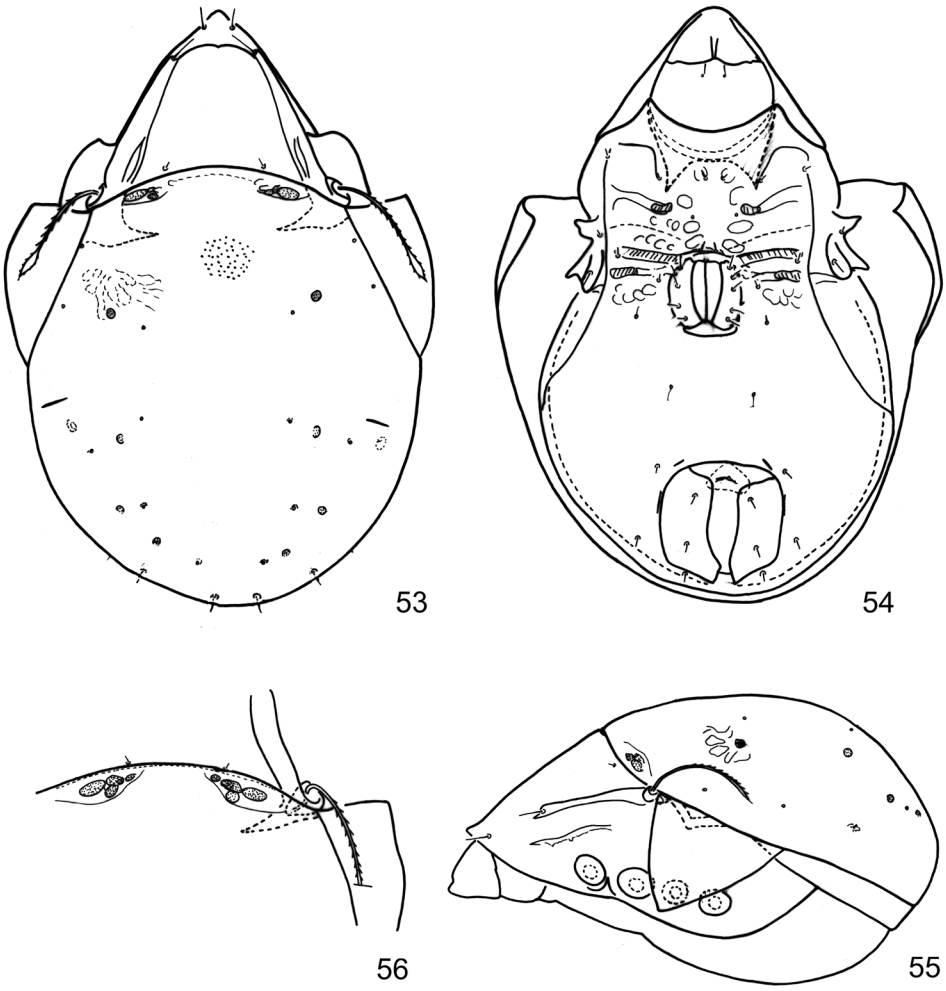
Material examined. Holotype: Malagasy Republic, Vohimana reserve, primary forest. 17. 04. 2008. Leg. CS. CSUZDI (Afr-996). 2 paratypes from the same sample. Holotype (1778-HO-09) and 1 paratype (1778-PO-09) in HNHM, 1 paratype in MHNG.

Diagnosis. Rostrum conical, rostral apex pointed. Lamellae long, dilated anteriorly, lamellar cusp small, translamella convex, weakly developed. Rostral and lamellar setae simple, straight, lamellar ones ending far from the insertion of rostral setae. Interlamellar setae minute. Tutorium well-developed, with short cusp. Sensillus very long, directed posteriorly, its peduncle five times longer than the head. Notogaster with ten pairs of alveoli or minute setae, and four pairs of small, round porose areas. Epimeral setae simple, minute. Epimeral borders and apodemes – except sejugal ones – weakly developed, sejugal borders compose a transversal band. Anogenital setal formula 5–1–2–3. Anterior adanal setae arising near to the anterior corner of anal aperture, lyrifissures *iad* located very near to them, also anteriorly. All legs monodactylous.

Measurements. Length of body: 276–295 μm, width of body: 200–226 μm.

Prodorsum: Rostral part wide, rostral apex triangular, pointed. Lamellae long, narrow, slightly dilated distally, directed inwards, lamellar setae located on their apices. Translamella present with a weak incision medially. Prelamella and sublamella absent. All prodorsal setae simple, minute or short, straight (Fig. 53). Sensillus very long, directed backwards, with small, lanceolate head, ciliate along the whole length. Its head sharply pointed medially.

Notogaster: Anterior notogastral margin well-developed, convex. Pteromorphs large, triangular. One pair of divided dorsosejugal porose area present (Fig. 56), behind lamellae. Four pairs of small, round porose areae well observable. Seven pairs of setal alveoli of notogastral setae, and three pairs of minute notogastral setae in posteromarginal position.



Figs 53–56. *Vilhenabates dissecatus* sp. n.: 53 = body in dorsal view, 54 = body in ventral view, 55 = podosoma in lateral view, 56 = anterior margin of notogaster

Lateral part of podosoma (Fig. 55): Tutorium short, with true apex. Pedotectum I long, its margin straight. A small porose areas lamellaris (*la*) visible. Circumpedal carina long, reaching the lateral margin of the ventral plate.

Ventral regions (Fig. 54): Apodemes and borders weakly developed. *Bo. sej.* reaching the genital aperture and connected with each other. Epimeral surface smooth, without pattern. All epimeral setae short, not ciliate. Epimeral borders (*bo. 4*) absent. Five pairs of simple genital, one pairs aggenital, two pairs of anal and three pairs of very short adanal setae present. Setae ad_3 and lyrifissures *iad* in preanal position, both located very near to the anterior corner of anal aperture.

Legs: All legs monodactylous. Femora of leg II–IV with distinct blade-like shape basally.

Remarks: Species of the genus *Vilhenabates* BALOGH, 1963 and *Phalacrozetes* AOKI, 1965 stand very near to each other, probably the separation of these genera or subgenera (SUBIAS 2004) is unjustified. The form of the rostrum, the number of claws and some other important characters are variable and overlapping, therefore, I use now the older name. Independently of this, on the basis of the divided dorsosejugal porose areas and the form of the translamella the new species well distinguished from all species of this relation.

Etymology: Named after the divided dorsosejugal porose areas.

Trachyoribates (Rostrozetes) pulcherrimus (BALOGH, 1960)

PÉREZ-IÑIGO (1969) synonymyized *T. (R.) pulcherrimus* (BALOGH, 1960) with *T (R.) foveolatus* (SELLNICK, 1925) = *T. (R.) ovulum* BERLESE, 1908. However, the notogastral surface of the two species is clearly different. Consequently the name *T. (R.) pulcherrimus* should be resurrected.

*

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REFERENCES

BALOGH, J. (1960) Oribates (Acari) nouveaux de Madagascar (1re serie). *Mémoires de l'Institut Scientifique de Madagascar Série (A)* **14**: 7–37.

BALOGH, J. (1962) Recherches sur la Faune Endogee de Madagascar. VII Oribates (Acariens) nouveaux. II. *Naturaliste malgache* **13**: 212–151.

BALOGH, J. & BALOGH, P. (1992) *The oribatid mite genera of the World, I–II.* Hungarian Natural History Museum, Budapest, 263+375 pp.

GRANDJEAN, F. (1954) Essai de classification des oribates (acariens). *Bulletin de la Société Zoologique de France* **78**: 421–446.

GRANDJEAN, F. (1965) Complément a mon travail de 1953 sur la classification des Oribates. *Acarologia* **7**: 713–734.

KONTSCHÁN, J. (2007) Two new Rotundabaloghia Hirschmann, 1975 species from Madagascar (Acari: Mesostigmata: Uropodina). *Annales Historico-naturales Musei Nationalis Hungarici* **99**: 171–176.

MAHUNKA, S. (1993) Oribatids from Madagascar I. (Acari: Oribatida). New and interesting mites from the Geneva Museum LXXVI. *Revue Suisse de Zoologie* **100**(2): 289–315.

MAHUNKA, S. (1994) Oribatids from Madagascar II. (Acari: Oribatida). New and interesting mites from the Geneva Museum LXXIX. *Revue Suisse de Zoologie* **101**(1): 47–88.

MAHUNKA, S. (1997) Oribatids from Madagascar III. (Acari: Oribatida). Acarologia Genavensia LXXXIII. *Revue Suisse de Zoologie* **104**(1): 115–170.

MAHUNKA, S. (2002) A survey of the Oribatida fauna of Madagascar (Acari:Oribatida). *Folia entomologica hungarica* **63**: 5–16.

MAHUNKA, S. & MAHUNKA-PAPP, L. (2001) Oribatids from Switzerland V (Acari: Oribatida: Suctobelbidae 2). (*Acarologica Genavensia XCVII*). *Revue suisse de Zoologie* **108**: 355–385.

MAHUNKA, S. & MAHUNKA-PAPP, L. (2007) Taxonomical and faunistical studies on oribatids collected in Kenya (Acari: Oribatida) I. *Acta Zoologica Academiae Scientiarum Hungaricae* **53**(1): 51–74.

MAHUNKA, S. & ZOMBORI, L. (1985) The variability of some morphological features in oribatid mites. *Folia entomologica Hungarica* **46**: 115–128.

MARSHALL, V. G., REEVES, R. M. & NORTON, R. A. (1987) Catalogue of Oribatida (Acari) of continental United States and Canada. *Memoirs of the Entomological Society of Canada* **139**: VI+418 pp.

NIEDBAŁA, W. (1998) Ptyctimous mites of the Ethiopian region. I. Euphthiracaroidea (Acari, Oribatida). *Journal of African Zoology* **112**(1): 15–75.

NIEDBAŁA, W. (2001) Study on the diversity of ptyctimous mites (Acari, Oribatida) and quest for centres of its origin: the fauna of the Ethiopian Region. *Monographs of the Upper Silensian Museum* **3**: 1–245.

NIEDBAŁA, W. (2004) Zoogeography of the ptyctimous mites (Acari: Oribatida) of Madagascar and other Eastern African islands. *International Journal of Tropical Insect Science* **24**(4): 330–335.

NIEDBAŁA, W. (2008) Description of a new species of ptyctimous mites (Acari: Oribatida) from Ethiopia and a checklist of ptyctimous mites of the Afrotropical Region. *Tropical Zoology* **21**: 1–9.

NORTON, R. A., ALBERTI, G., WEIGMANN, G. & WOAS, S. (1997) Porose integumental organs of oribatid mites (Acari, Otibatida). 1. Overview of types and distribution. *Zoologica* **146**: 1–33.

PÉREZ-IÑIGO, C. (1969) Resultados de la expedición Peris-Alvarez a la isla de Annobón (*) (13) Oribatid mites (1st series) (Acari, Oribatei). *EOS* **44**: 405–423.

SUBÍAS, L. S. (2004) Listado sistemático, sinonímico y biogeográfico de los ácaros oribátidos (Acariformes, Oribatida) del Mundo (1758–2002). *Graellsia* **60**: 3–305.

SUBÍAS, L. S. (2008) Listado sistemático, sinonímico y biogeográfico de los ácaros oribátidos (Acariformes, Oribatida) del Mundo (exepto fósiles) (Originally published in *Graellsia* **60**: 3–305, 2004, actualized in may 2008), 540 pp. Pdf.

WEIGMANN, G. (2006) Hornmilben (Oribatida). *Die Tierwelt Deutschlands, 76. Teil.* 520 pp.

WIŚNIEWSKI, J. (1993) Gangsystematik der Parasitiformes Teil 549. Die Uropodiden der Erde nach Zoogeographischen Regionen und Subregionen geordnet (Mit. Angabe der Länder). *Acarologie. Schriftenreihe für Vergleichende Milbenkunde* **40**: 221–291.

WOAS, S. (2002) 4. 1. Acari: Oribatida. In: ADIS, J. (ed.) *Amazonian Arachnida and Myriopoda.* Pensoft Publishers, Sofia –Moscow, pp. 21–291.

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