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Four new species of Mononchida (Nematoda) from tropical regions

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Abstract. Four new nematode species of the order Mononchida are described from the tropics. *Mononchus syrmatus* sp. n. from Ecuador is simply distinguished by the unusually long and slender tail. *Cobbonchus aequatorialis* sp. n. from Ecuador is especially characterized by the digitiform tail. *Iotonchus nepotum* sp. n. from Papua New Guinea is differentiated by the small body and very short, digitiform tail. *Miconchus papillifer* sp. n. from Ecuador differs from the other prodelphic species by the shape and length of the tail and the number and arrangement of the advulval papillae.

Four new species of mononchid nematodes are presented herein, two of the family Mononchidae and another two of the family Anatonchidae. They were obtained from soil samples collected in two tropical regions of Earth, Ecuador and Papua New Guinea.

MATERIAL AND METHODS

The nematodes were sampled by Hungarian scientists during their collecting trips in 1969 and 1988, respectively. The samples were fixed *in situ* with FAA, and then washed out in the laboratory by flotation techniques. The nematodes were picked out by hand, and fixed again with FAA. Subsequently they were processed to pure glycerine by a slow method, and finally mounted on permanent glass slides.

Measurements were taken by ocular micrometer, curved structures were measured along the curved medial line. Drawings were made with the aid of a drawing tube attachment. For the moment, all nematode specimens, holotypes and paratypes, are preserved in the nematode collection of the author, but later they will be deposited at the collection of the Zoological Department of the Hungarian Natural History Museum, Budapest.

It may be mentioned that also the older slides (39 years) contained fresh-like animals.

DESCRIPTIONS

Mononchus syrmatus sp. n.

(Fig. 1 A–D)

Holotype female: L = 1.65 mm; a = 32; b = 3.6; c = 4.3; c’ = 14; V = 49 %; buccal capsule 42 ×20 µm.

Paratype females (n = 5): L = 1.59–1.68 mm; a = 32–35; b = 3.5–3.9; c = 4.2–5.0; c’ = 13–15; V = 47–50 %.

General description. Body moderately slender, 48–55 µm wide at mid-region, irregularly coiled or twisted upon relaxation. Cuticle smooth and very thin, ± 1 µm all along the body. Lip region rounded, almost continuous with adjoining body, 25–27 µm wide, lips less separate, papillae in two circles, prominent. Body at posterior end of oesophagus 2.0–2.2 times as wide as head. Amphids small, caliciform with oval apertures, close to the anterior end of buccal capsule.

Buccal cavity (the chitinized capsule) oblong, barrel-shaped, 38–42×19–21 µm inclusive walls, twice as long as wide or 1.5–1.6 times as long as the labial diameter, occupying ± 9 % of oesophagus length. Dorsal tooth strong with apex pointed forward and located at 29–32 % of buccal capsule. Ventro-sublateral transverse ribs weak, op-

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posite to the tooth apex or shifted a little more anterior. Oesophagus nearly cylindrical, 427–463 µm long, occupying 26–28 % of body length. Nerve ring encircling oesophagus at about one-fourth of its length. Oesophago-intestinal valve non-tuberculate. Intestine with wavy walls, rectum about equal to anal body width. Distance between posterior end of oesophagus and vulva shorter (0.7–0.8 times) than oesophagus, or as long as 7.0–7.6 body diameters.

Female. Genital apparatus amphidelphic. Vulva transverse with sclerotized outer lips measuring 10 µm in width and similarly sclerotized inner lips measuring 8–9 µm; vagina 20–22 µm, extending more than one-third (35–36 %) body width. Advulval papillae lacking. Each genital branch 2.2–3.2 body widths long or occupying 7–9 % of body length. One gravid female possessing a large, thin-shelled egg measuring 112×38 µm, as long as 2.2 body diameters. Vulva–anus distance equal to 1.1–1.6 tail lengths. Tail unusually long and slender, 344–390 µm, occupying 20–24 % of entire length of body, first conoid, then slowly tapering, whip-like with a little swollen 4.5–5.0 µm thick tip bearing two minute papilla-like projections. Caudal glands moderately developed, spinneret terminal.

Male. Not found.

Differential characters and relationships. A moderately long representative of the genus with very thin cuticle, large buccal cavity, comparatively posteriorly located dorsal tooth, well sclerotized vulva, large egg and unusually long tail.

In a paper on the taxonomy of Mononchidae (Andrássy, 1993), I registered 14 species within the genus *Mononchus* Bastian, 1865. The number of valid species increased to 18 to the present. Regarding its tail length (13–14 anal body diameters), *Mononchus syrmatus* sp. n. is here and now the longest-tailed representative of the genus, and can be distinguished at the first glance from all other species the tails of which varying in length between 2 to 8 (exceptionally to 11) anal body diameters.

The longest-tailed species, *M. sandur* Eisendle, 2008, was described quite recently from the Austrian Alps. Its tail is longer (7–11 anal body diameters) than in the other species of the genus. *Mononchus syrmatus* sp. n. differs, however, also from it by the wider lip region (25–27 *vs*. 18–24 µm), the longer buccal capsule (38–42 *vs*. 28–35 µm) and, last but not least, by the more longer and slender tail (344–390 µm or c’ = 13–15 *vs*. 224–306 µm or c’ = 7–11).

Type specimens. Holotype female on slide No. 13176. Paratypes: five females and two juveniles; all in the collection of the author.

Type habitat and locality. Wet moss from a large trunk in a rain-forest, Laguna San Marcos, Prov. Pichincha, Ecuador; collected April, 1988 by A. Zicsi and Cs. Csuzdi.

Etymology. The species name is derived from the Greek/Latin word *σύρμα* or *syrma,* and means: a tail or train (of a dress); *syrmatus* = long-tailed, long-trained.

Cobbonchus aequatorialis **sp. n.**

(Fig. 2 A–D)

Holotype female: L = 1.76 mm; a = 32; b = 3.1; c = 32; c’ = 1.4; V = 64 %; buccal capsule 40×20 µm.

Paratype females (n = 4): L = 1.67–1.87 mm; a = 28–32; b = 2.8–3.1; c = 31–37; c’ = 1.4–1.5; V = 65–69 %.

General description. Body fairly large, curved or twisted after fixation, 57–64 µm wide at mid-region, slightly but rapidly widened at three regions: firstly just posterior to oesophagus, secondly at the genital region, and thirdly immediately prior to anus. Cuticle smooth, thin, 2.0–2.5 µm. Labial region somewhat widened, 28–30 µm wide, lips hardly separated, labial papillae conspicuous. Body at posterior end of oesophagus 1.6–1.8 times as wide as head. Amphids cup-shaped, located at the first sixth or fifth of the buccal cavity length.

Buccal capsule oblong, barrel-shaped, 40–42×20–21 µm, twice as long as wide or 1.3–1.5

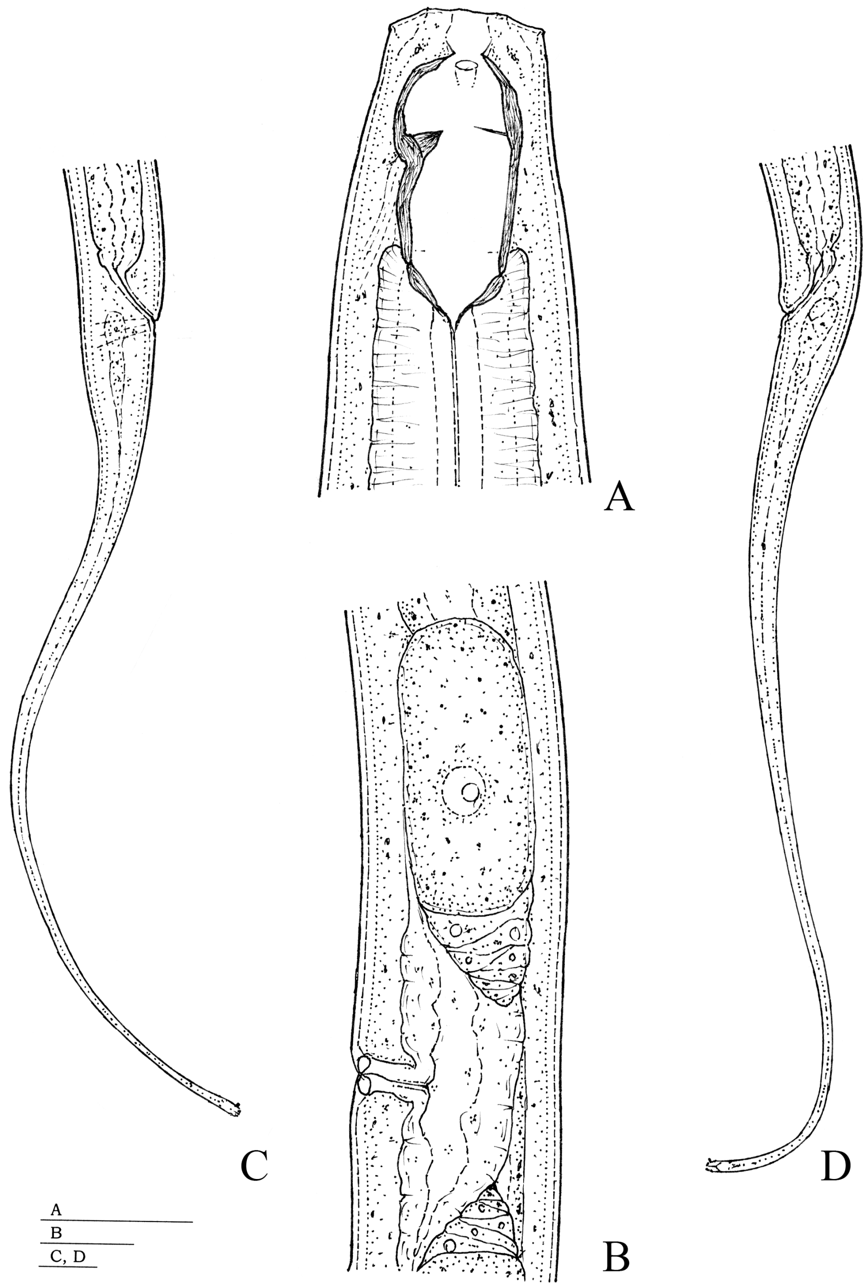

Figure 1. *Mononchus syrmatus* sp. n. A: anterior end; B: vulval region with anterior genital tract; C–D: female tails. (Scale bars 25 μm each)

times as long as labial diameter, occupying 6–7 % of entire length of the oesophagus. Its dorsal wall somewhat thicker than ventral wall. Dorsal tooth only slightly stronger than subventral teeth, its apex located at 46–50 %, apices of subventral teeth at 54–62 % of buccal length; subventral teeth never levelling exactly, but lying 2–3 % of buccal length from each other (e.g. 54 and 56 %, 60 and 62 %, respectively). Oesophagus muscular and nearly cylindrical, very long, 556 to 635 µm, occupying 32 to 36 % of entire length of body. Not only the postparietalia, but also the basal parts of the interparietalia are embedded in oesophageal tissues. Nerve ring at 21–23 % of the total neck region. Oesophago-intestinal junction non-tuberculate. Intestine wide-lumened, its cells polygonal and arranged in 12–15 longitudinal rows. Rectum shorter than anal body width. Distance between posterior end of oesophagus and vulva equal to one oesophagus length or 10–11 body diameters.

Female. Reproductive system amphidelphic. Vulva a short transverse slit with small sclerotized inner lips, vagina short, extending to one-fourth of the corresponding body width. No advulval papillae. Anterior gonad 2.2–2.8 body widths long or 8–9 % of body length, posterior gonad 3.0–3.5 body widths long or 10–11 % of body length. One large (two body widths long) egg measuring 122–130×26–27 µm. Vulva–anus distance 9.6 to 11.4 times as long as tail. Tail short, 50–56 µm, ±3 % of body length, characteristic in shape: broadly conoid to its half length, then rapidly narrowing, digitiform and ending in a mammiform tip. The digitiform part 28–36 µm long and 12–15 µm wide at its beginning. Caudal glands very large, the two anterior glands lying by the dorsal side of rectum. Anterior anal lip overhanging.

In the body cavity of two females, somewhat posterior to vulva, five and six tiny nematodes, respectively, were observed. They distinctly lied out of the intestine. Probably, they were small parasitic nematodes (mermithids?).

Male. Not found.

Differential characters and relationships. A bigger species with teeth lying in medial position, very long oesophagus, cuticularized vulval lips, paired gonads and characteristically shaped tail.

In a paper dealing with the taxonomy of Mononchidae (Andrássy, 1993) I listed 27 species of the genus *Cobbonchus* Andrássy, 1958. Meanwhile three further species were added to this sum. *Cobbonchus aequatorialis* sp. n. may be compared with those species of the genus that possess buccal teeth of medial position, and amphidelphic gonads. Of these, the new species most resembles *Cobbonchus coetzeeae* Andrássy, 1970 (described from South Africa), but differs from it in having a shorter and less slender body (1.67–1.87 mm, a = 28–32 *vs*. 2.2 mm, a = 47), more posteriorly located teeth (dorsal: 46–50 %, subventral: 54–62 % *vs*. dorsal: 36 %, subventral: 49 %), a longer oesophagus (one-third *vs*. one-fourth of body length), sclerotized vulval lips, a less curved and shorter tail (1.4–1.5 *vs*. 2.0–2.5 anal body widths) and a mammiform tail tip.

The species described hitherto under the name *Cobbonchus* or transferred to it from the old genus *Mononchus* suit well the genus characters. The only exception is *Cobbonchus longicaudatus* Jairajpuri, Ahmad & Sturhan, 1998. In having an unusually strong dorsal tooth – it is much larger than the subventral teeth – and a long, filiform tail (c' = 7–8 *vs*. 0.5–2.3 in the other species), this species seems to be rather strange for *Cobbonchus.* By virtue of its offset head, more or less funnel-shaped buccal cavity and the so large dorsal tooth, it appears to belong to the family Mylonchulidae rather than to the Mononchidae, where it will probably represent a separate genus.

Type habitat and locality. Moss from a trunk in a rain forest, Lago Agrio, Prov. Napo, Ecuador, collected April, 1988 by A. Zicsi and Cs. Csuzdi.

Type specimens. Holotype female on slide No. 13230. Paratypes: four females and two juveniles. All in the collection of the author.

Etymology. The species name *aequatorialis* (Latin) = equatorial.

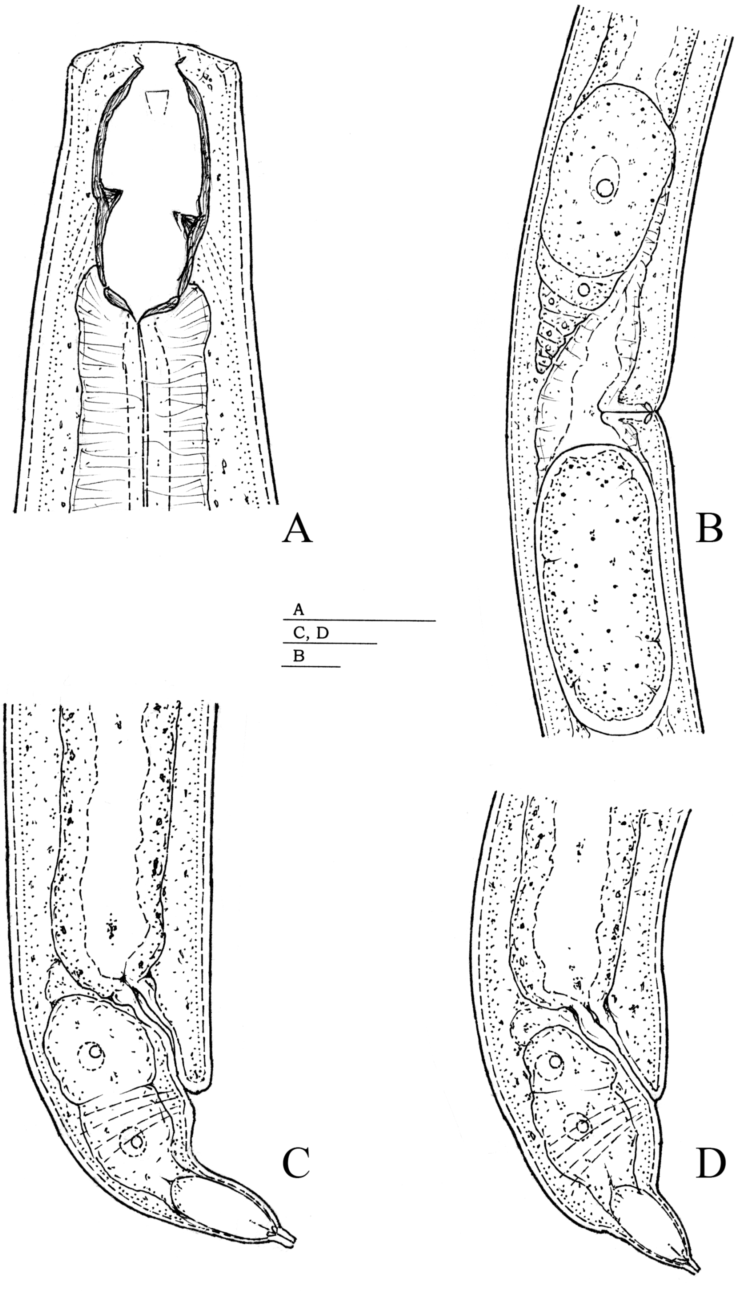

Figure 2. *Cobbonchus aequatorialis* sp. n. A: anterior end; B: genital region; C–D: female posterior ends. (Scale bars 25 µm each)

Iotonchus nepotum sp. n.

(Fig. 3 A–D)

Holotype female: L = 1.11 mm; a = 25; b = 3.8; c = 16; c' = 2.2; V = 66 %; buccal capsule 39×22 µm.

Paratype females (n = 6): L = 1.03–1.21 mm; a = 22–25; b = 3.1–3.8; c = 13–16; c' = 2.2–2.8; V = 66–70 %.

General description. A very small species within the genus. Habitus more or less C-shaped when fixed, more strongly curved posteriorly, body 41–48 µm wide at middle. Cuticle smooth, 1.5–2.0 µm thick. Head broad, rounded, 27–30 µm wide at level of posterior papillae. Lips moderately separate, papillae protruding. Body at posterior end of oesophagus 1.4–1.5 times as wide as head. Amphid small, aperture situated at the beginning of buccal capsule.

Buccal capsule large and roomy, barrel-shaped, 36–40×22–23 µm, 1.6–1.8 times as long as wide or 1.3–1.4 times as long as labial diameter, occupying 12–14 % of oesophagus length (measured from head). Buccal walls moderately thick. Dorsal tooth quite on the basis of interparietale, forward directed with apex located at 80–83 % of buccal length. No other armature. Oesophagus 294–336 µm long or 26–32 % of the total body length, surrounding ahead the postparietale (ventral) and the postparietale + tooth (dorsal). Oesophago-intestinal valve with lobe-like tubercles. Distance between posterior end of oesophagus and vulva equalling 1.2–1.5 oesophagus lengths or 8.5–10.2 body diameters. Rectum arched, about as long as anal body diameter.

Female. Genital system mono-prodelphic without posterior uterine sac. Vulva transverse with non-sclerotized inner lips. Vagina oblique. Advulval papillae not present. Gonad as long as 3.4–4.6 body diameters, occupying 13–18 % of body length. Uterus about equal to one body width, oviduct slender. Ovary dorsally directed, oocytes few in number. No uterine eggs observed. Vulva–anus distance 3.6–4.0 times as long as tail.

Tail short, 60–80 µm, 6–7 % of entire length of body, more or less finger-shaped, ventrally curved with rounded terminus. Caudal glands small, terminal pore (spinneret) minute. Anal lips swollen.

Male. Not observed.

Differential characters and relationships. A very small species of *Iotonchus* possessing a wide head, roomy buccal cavity, dorsal tooth of basal position, prodelphic female genital organ, lacking postvulval sack, and short, digitiform tail.

Iotonchus Cobb, 1916 is by far the richest genus not only in the family Anatonchidae, but within the whole order Mononchida. While in a paper dealing with the taxonomy of Anatonchidae (Andrássy, 1994), I registered 47 valid species, Vinciguerra and Orselli (2006) already listed 72 good species. This number recently amounts to 85. It may be mentioned that some years ago Siddiqi (2001) alone described eleven new *Iotonchus* species.

The majority (more than 60 %) of the representatives of *Iotonchus* are amphidelphic. The prodelphic species (27 in number) can be divided on the basis of presence or absence of postvulval uterine branch into two groups. *Iotonchus nepotum* sp. n. belongs to the second group and is well characterized by its small body and short tail. In having a very short tail, it can be distinguished from every member of both prodelphic groups (c' = 2.2–2.8 *vs*. 4 to 20). On the other hand, *I. nepotum* is also distinctive by its very short body (1.0–1.2 mm). There are only three prodelphic species that are nearly as small as our new one: *I. chantaburensis* Buangsuwon & Jensen, 1966 (0.8–1.0 mm), *I. singaporensis* Ahmad, Baniyamuddin & Jairajpuri, 2005 (1.0–1.2 mm) and *I. pusillus* Loof, 2006 (0.7–1.3 mm). *Iotonchus nepotum* sp. n. clearly differs from all of them in having a much shorter tail, and – owing to the shortness of the tail – a more posteriorly located vulva (V = 66–70 *vs*. 59–66 %).

Type habitat and locality. Humus and soil from a primary rain forest, in the vicinity of the small town Kiunga, western Papua New Guinea, collected July, 1969 by J. Balogh.

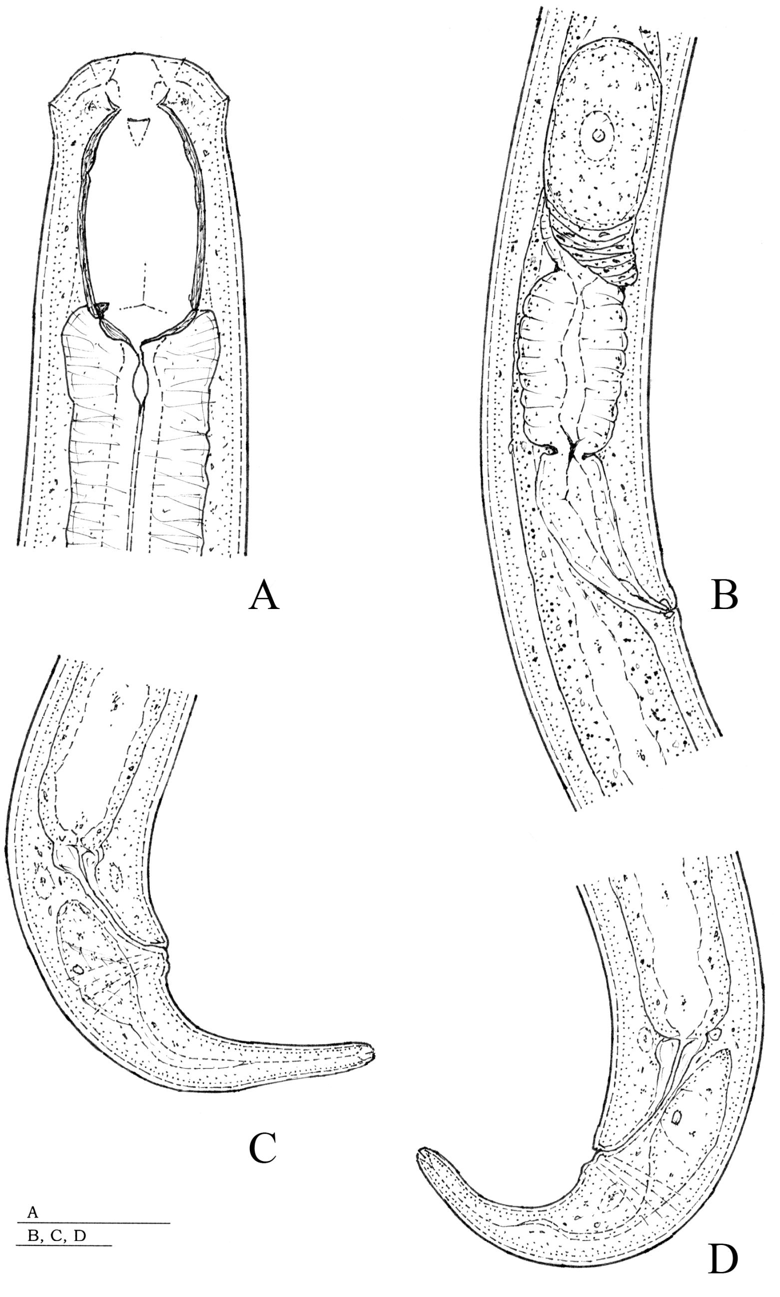

Figure 3. *Iotonchus nepotum* sp. n. A: anterior end; B: genital tract; C–D: female posterior ends. (Scale bars 25 µm each)

Type specimens. Holotype female on slide No. 13617. Paratypes: six females and three juveniles. All in the collection of the author.

Etymology The Latin word *nepos* means: a grandchild (*nepotum:* plural genitive). This species is dedicated to the grandchildren of the present author, Judit, Ádám and Zsuzsa (Judith, Adam and Susan).

Miconchus papillifer sp. n.

(Fig. 4 A–E)

Holotype female: L = 2.16 mm; a = 31; b = 3.9; c = 12.5; c' = 4.5; V = 78 %; buccal capsule 42×28 µm.

Paratype male: L = 1.98 mm; a = 32; b = 4.2; c = 18; c' = 2.6.

General description. Medium-sized, body almost straight, only posteriorly curved, 64–69 µm wide at middle, clearly widened in both sexes just behind oesophagus, and markedly narrowed in females immediately behind vulva. Cuticle apparently smooth, 2.5 µm thick in general, 3.5 µm thick on dorsal side of tail. Labial region truncate, distinctly broader than adjoining body, 40–44 µm wide. Lips large, separated, anterior papillae prominent, posterior paillae less conspicuous. Amphid aperture at level of beginning of the buccal cavity, small. Body at posterior end of oesophagus only 1.3–1.4 times wider than head.

Buccal capsule very roomy, basally flattened, 42×26 µm (female) or 38×28 µm (male), nearly 8 % of the total neck length, thin-walled. Teeth prebasal in position, lying at about 2/3 of buccal cavity, equally developed. Apex of dorsal tooth at 54 % (female) or 59 % (male), apices of subventral teeth at 54 and 56 % (female) or 63 and 66 % (male); the subventral teeth not levelling exactly with each other. Oesophagus 480–550 µm long, 24–25 % of entire length of body; neck region completely cylindrical. Ventral wall in posterior half of oesophagus with the usual pearl-shaped structure. Oesophago-intestinal junction possessing three conspicuous tubercles. Intestine wide-lumened. Rectum nearly equal in length to the anal body width. Distance between posterior end of oesophagus and vulva as long as 2.1 oesophagus lengths or 16 body widths.

Female. Prodelphic, postvulval sack practically absent. Vulva a transverse slit, vulval lips well sclerotized, anterior lip stronger than posterior. Vagina oblique, about half as long as corresponding body diameter. Gonad 2.7 times as long as body width, or 9 % of body length. One large egg: 155×58 µm, 2.7 times as long as wide or 2.2 times as long as body diameter. Anterior vulval lip strongly swollen. Advulval papillae present not only on the ventral but also on the dorsal side of body: ventrally four papillae (three prevulval and one postvulval), dorsally also four papillae. Vulva–anus distance equal to 1.7 tail lengths. Tail 170 µm long, occupying 8 % of entire length of body, strongly curved ventrally, in anterior half conoid, in posterior half nearly cylindrical; terminus rounded. Caudal glands poorly developed, spinneret a minute terminal tube on the tip of tail.

Male. Testes two. Spermatozoa small, spindle-shaped. Spicula 80 µm long, about as long as 3/4 tail length. Precloacal supplements eleven: eight large + three weakly developed. Tail similar to that of female, cylindrical in its posterior half and rounded on tip.

Differential characters and relationships. A medium-sized species of the genus *Miconchus* with broad head, large buccal cavity, pre-basally arranged teeth, enlarged anterior vulval lip, prodelphic gonad, lacking postvulval uterine sack, ventral and dorsal papillae on vulval region, relatively few male supplements, and with strongly curved, in posterior half cylindrical tail.

In a paper on the taxonomy of Anatonchidae (Andrássy, 1994), I enumerated 23 species within the genus *Miconchus* Andrássy, 1958; momently 30 species are known. The majority of them are amphidelphic. *Miconchus papillifer* sp. n. clearly differs from the four prodelphic species as follows:

From *M. digiturus* (Cobb, 1893) Andrássy,

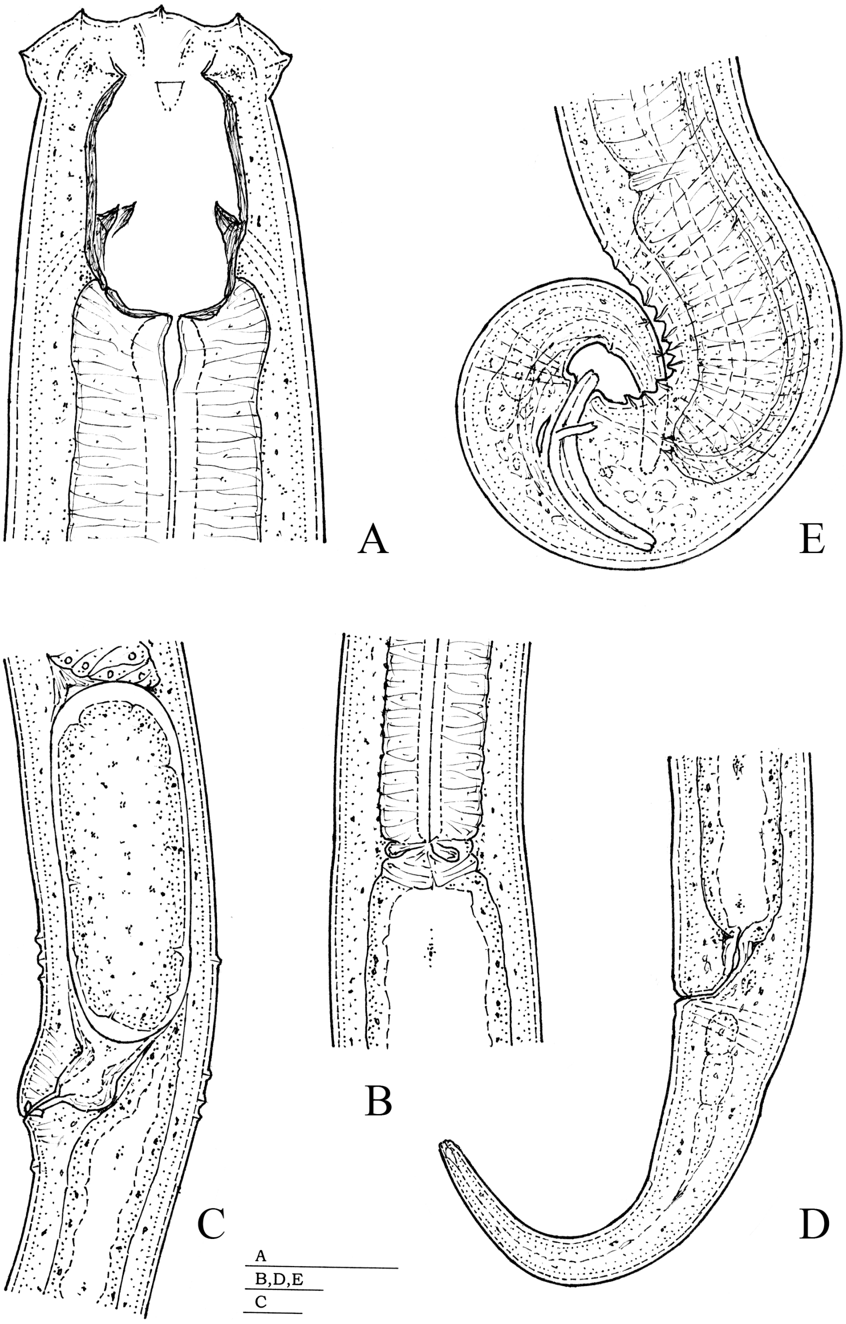

Figure 4. *Miconchus papillifer* sp. n. A: anterior end; B: cardial region; C: vulval region (look at the four ventral and four dorsal papillae); D: female tail; E: male posterior region. (Scale bars 25 µm each)

1958 (as redescribed by Mulvey, 1962 as well as by Jensen and Mulvey, 1968): body longer (2.2 *vs*. 1.4–1.9 mm), postvulval sack absent, ventral advulval papillae more numerous (4+4 *vs*. 1), supplements fewer (11 *vs*. 12–17), tail longer (170 µm, vs. 130–140 µm) and cylindrical in its second half.

From *M. gomezi* Zullini, Loof & Bongers, 2002: tooth apices more anterior (dorsal: 54–59 % vs. 76–77 %), postvulval uterine sack absent (vs. present, 1.9–2.5 body widths long), advulval ventral papillae more in number (4+4 *vs*. 2), tail longer (170 µm, c' = 4.8 *vs*. 115–129 µm, c' = 3.3–3.8) and not uniformly conoid, supplements fewer (9 vs. 13).

From *M. japonicus* Khan, Araki & Bilgrami, 2000: body larger (2.2 *vs*. 1.4–1.6 mm), tooth apices more anterior (dorsal: 54–59 % *vs*. 71–76 %), vulva more posterior (78 % vs. 69–73 %), vulval papillae present, tail cylindrical posteriorly with rounded terminus (*vs*. uniformly conoid with pointed terminus).

From *M. triodontus* Buangsuwon & Jensen, 1966: body longer (2.2 *vs*. 1.6–1.8 mm), vulva further back (78 % *vs*. 68–74 %), postvulval sack absent (*vs*. present, twice as long as body width), tail longer (170 µm, c' = 4.8 *vs*. 95–140 µm, c' = 3) and other shaped.

Miconchus papillifer sp. n. unambiguously differs from each species listed above in the number and arrangement (dorsal too!) of papillae on the vulval region as well as in the length and shape of tail.

Miconchus japonicus Khan, Araki & Bilgrami, 2000 from Japan and *M. koreanus* Jairajpuri, Tahseen & Choi, 2001 from South Korea agree in every respect with each other; thus, L = 1.4–1.6/1.3–1.7 mm, c = 9–12/10–12, V = 69–73/69–72 %, teeth basal with apices located at 71–76/71–73 % of buccal cavity length, gonad prodelphic, postvulval uterine sac and advulval papillae absent, tail of the same shape and of nearly equal length, caudal spinneret absent. No doubt, the two species are identical. Since *M. japonicus* was described in December, 2000 and *M. koreanus* in June, 2001, the valid name of the species remains *Miconchus japonicus.*

Zullini, Loof and Bongers (2002) described a species under the name "*Miconchus digiturus* (Cobb, 1893)" from Costa Rica, on the basis of four female specimens. Their animals differ from the descriptions of Cobb (1893, 1917), Mulvey (1962) and Jensen and Mulvey (1968) in some respects. The buccal cavity is larger (39–42 *vs*. 35–36 µm), the apices of teeth are located more posterior (77–81 % *vs*. 50–54 %), and there is no postvulval uterine sac (*vs*. present, as long as one body diameter). Owing to these differences the conspecifity of Cobb's *digiturus* and the Costa Rican specimens can be queried.

Type habitat and locality. Meadow soil from 15 cm depth, Papallacta, Prov. Napo, Ecuador, collected August, 1988 by A. Zicsi and Cs. Csuzdi.

Type specimens. Holotype female on slide No. 13262. Paratype: one male. Both specimens in the collection of the author.

Etymology. The species name *papillifer* (= papillae-bearing) refers to the unusual number and position (ventral and dorsal) of papillae on the vulval region.

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New and rare *Rotundabaloghia* species (Acari: Uropodina) from the tropics

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Abstract. Descriptions of eight new and seven known pecies of the uropodine genus *Rotundabaloghia* Hirschmann, 1975 are given from New Guinea, South Asia, South America and West Africa. Original descriptions and drawings as well as scanning micrographs are provided. With 76 figures.

The genus *Rotundabaloghia* Hirschmann, 1975 is one of the richest Uropodina genera in the tropical regions (Wiśniewski, 1993). Species of this genus occur in tropical soils, mosses and leaf litter, and they are members of the canopy fauna as well. Currently, the genus contains more than one hundred species from all around the world (Kontschán, 2007), however our knowledge on the *Rotundabaloghia* species of the tropical regions is highly unbalanced. For example, South-east Asia and Oceania are rather poorly known, only a few species were recorded from scattered localities including New Guinea from where the genus was first described by Hirschmann (1975a). In the same year, Hirschmann and Hiramatsu (1975) recorded several new *Rotundabaloghia* species from Japan, New Guinea, Philippines and Indonesia (Borneo). The last records for South-east Asia were presented by Hiramatsu (1983) who listed a number of new and rare species from Borneo.

Similarly to South-east Asia and Oceania, the *Rotundabaloghia* mites of West Africa have also scantily been investigated; hitherto only fourteen species were recorded for this vast continent; ten from Cameroon, three from Ghana and one from the Congo Republic (Hirschmann, 1992a).

Regarding the *Rotundabaloghia* mites, the best-known tropical region is South America. Hirschmann (1972) described the first species from here under the genus *Uroobovella* (*U. guttaseta* Hirschmann, 1972 and *U. unguiseta* Hirschmann, 1972). In the next year, Hirschmann (1973) described another species, *U. rotunda* Hirschmann, 1973 from Brazil. All these species were subsequently placed in the newly erected genus *Rotundabaloghia* Hirschmann, 1975 in which further new species were also added (Hirschmann, 1981, 1984).

At the beginning of the 1990's in summarizing his investigation on the *Rotundabaloghia* species of South America Hirshmann described 28 new species from Colombia (Hirschmann, 1992b) and furthermore reported 41 species from Brazil, Ecuador, Colombia, Peru, Venezuela and Guatemala (Hirschmann, 1992c). Quite recently, Kontschán (2007) reported seven uropodid species from Venezuela including a new *Rotundabaloghia*.

The Hungarian Natural History Museum possesses a rich unsorted „Berlese" soil-sample material collected by the different soil zoology expeditions to Africa (Balogh *et al.,* 1965), South America (Zicsi and Csuzdi, 2008) and other tropical regions. In this rich material eight new and several known species were found from New Guinea, Colombia, Ecuador, Congo Republic, Vietnam and Indonesia which are herein presented.

MATERIAL AND METHODS

Specimens were cleared in lactic acid and later stored in alcohol. Drawings were made with the aid of a camera lucida. Scanning micrographs were taken in the Hungarian Natural History Museum with a HITACHI SN 2600 scanning electron microscope. The specimens examined are

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deposited in the Soil Zoology Collection of the Hungarian Natural History Museum, Budapest.

Abbreviations used: h1-h4, hypostomal setae, St1-St5, sternal setae. Nomenclature for the ventral idiosomal setae is according to Hirschmann (1975a): V2, V6, V7 and V8 are the ventral setae, except that I use the name "adanal setae" (*ad*) instead of V4. Measurements are given in micrometres (µm).

DESCRIPTIONS OF THE SPECIES

Rotundabaloghia Hirschmann, 1975

Rotundabaloghia Hirschmann, 1975a: 23.
Rotundabaloghia Kontschán 2008: 18.

Diagnosis. Idisoma circular or rounded, dorsal part convex. Dorsal and marginal shields completely fused or fused along the anterior margin. Genital shield of female oblong, triangular, linguliform or shield-shaped. Genital shield of male circular, located between coxae 4. Number of ventral setae reduced, V2 inserted near basal part of genital shield, V7 and V8 near the metapodal lines. Only one pair of adanal setae is present, near the central part of the anal platelet. Setae V7 and V8 are smooth, pilose or bear short hairs or spines. Hypostomal setae h1 smooth, longer than the other hypostomal setae. Corniculi horn-like, laciniae short or long with short apical hairs. Chelicerae with nodus. All legs with a pair of ambulacral claws and with smooth simple setae.

Type species. *Rotundabaloghia baloghi* Hirschmann, 1975a by original designation.

Remarks. Hirschmann (1992b) divided the genus *Rotundabaloghia* to eleven species groups based on the ventral structures. The subdivision of this large genus into species groups can help in identification of species; however it does not refer to a subgeneric system, because the monophyly of the species groups is questionable. The most important characters and the distributions of Hirschmann's species groups are summarized in Kontschán (2008).

Rotundabaloghia baloghi Hirschmann, 1975

(Figs. 1–4 and 8–9)

Rotundabaloghia baloghi Hirschmann: 1975b, p. 29. Fig: p. 24.
Rotundabaloghia baloghi: Wiśniewski & Hirschmann 1993, p. 70, Wiśniewski 1993, p. 282.

Material examined. Five females and one male, 74-NG-Mc 6., New Guinea, McAdam-Park, primary rain forest, from canopy leaf litter, 11.VIII.1974. leg. J. Balogh.

Female. Length of idiosoma 300–320 µm, width 280–300 µm (n = 5). Shape circular, posterior margin rounded.

Dorsal side (Fig. 1). Marginal and dorsal shields fused. Most of dorsal setae long and pilose, three pairs in the central region short (five times shorter then the other dorsal setae) smooth and needle-like (Fig. 2). Dorsal shield with alveolate pattern.

Ventral side (Figs. 3 and 8). Sternal- and ventral shield with alveolar ornamentation. Three pairs of sternal setae (St1, St2 and St3) long and smooth, St4 ten times shorter than the other sternal setae. Distance between St1 and St2, same as between St2 and St3. St4 placed near the basis of St3. Ventral setae are as follows: V2 as long as V6, both smooth and setiform. V7 and V8 as long as V2 and V6, but V7 and V8 bear short spines on their margin. V7 is near of V8. Setae *ad* similar in shape to V7 and V8 but 1.5 times shorter (Fig. 9).

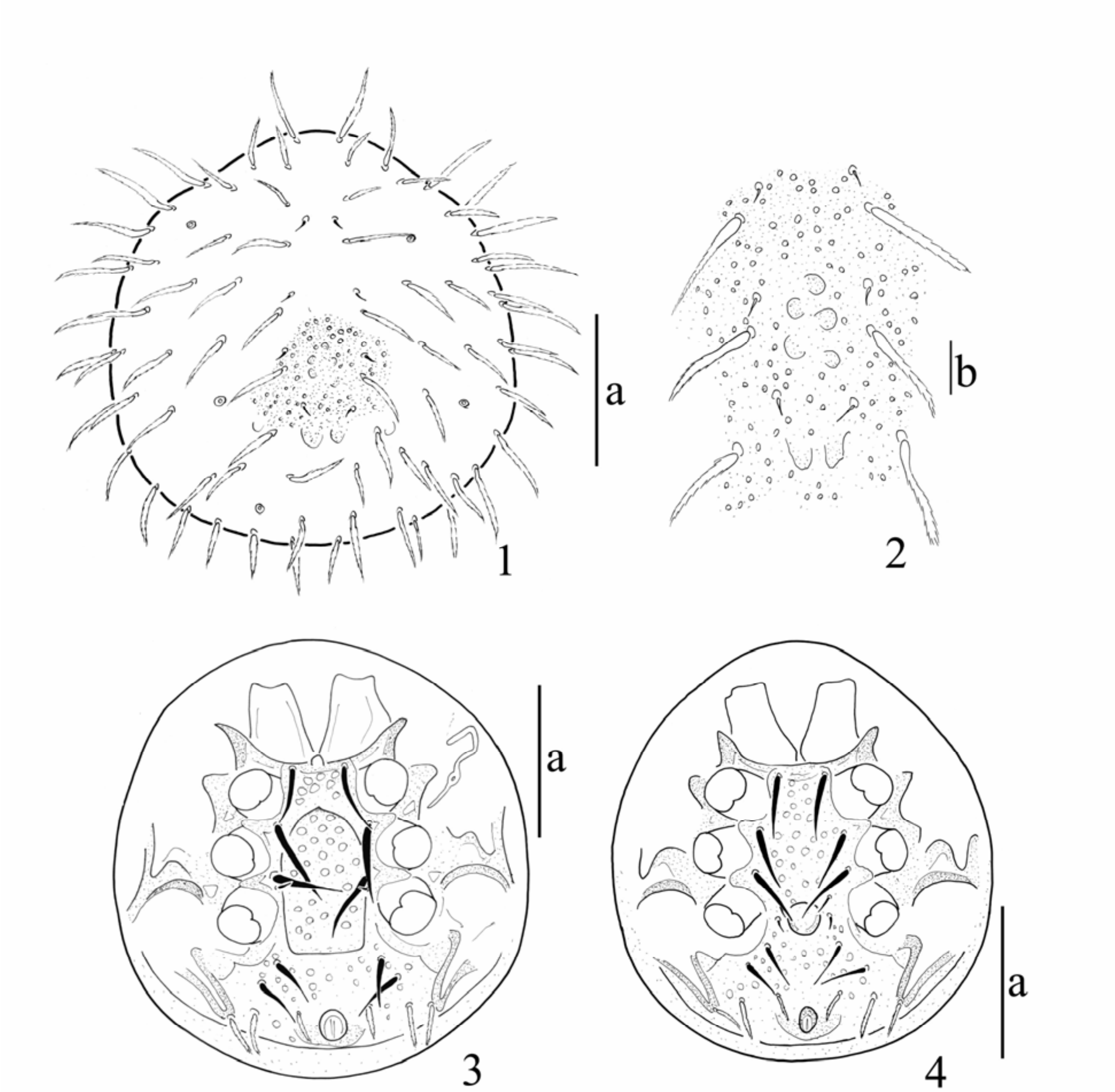
Genital shield linguliform, bears alveolar pattern and short spines on its apical margin. Stigmata situated near coxae 2. Peritreme hook-shaped.

Gnathosoma not clearly visible (covered by coxae 1)

Male. Length of idiosoma 300 µm, width 260 µm (n = 1). Shape circular, posterior margin rounded.

Dorsal side. Similar to the female.

Ventral side (Fig. 4). Sternal- and ventral shield with alveolar ornamentation. Three pairs of sternal setae (St1, St2 and St3) long and smooth, St4 four times St5 five times shorter than the other sternal setae. St1 placed near the anterior



Figures 1–4. *Rotundabaloghia baloghi* Hirschmann, 1975. 1 = dorsal view of female, 2 = dorsal setae on the central region of dorsal shield, 3 = ventral view of female, 4 = ventral view of male. (Scale bars: a: 100 µm, b: 20 µm)

margin of sternal shield, St2 near the anterior margin of coxae 3, St3 near the posterior margin of coxae 3. St5 is near to the central region of the genital shield. Ventral setae are as follows: V2 long, as long as V6, V2 and V6 smooth and setiform. V7 and V8 as long as V2 and V6, but V7 and V8 bear short spines on their margin. V7 is near of V8. Setae *ad* similar in shape to V7 and V8 but 1.5 times shorter

Genital shield alveolar and placed between coxae 4.

Gnathosoma. Not clearly visible (covered by coxae 1).

Distribution. New Guinea.

Rotundabaloghia mahunkai Hirschmann, 1975

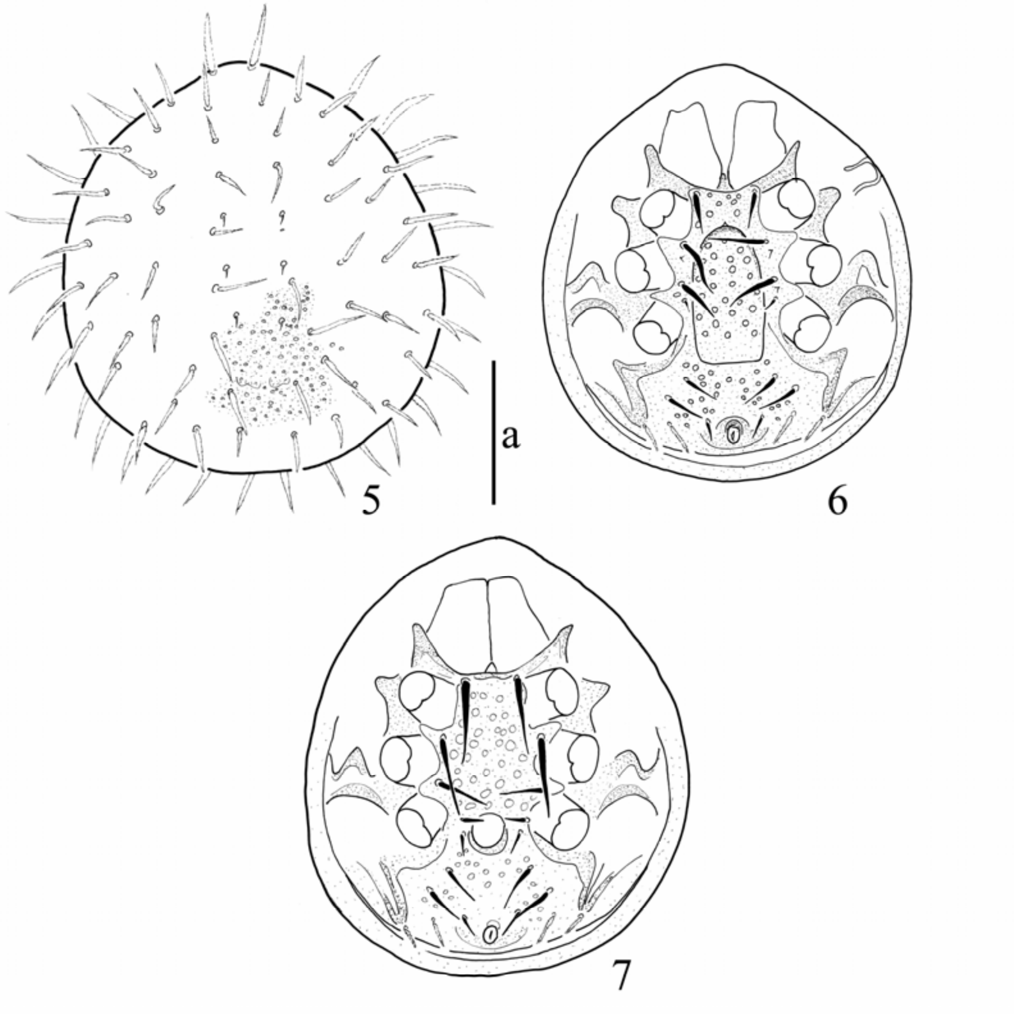
(Figs. 5–7 and 10–11)

Rotundabaloghia mahunkai Hirschmann: 1975b, p. 33., Fig: p. 33.
Rotundabaloghia mahunkai: Wiśniewski & Hirschmann 1993, p. 77., Wiśniewski 1993, p. 282.,

Material examined. Two females 74-NG-Mc 3 New Guinea, McAdam-Park, primary rain forest, from soil, 11.VIII.1974. leg. J. Balogh, four females and two males 74-NG-Mc 5 New Guinea, McAdam-Park, primary rain forest, from leaf litter, 11.VIII.1974. leg. J. Balogh, two females 74-NG-Mc 6 New Guinea McAdam-Park, primary rain forest, from canopy leaf litter, 11. VIII.1974. leg. J. Balogh, two females 71-NG-PO 27, New Guinea, Popondetta, secondary rain forest, from leaf litter, 06.VI.1971. leg. J. Balogh, six females 71-NG-PO 24, New Guinea, Popondetta, secondary rain forest, from leaf litter of a big tree, 06.VI.1971. leg. J. Balogh.

Female. Length of idiosoma 300–320 µm, width 280–300 µm (n = 16). Shape circular, posterior margin rounded.

Dorsal side (Fig. 5). Marginal and dorsal shields fused. Most of the dorsal setae long and pilose, three pairs of them are in the central region, short (five times shorter then other dorsal setae) smooth and needle-like. Pattern of dorsal shield is alveolate.



Figures 5–7. *Rotundabaloghia mahunkai* Hirschmann, 1975. 5 = dorsal view of female, 6 = ventral view of female, 7 = ventral view of male. (Scale bar: 100 µm)

Ventral side (Figs. 6 and 10). Sternal and ventral shield with alveolar ornamentation. Three pairs of sternal setae (St1, St2 and St3) long and smooth, St4 ten times shorter than the other sternal setae. Distance between St1 and St2 same as between St2 and St3. St4 placed near the basis of St3. Ventral setae are as follows: V2 long, as long as V6, both smooth and setiform. V7 and V8 as long as V2 and V6, but V7 and V8 bear short spines on their margin. V7 located near V8. Setae *ad* smooth, needle-like and 1.5 times shorter than V7 and V8 (Fig. 11).

Genital shield linguliform, bear alveolar pattern and short spines on its apical margin. Stigmata situated near coxae 2. Peritreme hook-shaped.

Gnathosoma. Not clearly visible (covered by coxae 1).

Male. Length of idiosoma 280 µm, width 250 µm (n=1). Shape circle, posterior margin rounded.

Dorsal side. Similar to that of the female.

Ventral side (Fig. 7). Sternal and ventral shield with alveolar ornamentation. Three pairs of sternal setae (St1, St2 and St3) long and smooth, St1 and St2 1.5 times longer than St3, St4 and St5 three times shorter than St3. St1 placed near the anterior margin of sternal shield, St2 near the anterior margin of coxae 3, St3 near the posterior margin of coxae 3. St5 located near the central region of the genital shield. Ventral setae are as follows: V2 long, as long as V6, V2 and V6 smooth and setiform. V7 and V8 as long as V2 and V6, but V7 and V8 bear short spines on their margin. V7 can be found near of V8. Setae *ad* smooth and needle-like and 1.5 times shorter than V7 and V8.

Genital shield alveolar and placed between coxae 4.

Gnathosoma. Not clearly visible (covered by coxae 1).

Distribution. New Guinea.

Rotundabaloghia triangulata **n. sp.**

(Figs. 12–15)

Material examined. Holotype: female, Vietnam, As-647, Vietnam, Duc me (Maria stream), 15 km S of Bao Loc, sifted in a bamboo forest, 22.X.1988. leg. S. Mahunka & T. Vásárhelyi.

Diagnosis. Dorsal shield with alveolar ornamentation, dorsal setae needle-like with short hairs on their apical part. Ventral and sternal shields without ornamentation. Genital shield of female triangular, with long process and without pattern. St2 and St3 long, V2, V6 and *ad* smooth, short and needle-like. V7 and V8 smooth, needle-like and two times longer than the other ventral setae. Peritreme mushroom-shaped.

Female. Length of idiosoma 340 µm, width 290 µm (n = 1). Shape oval, posterior margin rounded.

Male, nymphs and larva are unknown.

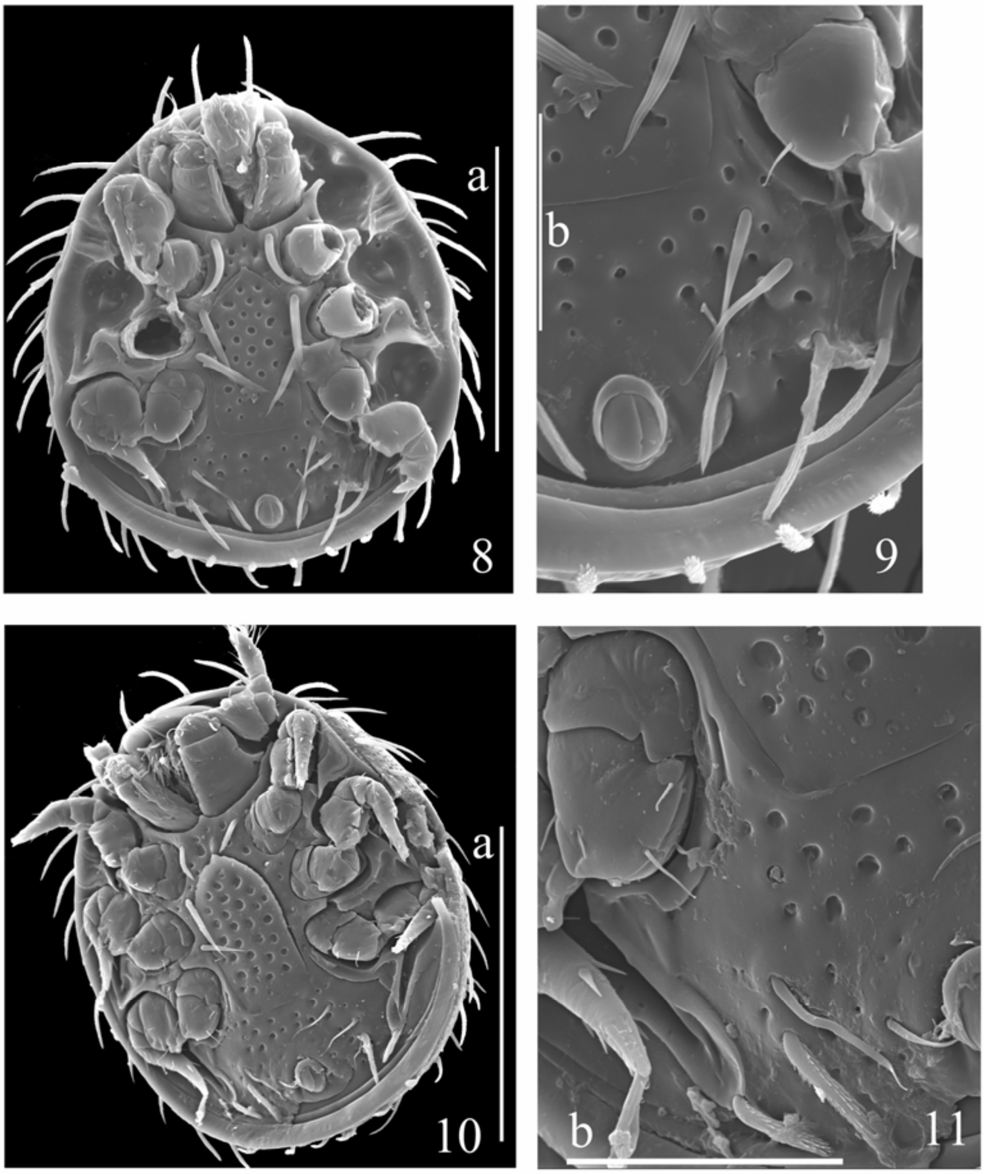
Dorsal side (Fig. 12). Marginal and dorsal shields fused. All dorsal setae short, needle-like and with short hairs on their apical part. Dorsal shield with alveolar ornamentation (Fig. 13).

Ventral side (Fig. 14). Sternal shield without ornamentation, all sternal setae not clearly visible, only St2 and St3 can be seen on the holotype. St2 and St3 smooth, long and needle-like. Their basis can be found near the central part of coxae 3. Pattern on ventral shield lacking, ventral setae are as follows: V2 and V6 short, smooth and needle-like, setae *ad* placed near the posterior margin of anal platelets and similar to V2 and V6 setae. V7 and V8 smooth, needle-like and two times longer than the other ventral setae.

Genital shield triangular, with long anterior process and without ornamentation. Stigmata situated between coxae 2 and 3. Peritreme mushroom-shaped.

Gnathosoma (Fig. 15). Corniculi horn-like, laciniae long and with some spines on their lateral margin. Hypostomal setae are as follows: h1 long, h2 three times and h3 two times shorter than h1. Setae h1, h2 and h3 smooth and needle-like, h4 as long as h2, and with serrated margins. Tritosternum, labrum and chelicera not clearly visible. Epistome with spines on its basal part and with short hairs on its apical margin. Spines and setae of basal part of palps are shown in Fig. 15.

Etymology. The name of the new species refers to the triangular genital shield.



Figures 8–11. Scanning micrograph of the New Guinean *Rotundabaloghia* species. 8 = *R. baloghi* Hirschmann, 1975, ventral view of female, 9 = ventral setae, 10 = *R. mahunkai* Hirschmann, 1975, ventral view of female, 11 = ventral setae. (Scale bars: a: 200 µm, b: 50 µm)

Remarks. The new species belongs to the *angulogynella* species group, which is characterized by the triangular genital shield of the females and the mushrooms-shaped peritreme. The long St2 and St3 setae can not be found in any other species of the *angulogynella* group.

***Rotundabaloghia vietnamensis* n. sp.**

(Figs. 16–24)

Material examined. Holotype: female Vietnam As-672, Paratypes: three males, locality and date same as that of the holotype, and one male Vietnam, Da Lat, Thac Datanla waterfall, 1200 m a.s.l. 07.XII.1994. leg. S. Mahunka.

Diagnosis. Dorsal shield with alveolar ornamentation, dorsal setae needle-like with short hairs on their apical part. Ventral shield without ornamentation, sternal shield with alveolar pattern. Genital shield of female triangular, with long process and without pattern. St2 and St4 short, St3 long and needle-like. V2, V6 and *ad* smooth, short and needle-like, V7 and V8 smooth, needle-like and two times longer than the other ventral setae. Peritreme mushroom-shaped.

Female. Length of idiosoma 350 µm, width 300 µm (n = 1). Shape oval, posterior margin rounded.

Dorsal side (Fig. 16-18). Marginal and dorsal shields fused. All dorsal setae short, needle-like and with short hairs on their apical part. Dorsal shield with alveolar ornamentation (Figs 22-23).

Ventral side (Figs 19 and 21). Sternal shield with alveolar ornamentation, two pairs of depressions can be seen near the anterior margin of genital shield. St1 absent, St2 and St4 smooth, short and needle-like, St3 similar to St2 and St4, but three times longer than St2 and St4. The basis of St2 placed near the anterior margin of coxae 3, St3 near the posterior margin of coxae 3 and the basis of St4 is found near of St3. Pattern of ventral shield lacking, ventral setae are as follows: V2 and V6 short, smooth and needle-like, *ad* absent. V7 and V8 smooth, needle-like and two times longer than the other ventral setae. Lyriform fissures can be found near the lateral margin of genital shield, near the lateral and posterior margins of posterior platelets.

Genital shield triangular, with long anterior process and without ornamentation. Stigmata situated between coxae 2 and 3. Peritreme mushroom-shaped.

Gnathosoma. Corniculi horn-shaped, laciniae long and with some spines on their lateral margin. Hypostomal setae are as follows: h1 long, h2 two times shorter than h1, h3 as long as h1. Setae h1, h2 and h3 smooth and needle-like, h4 not clearly visible. Tritosternum, labrum and epistome not clearly visible. Processus hyalinus can be seen on digitus fixus on the chelicera.

Male. Length of idiosoma 330–350 µm, width 270–300 µm (n = 4). Shape circle, posterior margin rounded.

Dorsal side. Similar to the female.

Ventral side (Figs 20 and 24). Sternal- and ventral shield with alveolar ornamentation. Four pairs of sternal setae (St1, St2, St3 and St4) short, smooth and needle-like. St1 and St2 placed near the anterior margin of coxae 3, St3 is found near the anterior margin of coxae 4. St4 located near the genital shield. Position and shape of ventral setae similar to that of the female, *ad* can be found near the anal platelets. Only one pair of lyriform fissures is seen, this placed near V4.

Genital shield circular and placed between coxae 4.

Gnathosoma. Not clearly visible (covered by coxae 1).

Etymology. The name of the new species refers to the country where it was collected.

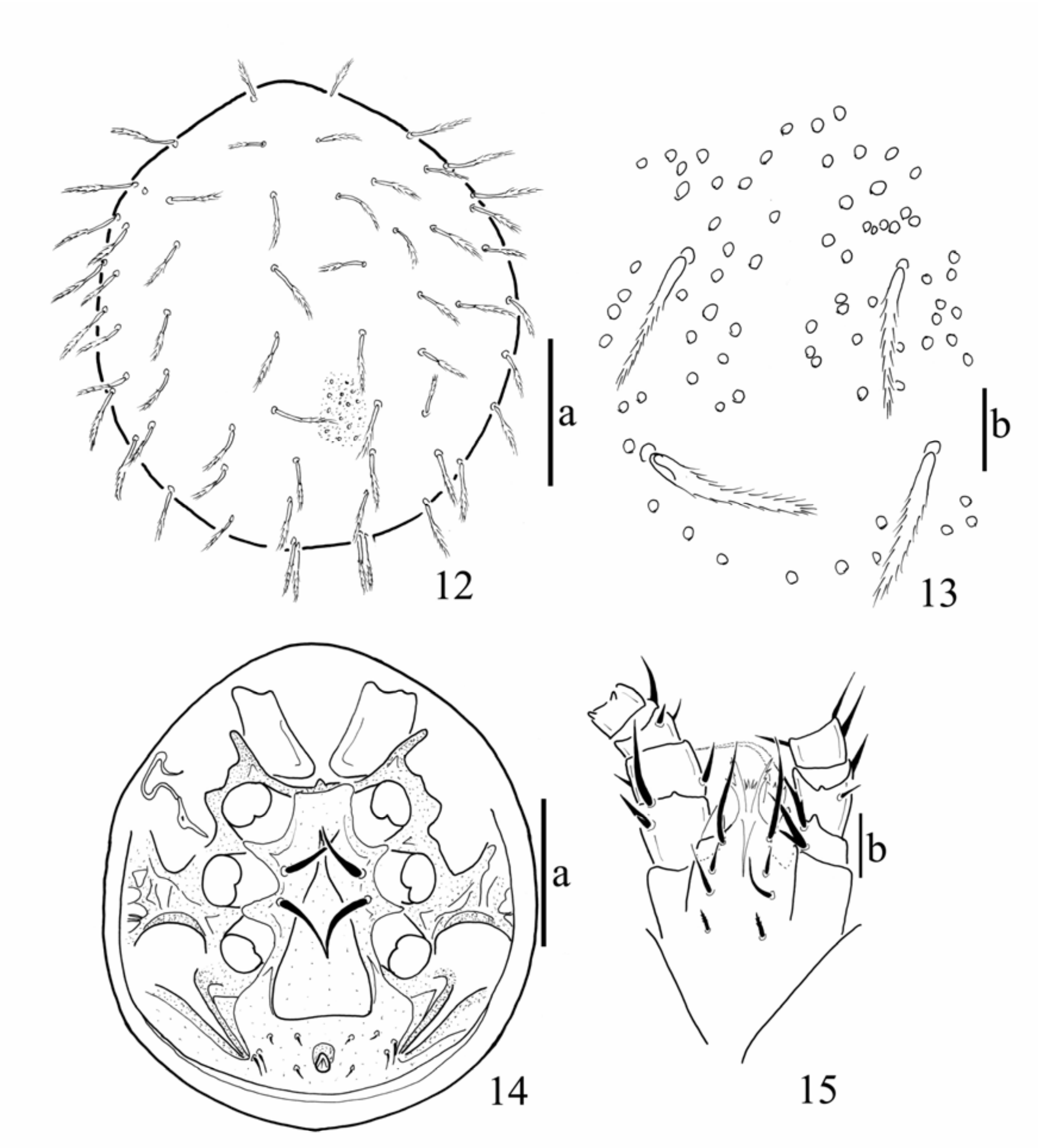
Remarks. This new species belongs to the *angulogynella*-species group, and is very similar to the other species found in Vietnam (*R. triangulata* n. sp.). However, *R. triangulata* lacks alveolar ornamentation on the sternal shield, and St2 setae are long, while *R. vietnamensis* has ornamented sternal shield and St2 setae are short.

Rotundabaloghia danyii n. sp.

(Figs. 25–26)

Material examined. Holotype: female, As-838, Indonesia, Borneo, Gunung Palung National park, Cabang Panti Research Station, Dipterocarp rainforest, 31.XII.2002, leg. L. Dányi.

Diagnosis. Dorsal shield with alveolar ornamentation, dorsal setae needle-like with short hairs on their apical part. Ventral shield without ornamentation, sternal shield with alveolar pattern. Genital shield of female semicircle, with short anterior process and with alveolar pattern. St2 long, St3 and St4 short, smooth and needle-like. V2 and V6 absent, *ad* bulbiform, V7 and V8 smooth, needle-like and as long as St2. Peritreme mushroom-shaped.



Figures 12–15. *Rotundabaloghia triangulata* n. sp. 12 = dorsal view of female, 13 = ornamentation and setae of dorsal shield, 14 = ventral view of female, 15 = ventral view of gnathosoma. (Scale bars: a: 100 µm, b: µm)

Female. Length of idiosoma 370 µm, width 310 µm (n = 1). Shape oval, posterior margin rounded.

Male, nymphs and larva are unknown.

Dorsal side (Fig. 25). Marginal and dorsal shields fused. All dorsal setae short, needle-like and with short hairs on their apical part. Dorsal shield with alveolar ornamentation.

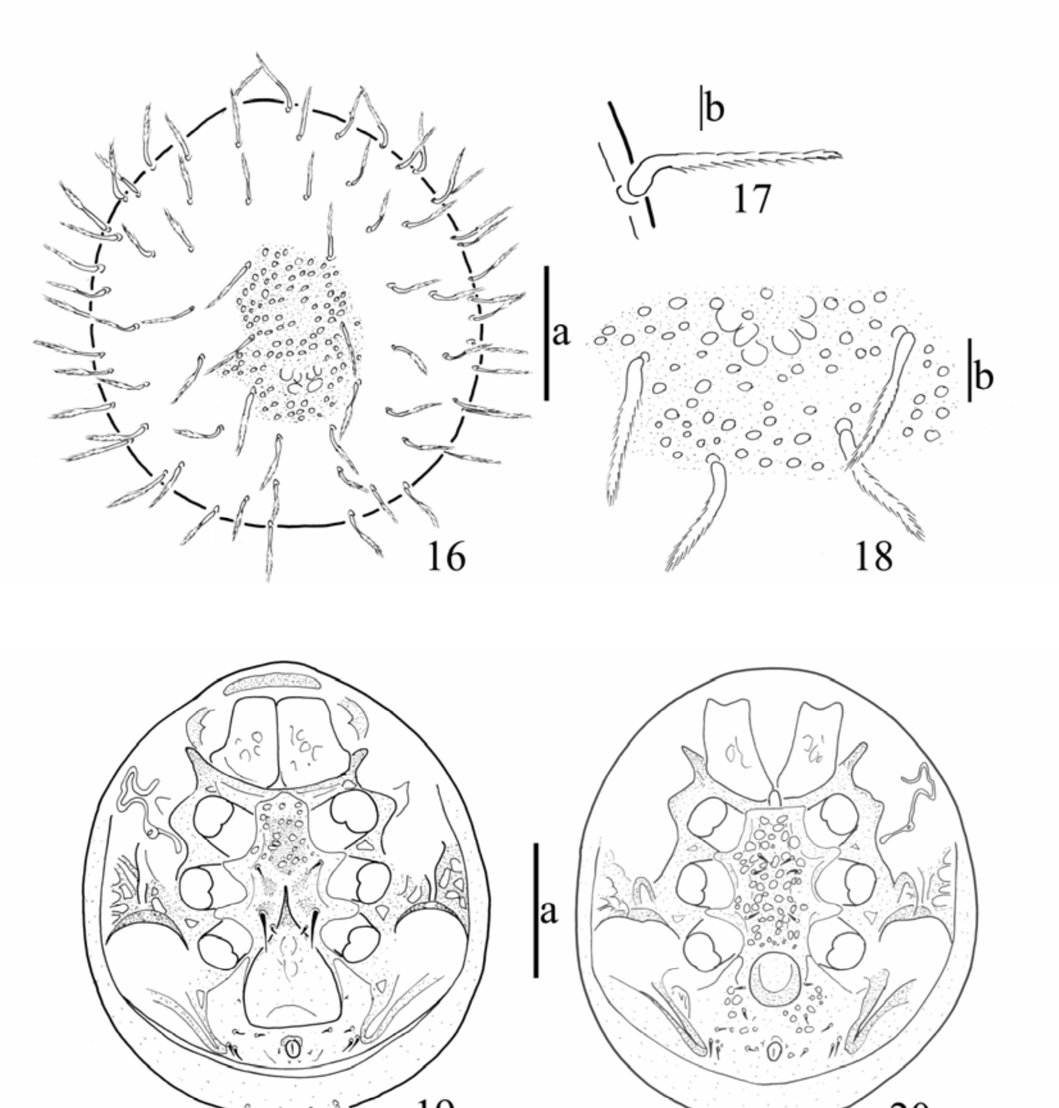
Ventral side (Fig. 26). Sternal shield with alveolar ornamentation, St1 absent, St2 long, smooth and needle-like. St3 and St4 similar to St2, but St3 and St4 two times shorter than St2. The basis of St2 can be found near the anterior part of coxae 3. St3 placed near the anterior margin of coxae 4, St4 localized near the posterior margin of coxae 4. Ornamentation of ventral shield lacking, ventral setae are as follows: V2 and V6 absent, *ad* bulbiform and placed near the anal platelets. V7 and V8 smooth, needle-like, V7 as long as V8.

Genital shield semicircular, with short anterior process and with alveolar ornamentation. Stigmata not clearly visible. Peritreme mushroom-like.

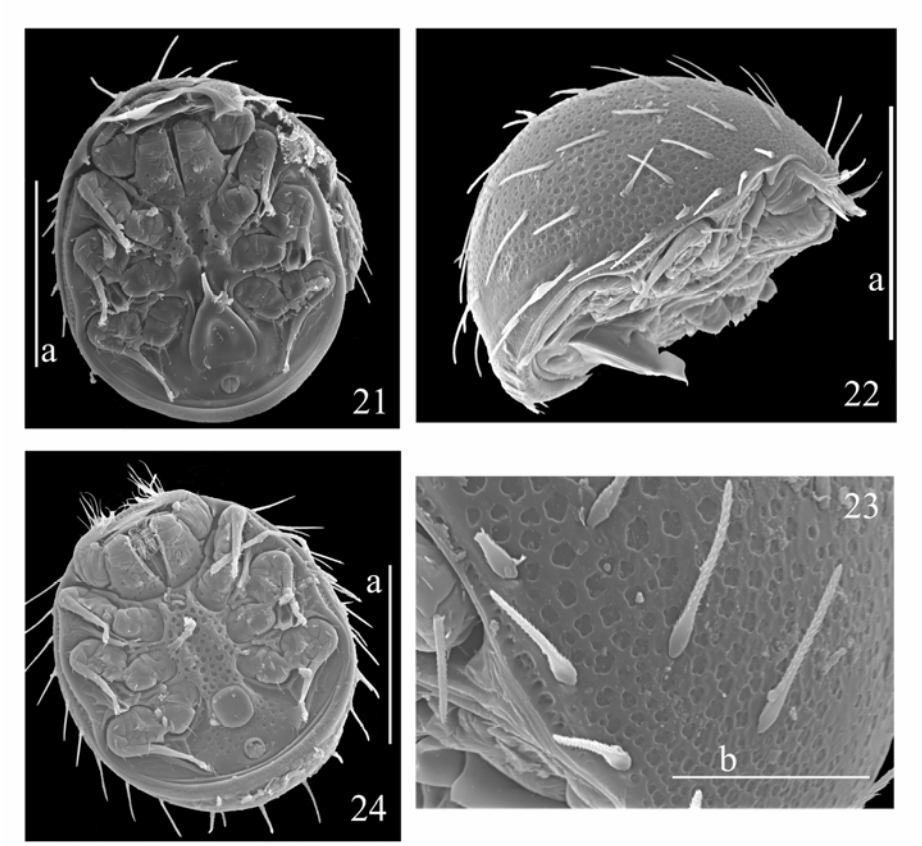
Gnathosoma. Not clearly visible.

Etymology. The new species is dedicated to my colleague and friend, László Dányi, who collected the specimen.

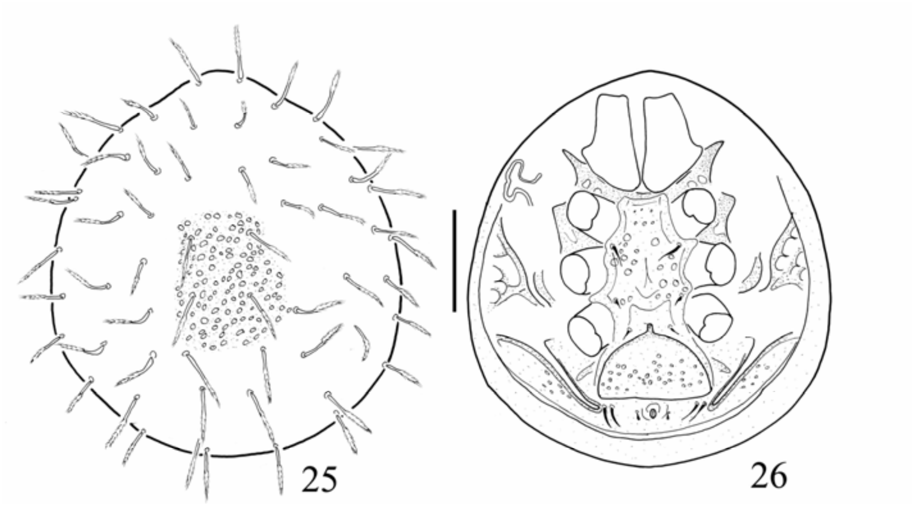
Remarks. The semicircular form of the genital shield in females is unique in the genus *Rotundabaloghia*, all other species are known to possess triangular, scutiform or linguliform genital shield. Hitherto this character was unknown in the *Rotundabaloghia* species.



Figures 16–20. *Rotundabaloghia vietnamensis* n. sp. 16 = dorsal view of female, 17 = dorsal setae from the marginal region, 18 = ornamentation and setae of dorsal shield, 19 = ventral view of female, 20 = ventral view of male. (Scale bars: a: 100 µm, b: µm)



Figures 21–24. Scanning micrograph of *Rotundabaloghia vietnamensis* n. sp. 21 = dorsal view of female, 22 = lateral view of female, 23 = ornamentation and setae of dorsal shield, 24 = ventral view of male. (Scale bars: a: 100 µm, b: µm)



Figures 25–26. *Rotundabaloghia danyii* n. sp. 25 = dorsal view of female, 26 = ventral view of female. (Scale bar: 100 µm)

Rotundabaloghia soliformis Hirschmann, 1992

(Figs. 27–29 and 68)

Rotundabaloghia soliformis Hirschmann, 1992c, p. 82., Fig: p. 82.
Rotundabaloghia soliformis: Wiśniewski & Hirschmann, 1993 p. 72., Wiśniewski, 1993 p. 239.

Material examined. Four females and four males, Ecuador, Ecu. Berl. 151. Pichincha Aguagua volcano (Prov. Pichincha), 4600 m. 19. IV. 1987. 4000 m. Soil and litter from below bushes on a rock rim of a rock wall of S exposure. leg. I. Loksa & A. Zicsi. Two females and two males, Ecuador, Ecu. Berl. 152. Pichincha Aguagua volcano (Prov. Pichincha), 4600 m. 19. IV. 1987. Moss from ground below bushes. leg. I. Loksa & A. Zicsi. Five females and seven males, Ecuador, Ecu. Berl. 154. Pichincha Aguagua volcano (Prov. Pichincha), 4600 m. 19. IV. 1987. Soil and moss from the edge of the rock rim. leg. I. Loksa & A. Zicsi. Four females and four males, Ecuador, Ecu. Berl. 128. Antisana volcano, road leading W, downwards to Pintag, 3600 m. 17. IV. 1987. 3000 m. Soil and litter from below shrubs, about 50 m above stream level. leg. I. Loksa & A. Zicsi. One female and four males, Ecuador, Ecu. Berl. 188. 32 km from Otavalo, on the way to Selva Alegre, 3700 m. 22. IV. 1987. Debris and moss of decomposing tree trunk. leg. I. Loksa & A. Zicsi.

Female. Length of idiosoma 360–370 µm, width 310–320 µm (n = 16). Shape circular, posterior margin rounded.

Dorsal side (Fig. 27). Marginal and dorsal shields fused. All dorsal setae needle-like and smooth. Ornamentation of dorsal shield lacking.

Ventral side (Figs 28 and 68). Sternal and ventral shield without ornamentation. Sternal setae short smooth and needle-like. One pair of lyriform fissures can be seen near setae St1. Distances between St1 and St2, furthermore between St2 and St3 four times longer than distance between St3 and St4. Ventral setae are as follows: V2 short, as long as V6, V7 and V8 1.5 times longer than V2 and V6. V7 is near V8. Setae *ad* as long as V2. All of the ventral setae smooth and needle-like.

Genital shield long and narrow, linguliform, and without process or ornamentation. Stigmata situated between coxae 2 and 3. Peritreme hook-form.

Gnathosoma: not clearly visible (covered by coxae 1)

Male. Length of idiosoma 400–410 µm, width 330–340 µm (n = 21). Shape circle, posterior margin rounded.

Dorsal side. Similar to that of the female. Marginal and dorsal shield fused. All dorsal setae needle-like and smooth. Dorsal shield without ornamentation.

Ventral side (Fig. 29). Sternal and ventral shield without ornamentation. Sternal setae short smooth and needle like. Distance between St1 and St2 two times longer than the distance between St3 and St4. Distance between St2 and St3 1.5 times longer then the distance between St3 and St4. One pair of lyriform fissures can be seen near of setae St5. Ventral setae are as follows: V2 short, as long as V6, V7 and V8 1.5 times longer than V2 and V6. V7 is near of V8. Setae *ad* as long as V2. All of the ventral setae smooth and needle-like.

Genital shield alveolar and placed between coxae 4. Stigmata situated between coxae 2 and 3. Peritreme hook-shaped.

Gnathosoma. Not clearly visible (covered by coxae 1).

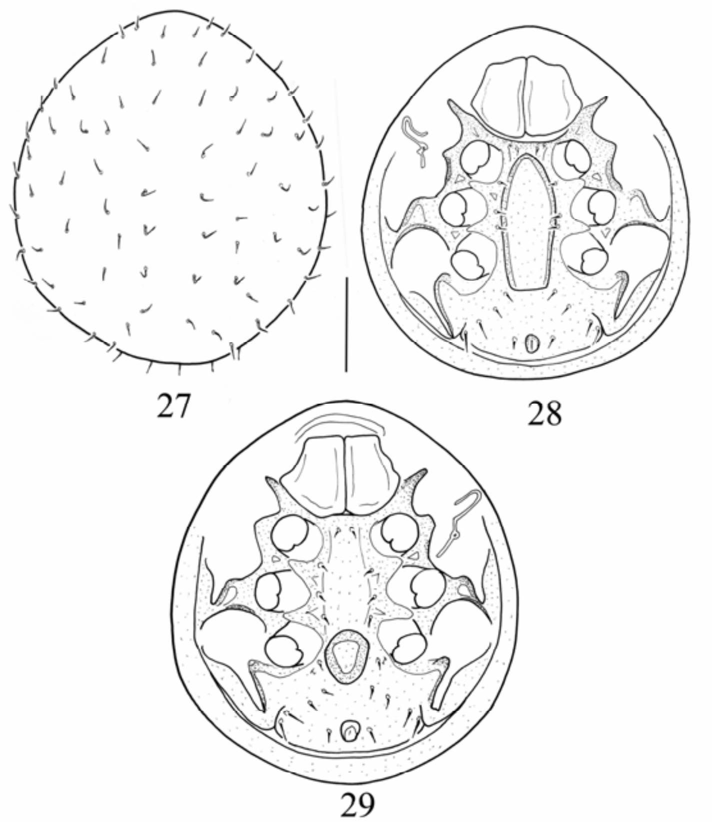
Distribution. Ecuador.

Rotundabaloghia baczaensis Hirschmann, 1992

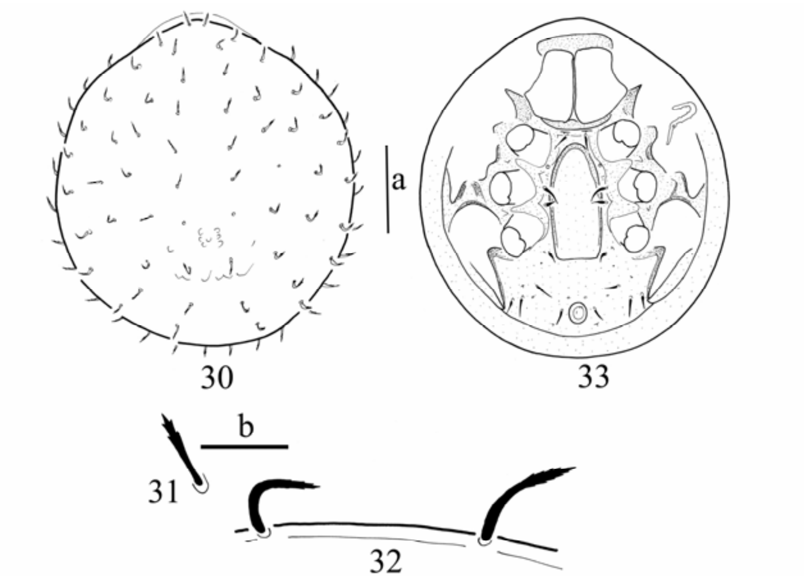
(Figs. 30–33)

Rotundabaloghia baczaensis Hirschmann: 1992c, p. 85., Fig: p. 84.
Rotundabaloghia baczaensis: Wiśniewski & Hirschmann 1993 p. 71., Wiśniewski 1993 p. 239.

Material examined. One female, Ecuador, Ecu. Berl. 152. Pichincha Aguagua volcano (Prov. Pichincha), 4600 m. 19. IV. 1987. Moss from ground below bushes. leg. I. Loksa & A. Zicsi. Three females, Ecuador, Ecu. Berl. 127. Antisana volcano, road leading W, downwards to Pintag, 3600 m. 17. IV. 1987. 3600 m. Paramo; cushion-plants. leg. I. Loksa & A. Zicsi.



Figures 27–29. *Rotundabaloghia soliformis* Hirschmann, 1992. 27 = dorsal view of female, 28 = ventral view of female, 29 = ventral view of male. (Scale bar: 100 µm)



Figures 30–33. *Rotundabaloghia baczaensis* Hirschmann, 1992. 30 = dorsal view of female, 31 = j1 seta, 32 = dorsal setae, 33 = ventral view of female. (Scale bars: a = 100 µm, b = 20 µm)

Female. Length of idiosoma 370–400 µm, width 340–350 µm (n = 4). Shape circle, posterior margin rounded.

Dorsal side (Fig. 30). Marginal and dorsal shields fused. All dorsal setae needle-like and their margin provided with some short spines (Figs 31–32). Pattern of dorsal shield is lacking.

Ventral side (Fig. 33). Sternal and ventral shield without ornamentation. Sternal setae long, smooth and needle like. One pair of lyriform fissures can be seen on the anterior margin of sternal shield near setae St1. St1 placed near the anterior margin of coxae 2, St2 near the posterior margin of coxae 2, St3 and St4 can be found near coxae 3. Distance between St3 and St4 shorter than the distance between St2 and St3. Ventral setae are as follows: V2 placed near the posterior margin of genital shield. V2 short and as long as V6, V7 and V8 1.5 times longer than V2 and V6. V7 can be found near V8. Setae *ad* as long as V2. All of ventral setae smooth and needle-like.

Genital shield linguliform, and without process and ornamentation. Stigmata situated between coxae 2 and 3. Peritreme hook-shaped.

Gnathosoma. Not clearly visible (covered by coxae 1)

Distribution. Ecuador.

Rotundabaloghia ecuadorensis Hirschmann, 1992

(Figs. 34–41 and 69–70)

Rotundabaloghia ecuadorensis Hirschmann: 1992c, p. 91., Fig: p. 92.
Rotundabaloghia ecuadorensis: Wiśniewski & Hirschmann 1993 p. 96., Wiśniewski 1993 p. 239.

Material examined. One female and three males, Ecuador, E. 28. Prov Tungurahura 3 km before the Laguna Pisayambo 3800 m, swampy slope. 06. V. 1993. leg. A. Zicsi, Cs. Csuzdi & M. Florenzio. Seven females and five males, Ecuador, E. 18. Prov. Tungurahura. Leaving San Jose de Poalo, 3700 m. 05. V. 1993. leg. A. Zicsi, Cs. Csuzdi & M. Florenzio. Three females and one male, Ecuador, E. 34. Prov Tungurahura. Above the Pucara hydroelectric station, 3420 m. 07. V. 1993. leg. A. Zicsi, Cs. Csuzdi & M. Florenzio. One female and two males, Ecuador, Ecu. Berl. 128. Antisana volcano, road leading W, downwards to Pintag, 3600 m. 17. IV. 1987. 3000 m. Soil and litter from below shrubs, about 50 m above stream level. leg. I. Loksa & A. Zicsi. One female, Ecuador, Ecu. Berl. 192. 30 km from Otavalo, on the way to Selva Alegre, 3900 m. 22. IV. 1987. Paramo vegetation; small plants from among tussocks. leg. I. Loksa & A. Zicsi. One female and two males, Ecuador, Ecu. Berl. 193. 30 km from Otavalo, on the way to Selva Alegre, 3900 m. 22. IV. 1987. Roots and detritus of tussocks. leg. I. Loksa & A. Zicsi.

Female. Length of idiosoma 370–380 µm, width 330–340 µm (n = 7). Shape circular, posterior margin rounded.

Dorsal side (Fig. 34). Marginal and dorsal shields fused. All dorsal setae needle-like and bear short hairs on their apical part (Figs. 35–37). Ornamentation of dorsal shield lacking, only on central part can be seen alveolar pattern (Fig 36).

Ventral side (Figs 38 and 69). Sternal- and ventral shield without ornamentation. Sternal setae short smooth and needle like. St1 placed near the anterior margin of sternal shield, St2 placed near the posterior margin of coxae 2, St3 near the central part of coxae 3, and St4 near the anterior margin of coxae 4. One pair of lyriform fissures can be seen near of setae St1 and on posterior part of coxae 4. Ventral setae are as follows: V2 short and placed near the basal part of genital shield. V6, V7 and V8 two times longer than V2. Setae *ad* as long as V2. All of ventral setae smooth and needle-like.

Genital shield scutiform, and without process and with alveolar ornamentation on the central region. Stigmata situated between coxae 2 and 3. Peritreme hook-like.

Gnathosoma (Fig. 39). Corniculi horn-like, laciniae smooth and long, apical part of labrum with hairs. Hypostomal setae: h1 long, smooth and needle-like, h2 twice shorter then h1 smooth and needle-like, h3 smooth and needle-like, as long as h4, h4 with serrated margin. Epistome and tritosternum not clearly visible. Chelicera with nodus and fixed digit with sensillus (Fig. 40).

Male. Length of idiosoma 360–370 µm, width 320–330 µm (n = 5). Shape circle, posterior margin rounded.

Dorsal side. Similar to the females. Marginal and dorsal shields fused. All dorsal setae needle-like and bear short hairs on their apical part.

Alveolar ornamentation can be found on central part of dorsal shield, the pattern on the other part of dorsal shield lacking.

Ventral side (Figs 41 and 70). Sternal- and ventral shield without ornamentation. Sternal setae smooth, needle like and with different size. St1 placed near the anterior margin of sternal shield, St2 placed near the posterior margin of coxae 2, St3 near the central part of coxae 3, and St4 near the anterior margin of coxae 4, St5 near the posterior margin of genital shield. One pair of lyriform fissures can be seen near setae St1 and St5. St1 short, three times shorter than St2, St2 as long as St5, St3 and St4 1.5 times longer than St2. Ventral setae are as follows: V2 short. V6, V7 and V8 two times longer than V2. Setae *ad* as long as V2. All of the ventral setae smooth and needle-like.

Genital shield alveolar and placed between coxae 4. Stigmata situated between coxae 2 and 3. Peritreme hook-shaped.

Distribution. Ecuador.

Rotundabaloghia zicsiana n. sp.

(Figs. 42–45)

Material examined. Holotype: female, Ecuador, E. 5. Prov. Cotopaxi. Toward Latacunga at the foot of Cotopaxi Volcano. 04. V. 1993. leg. A. Zicsi & Cs. Csuzdi & M. Florenzio. Paratype: one female locality and date same as the holotype.

Diagnosis. Dorsal shield without ornamentation, dorsal setae needle-like with short hairs on their apical part. Ventral and sternal shields without ornamentation. Genital shield of female linguliform, without process and pattern. V6 setae lacking. Peritreme hook-from.

Description. Female. Length of idiosoma 300–310 µm, width 250–260 µm (n = 2). Shape oval, posterior margin rounded.

Male, nymphs and larva are unknown.

Dorsal side (Fig. 42). Marginal and dorsal shields fused. All dorsal setae short, needle-like and with short hairs on their apical part (Fig. 43). Dorsal shield without ornamentation.

Ventral side (Fig. 44). Sternal shield without ornamentation, all sternal setae smooth and needle-like. St1 placed near the anterior margin of sternal shield, St2 near the posterior margin of coxae 2, St3 and St4 near the posterior margin of coxae 3. Pattern of ventral shield lacking, ventral setae (V7 and V8 present, V6 absent) smooth, setiform and as long as sternal setae. V2 placed near the posterior margin of genital shield. Setae *ad* as long as the ventral setae. Lyriform fissures can be found near V2 and between V7 and V8.

Genital shield linguliform, without process and ornamentation. Stigmata situated between coxae 2 and 3. Peritreme hook-form.

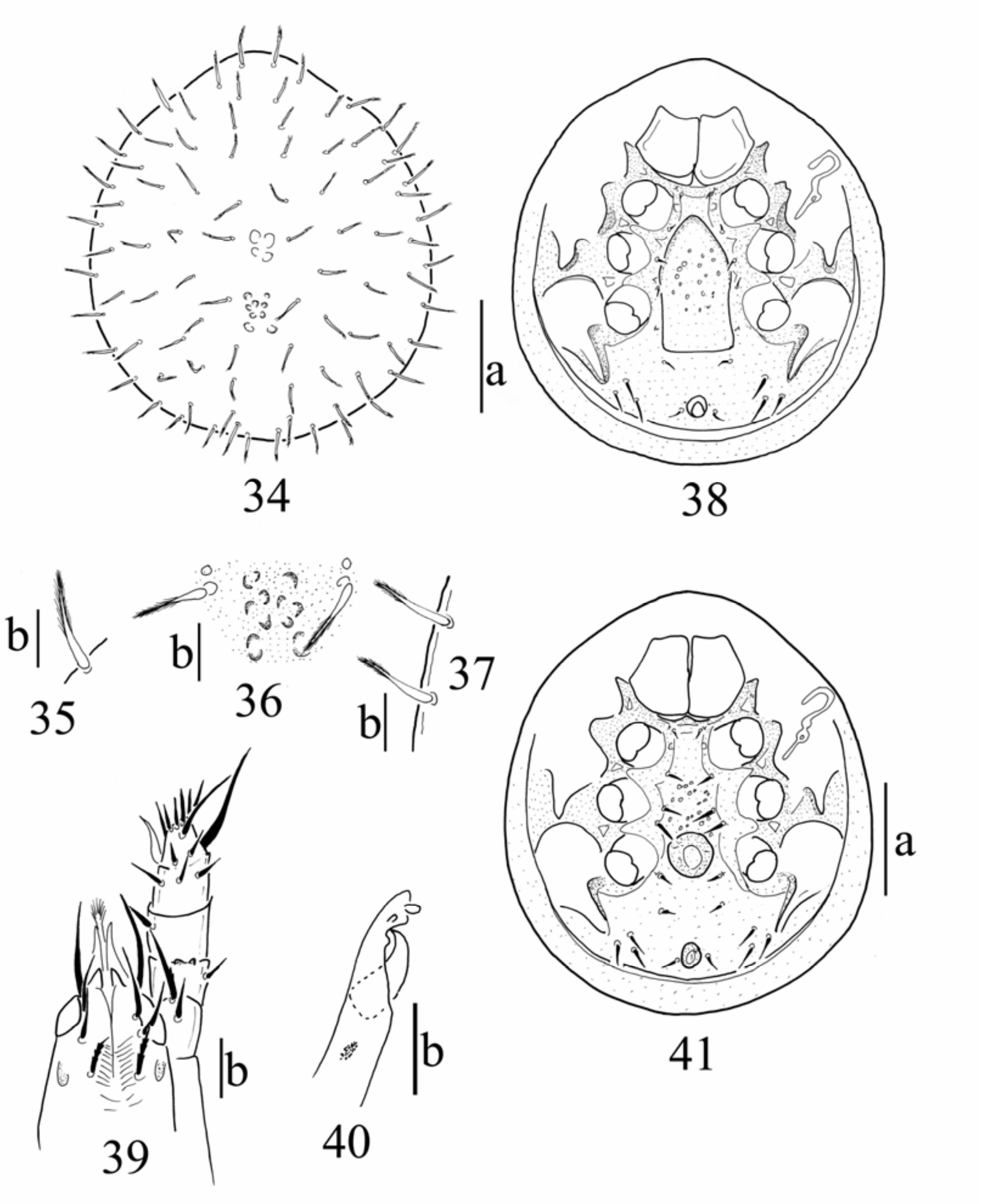
Gnathosoma (Fig. 45). Corniculi horn-like, laciniae long and smooth. Hypostomal setae are follow: h1 long, needle-like, basal part with serrated margin, h2 and h3 shorter than h1, smooth and needle-like, h4 shorter than h2, needle-like and smooth. Tritosternum with narrow basis, laciniae not clearly visible. Labrum and chelicera not clearly visible and apical part of epistome with short hairs and its basal part with spines.

Etymology. I dedicate the new species to Prof. András Zicsi, the renowned earthworm specialist, who collected soil samples in Ecuador.

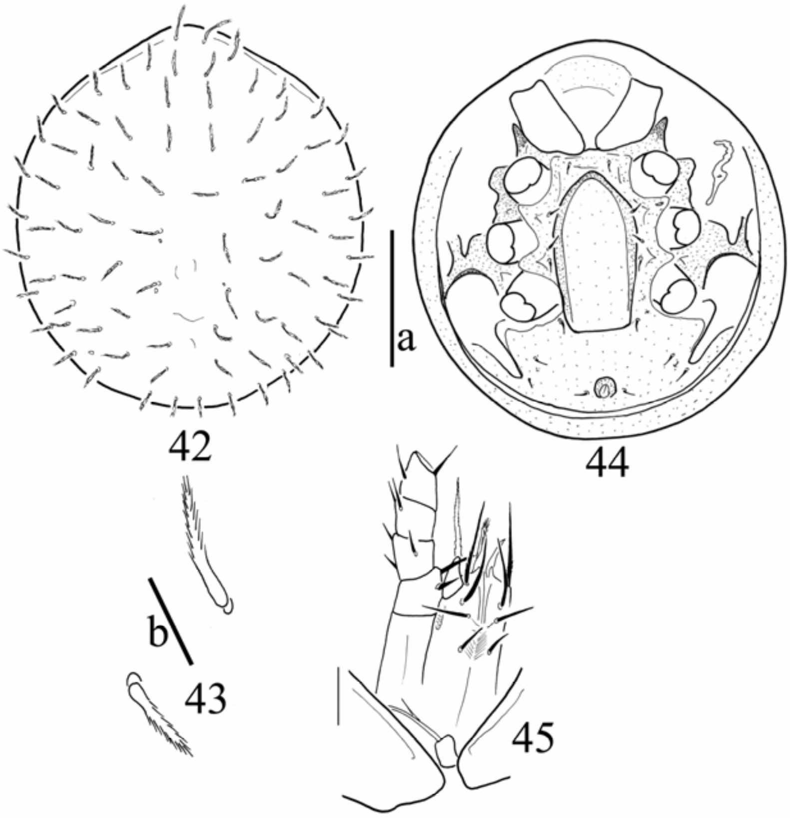
Remarks. The new species is similar to the species *Rotundabaloghia venezuelae* Hirschmann, 1992. The most important differences between the two species are shown in Table 1.

Table 1. Morphological differences between the species *R. venezuelae* and *R. zicsiana*

	R. venezuelae	*R. zicsiana*
Shape of genital shield	scutiform	linguliform
Place of St2	near the central part of coxae 2	near the posterior margin of coxae 2



Figures 34–41. *Rotundabaloghia ecuadorensis* Hirschmann, 1992. 34 = dorsal view of female, 35 = j1 seta, 36 = ornamentation on the dorsal shield, 37 = dorsal setae, 38 = ventral view of female, 39 = ventral view of gnathosoma, 40 = chelicera, 41 = ventral view of male. (Scale bars: a = 100 µm, b = 20 µm)



Figures 42–45. *Rotundabaloghia zicsiana* n. sp. 42 = dorsal view of female, 43 = dorsal setae, 44 = ventral view of female, 45 = ventral view of gnathosoma. (Scale bars: a = 100 µm, b = 20 µm)

Rotundabaloghia reticuloides n. sp.

(Figs. 46–49)

Material examined. Holotype: female, Ecuador, Ecu. Berl. 191. 32 km from Otavalo, on the way to Selva Alegre, 3700 m. 22. IV. 1987. Wet soil and detritus of a ferny area along the creek (on creek level). leg. I. Loksa & A. Zicsi. Paratypes: one female and two males, locality and date same as holotype.

Diagnosis. Dorsal shield with fine alveolar ornamentation, dorsal setae needle-like with short hairs on their apical margin. Ventral and sternal shields of female without ornamentation, genital shield of female with reticulate pattern. Ventral shield smooth, sternal shield of male with reticulate ornamentation. All sternal setae smooth, needle-like and shorter than ventral setae by both sexes. Peritreme hook-like.

Female. Length of idiosoma 460–470 µm, width 400–420 µm (n = 2). Shape oval, posterior margin rounded.

Nymphs and larva unknown.

Dorsal side (Fig. 46). Marginal and dorsal shield fused. All dorsal setae short, needle-like with short hairs on their apical margin. One pair of lyriform fissure can be seen on the central part of dorsal shield which bears fine alveolar ornamentation (Fig. 47)

Ventral side (Fig. 48). Sternal shield without ornamentation, all sternal setae smooth, short and needle-like. St1 placed near the anterior margin of coxae 2, St2 near the posterior margin of coxae 2, St3 near central region of coxae 3, St4 placed near the anterior margin of coxae 4. Ornamentation of the ventral shield lacking, all ventral setae twice as long as the sternal setae furthermore smooth and needle-like. V2 placed near the posterior margin of genital shield. Setae *ad* as long as the ventral setae. V3 absent. Lyriform fissures can be found near V2.

Genital shield linguliform, without process and with reticulate ornamentation. Stigmata situated between coxae 2 and 3. Peritreme hookform.

Gnathosoma. Not clearly visible (covered by coxae 1).

Male. Length of idiosoma 440–460 µm, width 410–420 µm (n = 2). Shape circle, posterior margin rounded.

Dorsal side. Similar to the females. Marginal and dorsal shield fused. All dorsal setae short, needle-like with short hairs on their apical part. Dorsal shield with fine alveolar ornamentation.

Ventral side (Fig. 49). Sternal shield with reticulate ornamentation, all sternal setae short, smooth and needle-like. St1 placed near the anterior margin of coxae 2, St2 near the posterior margin of coxae 2, St3 near central region of coxae 3, St4 near the anterior margin of genital shield. Ornamentation of ventral shield lacking, all ventral setae twice as long as the sternal setae, smooth and needle-like. V2 placed near the posterior margin of genital shield. V3 present and as long as *ad*. Setae *ad* 1.5 times shorter than the other ventral setae (V6, V7 and V8). Lyriform fissures near V2.

Genital shield alveolar and placed between posterior margins of coxae 4. Stigmata situated between coxae 2 and 3. Peritreme hook-like.

Gnathosoma. Not clearly visible (covered by coxae 1).

Distribution. Ecuador.

Etymology. The name of the new species refers to the ornamentation of genital shield of female.

Remarks. The reticulate pattern on the genital shield of female and on the sternal shield of male is unique by species of this genus in Central- and South-America.

***Rotundabaloghia ecuadorica* n. sp.**

(Figs. 50–53)

Material examined. Holotype: female, Ecuador, Ecu. Berl. 36. Chimborazo SW, Loma Yanausha, 4000 m. 3. IV. 1987. Cushion-plants from grazed area. leg. I. Loksa & A. Zicsi. Paratypes: two females and two males, locality and date same as holotype.

Diagnosis. Dorsal shield with fine alveolar ornamentation, dorsal setae needle-like. Sternal shield smooth, but the ventral shield bears alveolar ornamentation at the female and the sternal shield of male possesses alveolar pattern. Ornamentation of the ventral shield by both sexes alveolar. V7 and V8 setae bear hairs on their margins. Peritreme P-shaped.

Female. Length of idiosoma 340–370 µm, width 330–340 µm (n = 3). Shape oval, posterior –margin rounded.

Nymphs and larva are unknown.

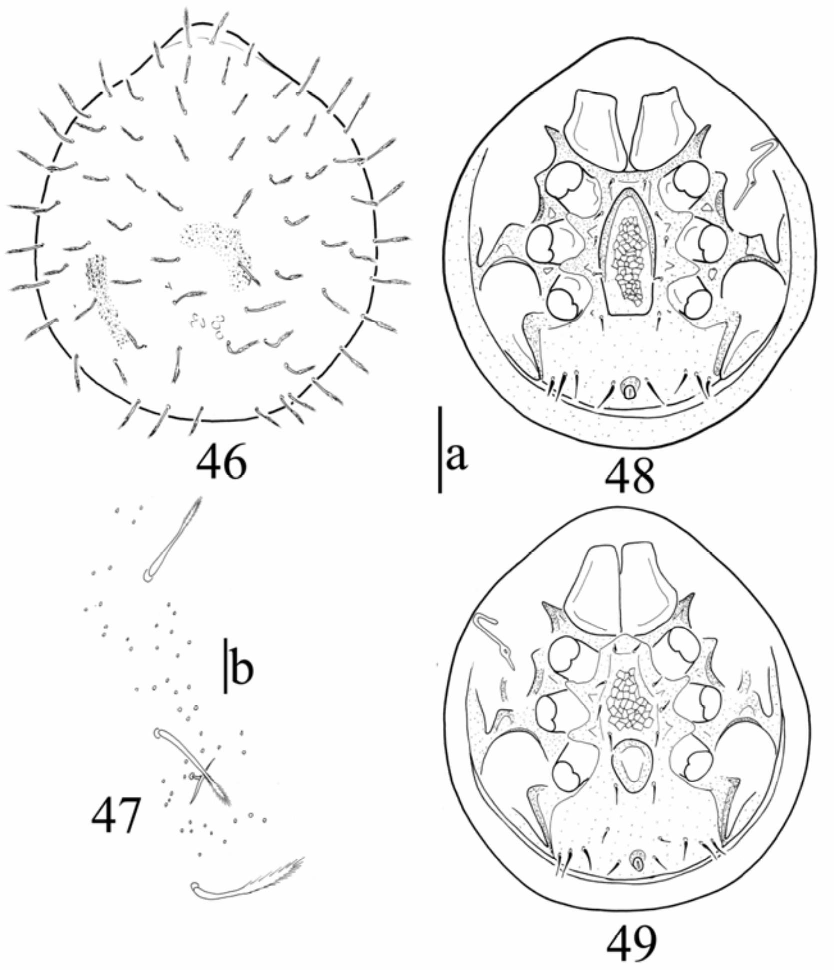
Dorsal side (Fig. 50). Marginal and dorsal shield fused. All dorsal setae short, smooth and needle-like. Fine alveolar ornamentation can be found on the dorsal shield.

Ventral side (Fig. 51). Sternal shield without ornamentation, all sternal setae smooth, short and needle-like. St1 placed near the anterior margin of coxae 2, St2 near the posterior margin of coxae 2, St3 near the central region of coxae 3, St4 is near the anterior margin of coxae 4. Alveolar ornamentation on the ventral shield present. V2, *ad* and V6 smooth and needle-like, V3 absent, V7 and V8 with hairs on their margins (Fig. 52). Lyriform fissures near V2 and between V6 and V7.

Genital shield linguliform, without process and with alveolar ornamentation. Stigmata situateed between coxae 2 and 3. Peritreme characteristic P-shaped.

Gnathosoma. Not clearly visible (covered by coxae 1).

Male. Length of idiosoma 440–460 µm, width 410–420 µm (n = 2). Shape circular, posterior margin rounded.



Figures 46–49. *Rotundabaloghia reticuloides* n. sp. 46 = dorsal view of female, 47 = dorsal setae and ornamentation, 48 = ventral view of female, 49 = ventral view of male. (Scale bars: a = 100 µm, b = 20 µm).

Dorsal side. Similar to that of the females. Marginal and dorsal shield fused. All dorsal setae short, smooth and needle-like. Dorsal shield with fine alveolar ornamentation.

Ventral side (Fig. 53). Sternal shield with alveolar ornamentation, all sternal setae short, smooth and needle-like. St1 placed near the anterior margin of coxae 2, St2 near the posterior margin of coxae 2, St3 near the central region of coxae 3, St4 placed near the anterior margin of genital shield. Ornamentation of the ventral shield alveolar, V2, V3, *ad* and V6 smooth and needle-like, V7 and V8 with hairs on their margins.

Genital shield alveolar and placed between posterior margins of coxae 4. Stigmata situated between coxae 2 and 3. Peritreme characteristic P-shaped.

Gnathosoma. Not clearly visible (covered by coxae 1).

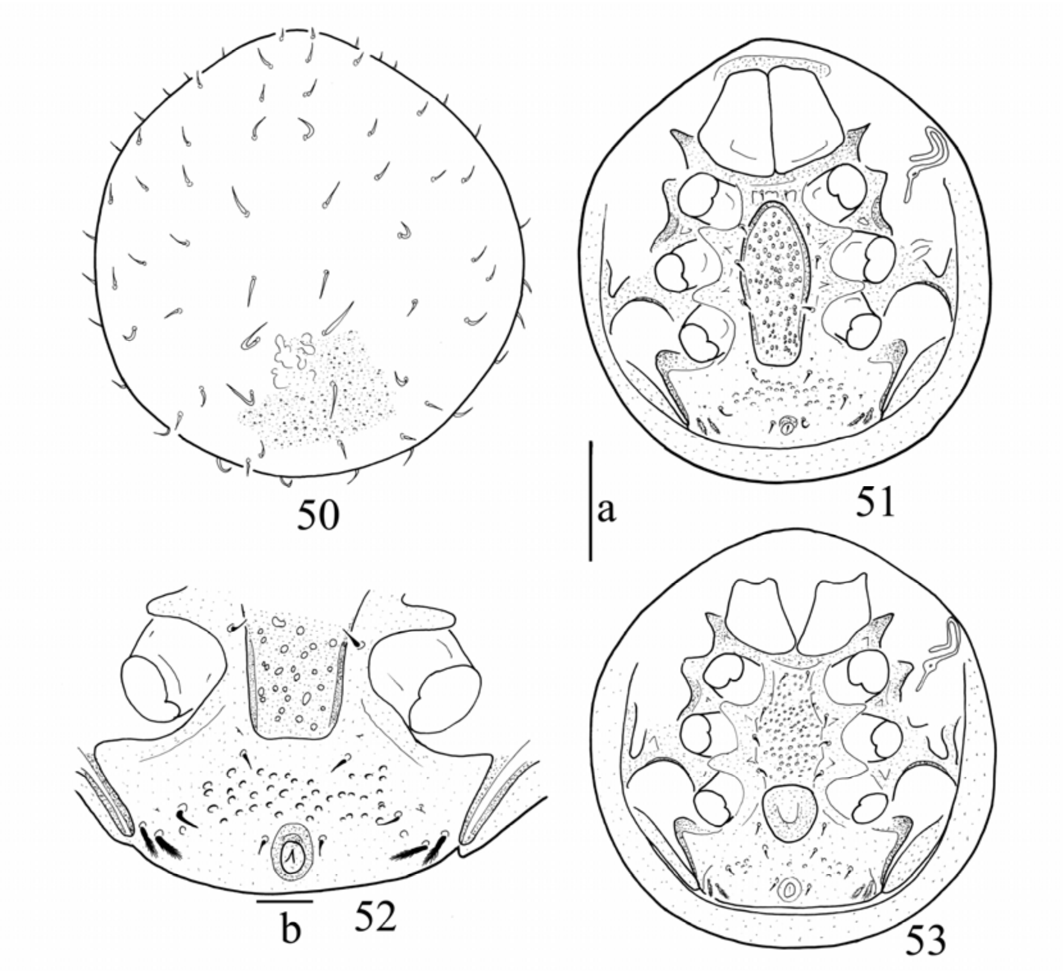
Distribution. Ecuador.

Etymology. The name of the new species refers to the country where the species was collected.

Remarks. The new species belongs to the *mahunkai*-species group (the common characters of this group are the followings: ornamentation on genital- and ventral shields presents furthermore V7 and V8 bear hairs on their margin). Only one species is known from this species group from Central and South America (*R. monserratensis* Hirschmann, 1992). The new species differs from *R. monserratensis* in the characters shown in Table 2.

Table 2. Morphological differences between *R. ecuadorica* and *R. monserratensis*

	R. ecuadorica	*R. monserratensis*
Length of sternal setae	short (St2 not reach to basis of St3)	long (St2 reach to basis of St3)
Length of ventral setae	short (V2 not reach to basis of V6)	long (V2 reach to basis V6)
Shape of peritreme	characteristic P-shaped	hook-shaped



Figures 50–53. *Rotundabaloghia ecuadorica* n. sp. 50 = dorsal view of female, 51 = ventral view of female, 52 = ventroanal region of female, 53 = ventral view of male. (Scale bars: a = 100 µm, b = 20 µm)

Rotundabaloghia resinae Hirschmann, 1992

(Figs. 54–57 and 71)

Rotundabaloghia resinae Hirschmann: 1992b, p. 63., Fig: p. 62.

Rotundabaloghia resinae: Wiśniewski & Hirschmann 1993 p. 79., Wiśniewski 1993 p. 235.

Material examined. One female and four males, from Colombia, near Rio Claro, from lichens and moss, 05.X.-15.XI.1984. leg. J. Balogh and six females and eight males, from Colombia, near Rio Claro, from leaf litter, 05.X.-15.XI.1984. leg. J. Balogh.

Female. Length of idiosoma 330–340 µm, width 300–310 µm (n = 7). Shape circle, posterior margin rounded.

Dorsal side (Fig. 54). Marginal and dorsal shield fused. All dorsal setae needle-like and bear short hairs on their apical part (Fig 55). Ornamentation of dorsal shield lacking.

Ventral side (Fig. 56). Sternal and ventral shield without ornamentation. Sternal setae short smooth and needle-like. St1 placed the anterior margin of genital shield, St2 placed near the posterior margin of coxae 2, St3 and St4 near coxae 3, St 5 can be seen near the posterior margin of genital shield. One pair of lyriform fissures can be seen near St5. Ventral setae are as follows: V2 short. V6, V7 and V8 two times longer than V2. Setae *ad* as long as V2. All ventral setae smooth and needle-like.

Genital shield long, apical part wider than the basal part, linguliform, and without process and ornamentation. Stigmata situated between coxae 2 and 3. Peritreme hook-shaped.

Gnathosoma. Not the entire gnathosoma is visible. Visible part is as follows: corniculi horn-like, laciniae smooth, apical part subdivided with two short branches. Hypostomal setae: h1 long, smooth and needle-like, h2 twice shorter then h1 smooth and needle-like, h3 as long as h2, their margin serrated. Epistome with serrated margin on its basal part and short hairs on its apical part. Tritosternum not clearly visible. Chelicera with nodus and fixed digit with sensillus.

Male. Length of idiosoma 340–350 µm, width 310–320 µm (n = 12). Shape circle, posterior margin rounded.

Dorsal side. Similar to the females. Marginal and dorsal shields fused. All dorsal setae needle-like and bear short hairs on their apical part. Dorsal shield without ornamentation.

Ventral side (Figs 57 and 71). Sternal and ventral shield without ornamentation. Sternal setae short smooth, needle like and arranged in two lines in the central region of the sternal shield. Distance between St1 and St2 two times longer than distances between St2 and St3, and St3 and St4. Ventral setae are as follows: V2 short. V6, V7 and V8 two times longer than V2. Setae *ad* as long as V2. All of the ventral setae smooth and needle-like.

Genital shield alveolar and placed between coxae 4. Stigmata situated between coxae 2 and 3. Peritreme hook-shaped.

Gnathosoma. Not clearly visible (covered by coxae 1).

Distribution. Colombia.

Rotundabaloghia coricoensiformis n. sp.

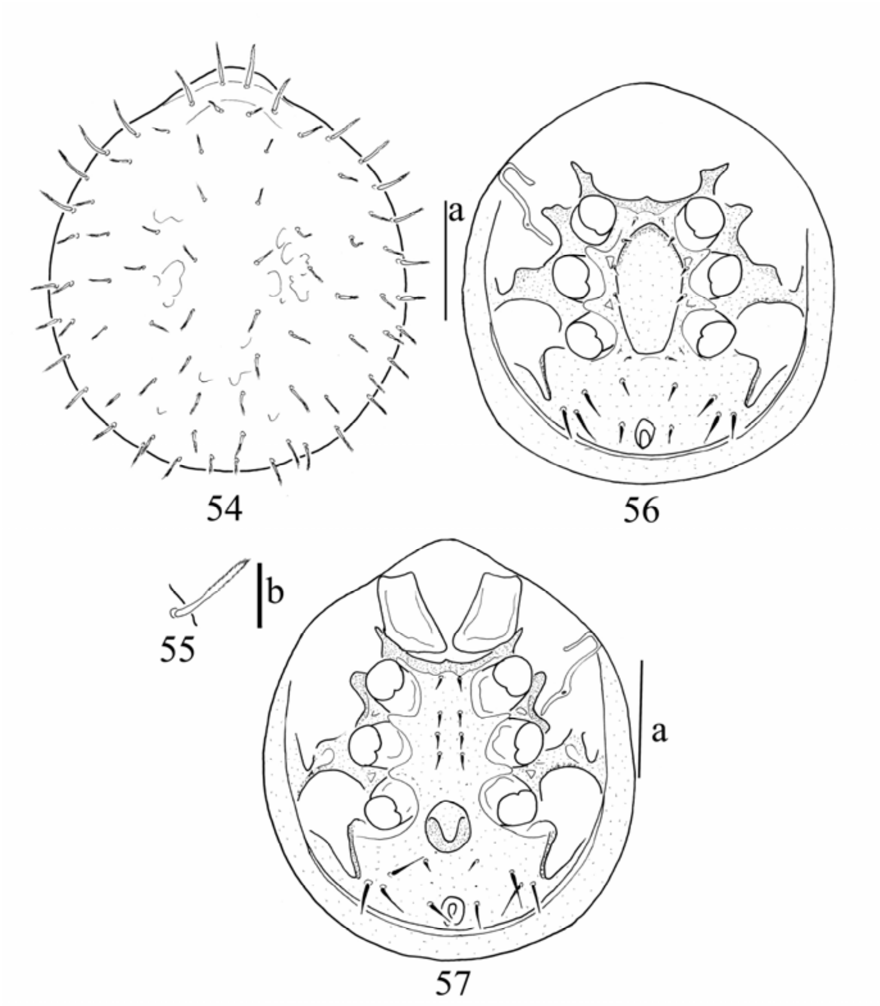
(Figs. 58–60)

Material examined. Holotype: female from Columbia, near Rio Claro, from leaf litter, 05.X.-15.XI.1984. leg. J. Balogh. Paratype: one female and one male from Colombia, near Rio Claro, from leaf litter, 05.X.-15.XI.1984. leg. J. Balogh, and one male from Colombia, near Rio Claro, from lichens and moss, 05.10.-15.11.1984. leg. J. Balogh.

Diagnosis. Dorsal shield ornamentation lacking, dorsal setae needle-like. Ventral and sternal shields without ornamentation. St3 of female three times longer than other sternal setae. Genital shield of female linguliform, without process and pattern. All ventral setae long, smooth and needle-like. Peritreme hook-from.

Female. Length of idiosoma 320–330 µm, width 290–300 µm (n = 2). Shape oval, posterior margin rounded.

Nymphs and larva are unknown.



Figures 54–57. *Rotundabaloghia resinae* Hirschmann, 1992. 54 = dorsal view of female, 55 = dorsal seta, 56 = ventral view of female, 57 = ventral view of male. (Scale bars: a = 100 µm, b = 20 µm)

Dorsal side (Fig. 58). Marginal and dorsal shields fused. All dorsal setae short, needle-like. Dorsal shield without ornamentation.

Ventral side (Fig. 59). Sternal shield without ornamentation, all sternal setae smooth and needle-like. St1 short, placed near the anterior margin of sternal shield, St2 twice longer than St1 and located near of coxae 2, St3 placed near the anterior region of coxae 3 and three times longer than St1. St4 as long as St1, and can be seen near the anterior margin of coxae 4. Ornamentation of ventral shield lacking, all ventral setae long (as long as St3) smooth and needle-like. V2 placed near the posterior margin of genital shield. Setae *ad* as long as the ventral setae. Lyriform fissures can be found near V2 and between V6 and V7.

Genital shield linguliform, without process and ornamentation. Stigmata situated between coxae 2 and 3. Peritreme hook-form.

Gnathosoma. Not clearly visible (covered by coxae 1).

Male. Length of idiosoma 310–320 µm, width 270–290 µm (n = 2). Shape circle, posterior margin rounded.

Dorsal side. Similar to the females. Marginal and dorsal shields fused. All dorsal setae short, needle-like. Dorsal shield without ornamentation.

Ventral side (Fig. 60). Sternal shield without ornamentation, all sternal setae smooth and needle-like. Sternal setae arranged in lines. St1 short, placed near the anterior margin of sternal shield, St2, St3 and St4 three times longer than St1. Pattern of ventral shield lacking, all ventral setae long, smooth and needle-like. V2 placed near the posterior margin of genital shield, V2 as long as St1. Setae *ad* as long as the ventral setae. Lyriform fissures can be found near V2, and between V6 and V7.

Genital shield alveolar and placed between posterior margins of coxae 4. Stigmata situated between coxae 2 and 3. Peritreme hook-shaped.

Gnathosoma. Not clearly visible (covered by coxae 1).

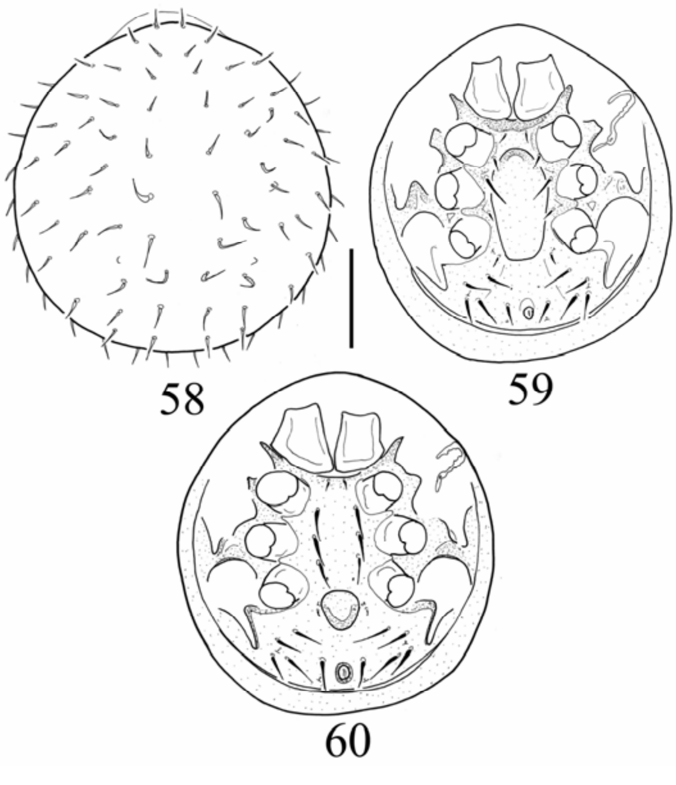
Distribution. Colombia.

Etymology. The new species is similar to the species *Rotundabaloghia coricoensis* Hirschmann, 1981, the name of the new species refers to the *R. coricoensis* and the similarity.

Remarks. The new species is similar to the species *Rotundabaloghia coricoensis* Hirschmann, 1992. The most important differences between the two species are shown in Table 3.

Table 3. Main differences between *R. coricoensis* and *R. coricoensiformis*

	R. coricoensis	*R. coricoensiformis*
	Female	*Female*
Place of St1	near the anterior margin of genital shield	near the anterior margin of sternal shield
Size of V2	long	short
	Male	*Male*
Size of V2	long	short



Figures 58–60. *Rotundabaloghia coricoensiformis* n. sp. 58 = dorsal view of female, 59 = ventral view of female, 60 = ventral view of male. (Scale bar: 100 μm)

Rotundabaloghia extremica n. sp.

(Figs. 61–67)

Material examined. Holotype: female, Columbia, near Rio Claro, from leaf litter, 05.X.-15.XI. 1984. leg. J. Balogh. Paratypes: one female and one male, locality and date same as holotype.

Diagnosis. Dorsal shield with alveolar ornamentation, which forms a net structure. All dorsal setae needle-like, with hairs on their margin. Sternal shield smooth, but ventral shield bear alveolar ornamentation in the female and the sternal shield of male with alveolar pattern. St2 and St3 longer and wider than St1 and St4. St2 and St4 can be found in extreme position by the male. Ornamentation of ventral shield in the females and males is alveolar. Apical part of V8 setae bone-shaped. Peritreme hook-from.

Female. Length of idiosoma 270–280 µm, width 240–260 µm (n = 2). Shape oval, posterior margin rounded.

Nymphs and larva are unknown.

Dorsal side (Fig. 61). Marginal and dorsal shields fused. All dorsal setae with hairs on their margins (Figs 62-64). Dorsal shield bears alveolar ornamentation, which forms a net structure (Fig. 63).

Ventral side (Fig. 65). Sternal shield without ornamentation, all sternal setae smooth and needle-like. St1 short, placed near the anterior margin of coxae 2, St2 near the central region of coxae 2, wider and twice longer than St1, St3 near the anterior margin of coxae 3, similar to St2. St4 placed near the anterior margin of coxae 4 and three times shorter than St3. Pattern of ventral shield alveolar. V2 and V6 smooth and needle-like and two times shorter than St4. V3 absent. V7 and as long as *ad,* smooth and needle-like, but three times longer than V2 and V6. V8 as long as V7. The apical part of V8 bone-shaped. Lyriform fissures can be found near V2 and near V8.

Genital shield linguliform, without process and with alveolar ornamentation. Stigmata situateed between coxae 2 and 3. Peritreme hook-form.

Gnathosoma (Fig. 66). Corniculi horn-like laciniae twice longer than corniculi and smooth. Labrum with short spines on its apical part. Hypostomal setae are as follows: h1 smooth, long and needle-like, h2 similar to the h1, but twice shorter than h1, h3 smooth, needle-like and 1.5 longer than h2, h4 with serrated margin and as long as h2. Basal part of the epistome with serrated margin, apical part with short hairs. Chelicerae with nodus, and the fixed digit with sensillus. Setae of basal part of palp are shown in Fig. 66.

Male. Length of idiosoma 370 µm, width 310 µm (n = 1). Shape circle, posterior margin rounded.

Dorsal side. Marginal and dorsal shields fused. All dorsal setae with hairs on their margins. Dorsal shield bears alveolar ornamentation, which forms a net structure.

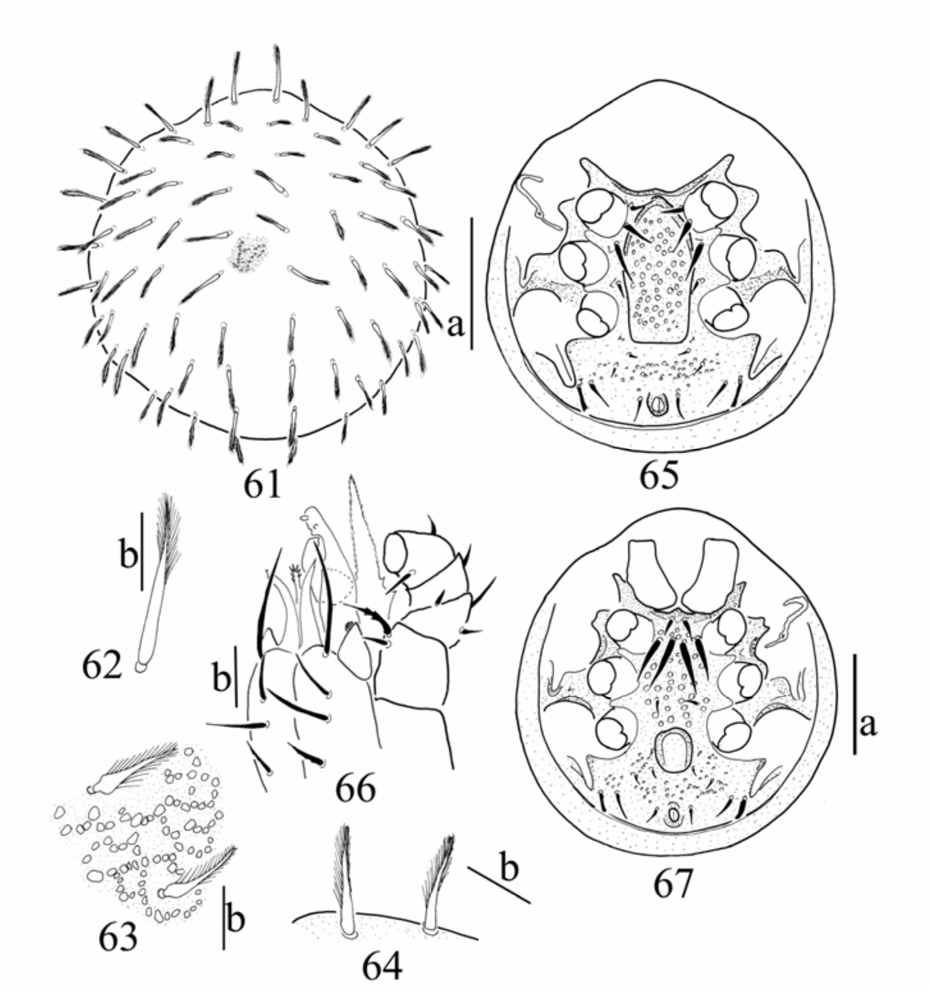
Ventral side (Fig. 67). Sternal shield with alveolar ornamentation, all sternal setae smooth. St1 short, placed near the anterior margin of sternal shield, St2 and St3 near the central region of coxae 2, wider and twice longer than St1, St4 placed near the anterior margin of coxae 4 and three times shorter than St3. Pattern of ventral shield alveolar. V2, V3 and V6 smooth and needle-like, and two times shorter than St4. V7 1.5 times longer than *ad*, V7 and *ad* smooth and needle-like. V8 as long as V7, and the apical part of V8 bone-shaped.

Genital shield alveolar and placed between posterior margins of coxae 4. Stigmata situated between coxae 2 and 3. Peritreme hook-shaped

Gnathosoma. Not clearly visible (covered by coxae 1).

Etymology. The name of the new species refers to the extreme position of St2 and St3 on the sternal shield of male.

Remarks. The new species is well distinguishable from the heretofore known *Rotundabaloghia* species by the position and shape of sternal setae. Setae St3 are placed in an unusual position in the new species; between setae St2. The shape of the setae V8 is bone-shaped, which is also an unknown feature in other *Rotundabaloghia* species.



Figures 61–67. *Rotundabaloghia extremica* n. sp. 61 = dorsal view of female, 62 = j1 seta, 63 = dorsal ornamentation,64 = dorsal setae, 65 = ventral view of female, 66 = ventro-lateral view of gnathosoma, 67 = ventral view of male. (Scale bars: a = 100 µm, b = 20 µm)

Rotundabaloghia congoensis Hirschmann, 1992

(Figs 72–76)

Rotundabaloghia congoensis Hirschmann: 1992a, p. 37., Fig: p. 39.

Rotundabaloghia congoensis: Wiśniewski & Hirschmann 1993 p. 73., Wiśniewski 1993 p. 244.

Material examined. Two females. Congo Republic, Sibiti, IRHO rain forest, Berlese sample, litter and humus. 24.XI.1963. leg. J. Balogh & A. Zicsi (No 233).

Female. Length of idiosoma µm, width µm (n = 3). Shape circle, posterior margin rounded.

Dorsal side (Fig. 72). Marginal and dorsal shields fused. All dorsal setae needle-like and bear short hairs on their apical part (Fig. 73). Ornamentation of dorsal shield lacking.

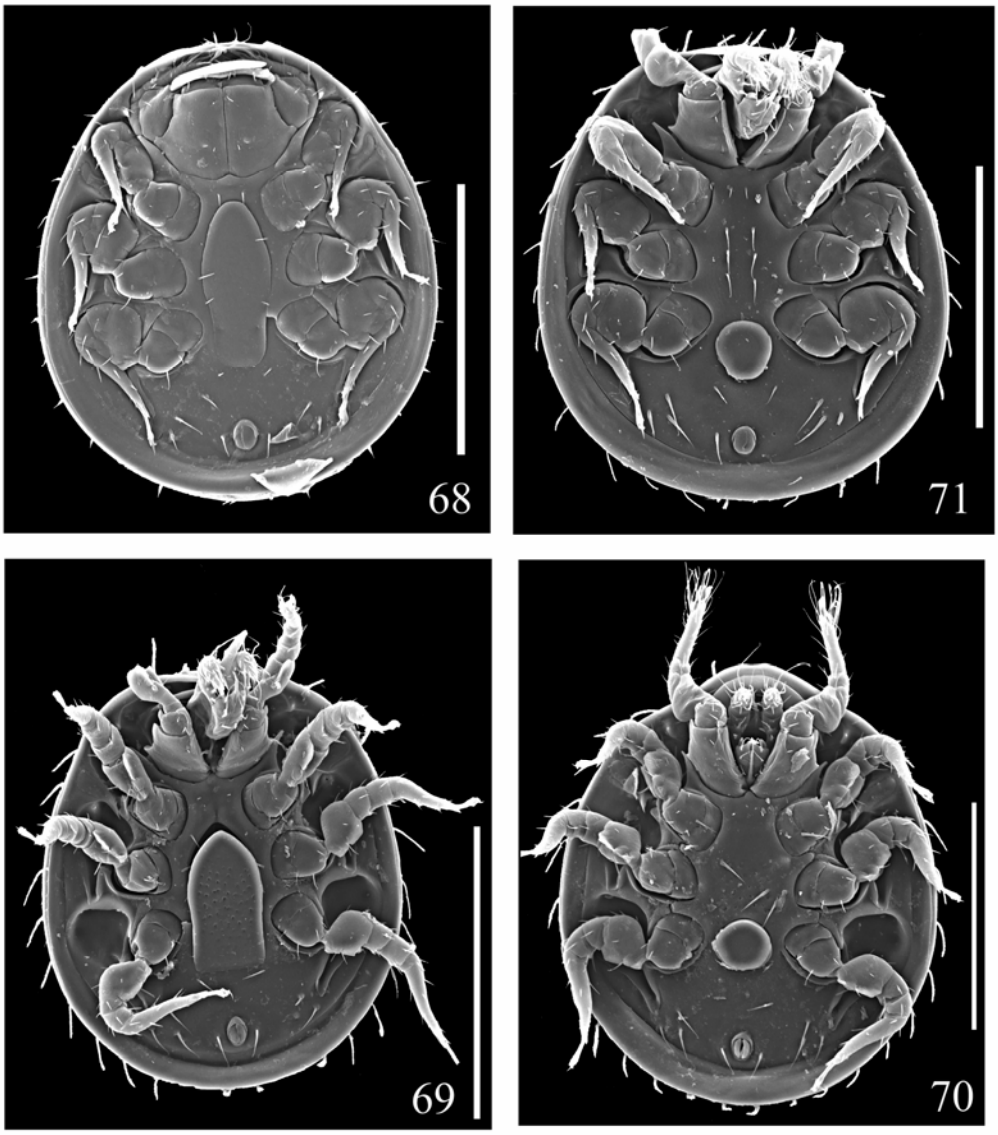
Ventral side (Figs 74 and 76). Sternal and ventral shields without ornamentation. Sternal setae short smooth and needle like. St1 placed near anterior margin of sternal shield, St2 placed near the posterior margin of coxae 2, St3 and St4 near the posterior part of coxae 3. Ventral setae are as follows: V2 short and placed near the basal part of genital shield. V6, V7 and V8 two times longer than V2. Setae *ad* as long as V7. All ventral setae smooth and needle-like.

Genital shield scutiform, and without process and with small alveolar ornamentation on the central region. Stigmata situated between coxae 2 and 3. Peritreme hook-like.

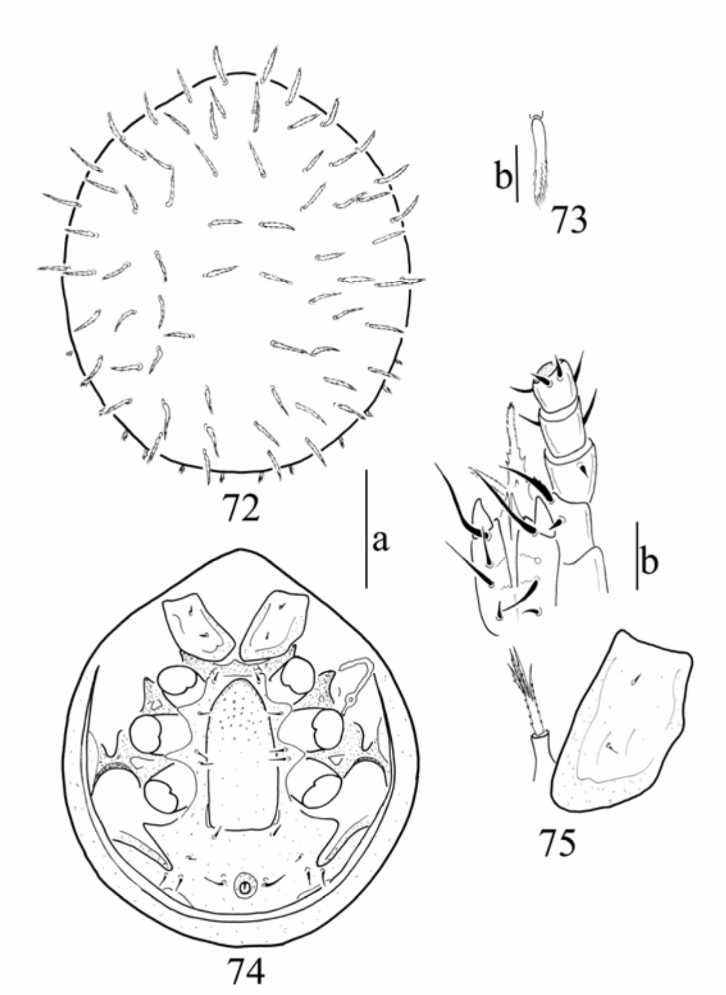
Gnathosoma (Fig. 75). Corniculi horn-like, laciniae smooth and long, apical part of labrum with hairs. Hypostomal setae: h1 long, smooth and needle-like, h2 three times shorter than h1, smooth and needle-like, h3 smooth and needle-like, shorter than h1, h4 twice shorter than h2 and smooth. Epistome with serrated basis and apical part bear short hairs. Tritosternum with four branches, margin of branches serrated. Chelicerae not clearly visible.

Distribution. Congo Republic.

Acknowledgements – This paper was supported by the János Bolyai Research Scholarship of the Hungarian Academy of Sciences.



Figures 68–71. Scanning micrograph of *Rotundabaloghia* species. 68 = dorsal view of *R. soliformis* Hirschmann, 1992 (female), 69 = dorsal view of *R. ecuadorensis* Hirschmann, 1992 (female), 70 = dorsal view of *R. ecuadorensis* Hirschmann, 1992 (male), 71 = dorsal view of *R. resinae* Hirschmann, 1992 (male). (Scale bar: 100 µm)



Figures 72–75. *Rotundabaloghia congoensis* Hirschmann, 1992. 72 = dorsal view of female, 73 = dorsal setae, 74 = ventral view of female, 75 = ventral view of gnathosoma. (Scale bars: a = 100 µm, b = 20 µm)

Figure 76. Scanning micrograph of *Rotundabaloghia congoensis* Hirschmann, 1992. (Scale bar: 100 µm)

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Dissorhina cretensis n. sp. and some other remarkable oribatid mites (Acari: Oribatida) from Crete, Greece

S. Mahunka[1]

Abstract. Newly collected and identified oribatids from Crete are studied and a list of the hitherto known species is provided. Altogether 37 species are enumerated from several sites of the island, among them 23 newly determined. One species new to science, *Dissorhina cretensis* n. sp., is described and three known, but rare species – *Chamobates dentotutorii* Shaldybina, 1969, *Ocesobates boedvarssoni* (Sellnick, 1974) and *Humerobates rostrolamellatus* Grandjean, 1936 – are described and/or commented and illustrated. With 18 figures.

INTRODUCTION

The oribatid fauna of Greece, especially that of the Greek islands, is rather poorly known. This raises objections when someone aims to get to know and investigate the origin of the oribatid fauna of the entire Balkan Peninsula, including its historical changes and possible movements (see also Mahunka & Mahunka-Papp, 2008). The ultimate goal of our research is the comprehensive description of the already detected, but till now not fully understood north-south migration of this little animals.

Our knowledge regarding the oribatids of the Balkan Peninsula is mostly based on the collectings carried out by Beier in 1929, and more recently by Hauser in 1970–1980, as well as on the collected materials elaborated by Sellnick (1931) and Mahunka (1974, 1977a, 1977b, 1979, 1982, 2001). However, the data on the fauna of the Greek islands are almost exclusively based on the collecting activities by Hauser.

All the data on the oribatids of Greece were summarised by Flogaitis (1992). According to him, 220 species have hitherto been recorded from the whole country. Unfortunately, this sum is not exact since there are several incorrect data in his list. For instance, many species are listed twice, the identified “cf.” and also species referred to as genus name plus “sp.” are both contained in it). The above mentioned species and the identification of several further ones are therefore rather uncertain. On the other hand, a species already reported from Greece, *Papillacarus aciculatus* (Berlese, 1905), is omitted from the enumeration. The real list should contain about 200 oribatid species only.

As for Crete, no more than 14 species have been reported so far (Mahunka, 1979, 1982). This number must be considered a small fraction of the expected species from that great island. As a result of our recent investigations, I can add 23 further species to the oribatid fauna of Crete. One of them, *Dissorhina cretensis* sp. n. proved to be new to science, further twelve species for the fauna of Greece, and nine species for the fauna of Crete. The number of the oribatid species known from Crete amounts to 37. Among them, poorly known and rare species have also been observed, like *Chamobates dentotutorii* Shaldybina, 1969, *Ocesobates boedvarssoni* (Sellnick, 1974) and *Humerobates rostrolamellatus* (Grandjean, 1936). Hereunder I give some remarks on their morphology, relatedness or kinship.

Similarly to my earlier papers, I follow the system of Marshall *et al*. (1987) based on that of Grandjean (1954, 1965), but with some modifications introduced by Subías (2004, 2008) and Weigmann (2006). As to the descriptions, the morphological terminology of Grandjean was used with some modifications concerning the studied groups or organs (e.g. Mahunka & Zombori, 1985; Norton *et al*., 1997; Mahunka & Mahunka-Papp, 2001; Niedbała, 1992, and the before mentioned publications).

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MATERIAL AND METHODS

The most recent studies on the oribatid fauna of Crete, including my work and that of my collaborators (Luise Mahunka-Papp, József Villági and Cecilia Villági-Szeredi), are based on the materials collected by the former researchers of the Hungarian Natural History Museum (Dr. Tamás Szűts and Ágnes Garai). The first parts of the results arising from the elaboration of the Crete material are presented in this paper.

The material examined is deposited at the Hungarian Natural History Museum, Budapest (HNHM), and some paratypes are preserved with the Muséum d'histoire naturelle de Genève (MHNG). The samples originate from four localities of which the list is given hereunder while in the list of species only the reference code numbers are indicated. At earlier published species only the authors and years of publication are mentioned.

LIST OF LOCALITIES

HNHM 08/21: Greece, Crete, Kato Karouzano. 23.VI.2008. Bush litter, clump of grass, roofs. Leg. S. Mahunka & J. Villági.

HNHM 08/23: Greece, Crete, Ano Kera. 23.VI.2008. Dry moss and lichens from rocky wall. Leg. S. Mahunka & J. Villági.

HNHM 08/24: Greece, Crete, Leraptera. 25.VI. 2008. Dry litter with soil from bush. Leg. S. Mahunka & J. Villági.

HNHM 08/31: Greece, Crete, Idaio, Cave Antro. 30.VII.2008. Soil and decaying debris from the cave. Leg. Á. Garai.

LIST OF IDENTIFIED SPECIES

BRACHYCHTHONIIDAE Thor, 1934

Brachychthonius hauserorum Mahunka, 1979 (Mahunka, 1979)

Eobrachychthonius similis Mahunka, 1979

Liochthonius horridus (Sellnick, 1928)

Liochthonius strenzkei Forsslund, 1963 (Mahunka 1982)

Poecilochthonius spiciger (Berlese, 1910)
Localities: HNHM-08/21, HNHM-08/24.

COSMOCHTHONIIDAE Grandjean, 1947

Cosmochthonius reticulatus Grandjean, 1947

SPHAEROCHTHONIIDAE Grandejan, 1956

Sphaerochthonius splendidus (Berlese, 1904)
Locality: HNHM 08/21.

EPILOHMANNIIDAE Oudemans, 1923

Epilohmannia cylindrica cylindrica (Berlese, 1904)

LOHMANNIIDAE Berlese, 1916

Papillacarus aciculatus (Berlese, 1905)

PHTHIRACARIDAE Perty, 1841

Phthiracarus (Archiphthiracarus) tzanoudakisi Mahunka, 1979

STEGANACARIDAE Niedbala, 1986

Atropacarus platakisi (Mahunka, 1979)

Notophthiracarus (*Calyptophthiracarus*) *heterotrichus* (Mahunka, 1979)

Steganacarus (Steganacarus) flagellatissimus Mahunka, 1979

Steganacarus (Tropacarus) lasithiensis Mahunka, 1979

NOHRIDAE Berlese, 1896

Nothrus anauniensis Canestrini et Fanzago, 1876
Locality: HNHM 08/23.

HERMANNIELLIDAE Grandjean, 1934

Hermanniella septentrionalis Berlese, 1910
Locality: HNHM 08/21.

LICNOBELBIDAE Grandjean, 1965

Licnobelba caesarea (Berlese, 1910)

ZETORCHESTIDAE Michael, 1898

Zetorchestes falzonii Coggi, 1898
Locality: HNHM 08/24.

Zetorchestes flabrarius Grandjean, 1951
Locality: HNHM 08/23.

XENILLIDAE Woolley et Higgins, 1966

Xenillus tegeocranus (Hermann, 1804)
Locality: HNHM 08/21.

TECTOCEPHEIDAE Grandjean, 1954

Tectoepheus sarekensis Träghårdh, 1910
Locality: HNHM 08/24.

OPPIIDAE Sellnick, 1937

Dissorhina cretensis n. sp.

Dissorhina peloponnesiaca Mahunka, 1974
Locality: HNHM 08/21.

Lauroppia marginedentata (Strenzke, 1951)
Locality: HNHM 08/31.

Oppiella nova (Oudemans, 1902)
Locality: HNHM 08/31.

QUADROPPIIDAE Balogh, 1983

Quadroppia michaeli Mahunka, 1977
Locality: HNHM 08/24.

SUCTOBELBIDAE Jacot, 1938

Suctobelbella similis (Forsslund, 1941)
Locality: HNHM 08/23.

Suctobelbella subcorbcornigera (Forsslund, 1941)
Locality: HNHM 08/21.

PASSALOZETIDAE Grandjean, 1954

Passalozetes hauseri Mahunka, 1977

HUMEROBATIDAE Grandjean, 1970

Humerobates rostrolamellatus Grandjean, 1936
Localities: HNHM 08/21, HNHM 08/24.

PUNCTORIBATIDAE Thor, 1937

Minunthozetes pseudofusiger (Schweizer, 1922)
Localities: HNHM 08/21, HNHM 08/31

Minunthozetes semirufus (C. L. Koch, 1841)
Locality: HNHM 08/24.

CHAMOBATIDAE Thor, 1937

Chamobates dentotutorii Shaldybina, 1969
Locality: HNHM 08/21, HNHM 08/24.

Chamobates spinosus Sellnick, 1928
Locality: HNHM 08/31.

Ocesobates boedvarssoni (Sellnick, 1974)
Locality: HNHM 08/31.

ACHIPTERIIDAE Thor, 1929

Parachipteria punctata (Nicolet, 1855)
Locality: HNHM 08/24.

ORIBATELLIDAE Jacot, 1925

Oribatella ornata (Coggi, 1900)
Locality: HNHM 08/31

ORIBATULIDAE Thor, 1929

Zygoribatula frisiae (Oudemans, 1900)
Locality: HNHM 08/21.

DESCRIPTION OF THE NEW AND NOTES ON RARE SPECIES

Dissorhina cretensis **n. sp.**

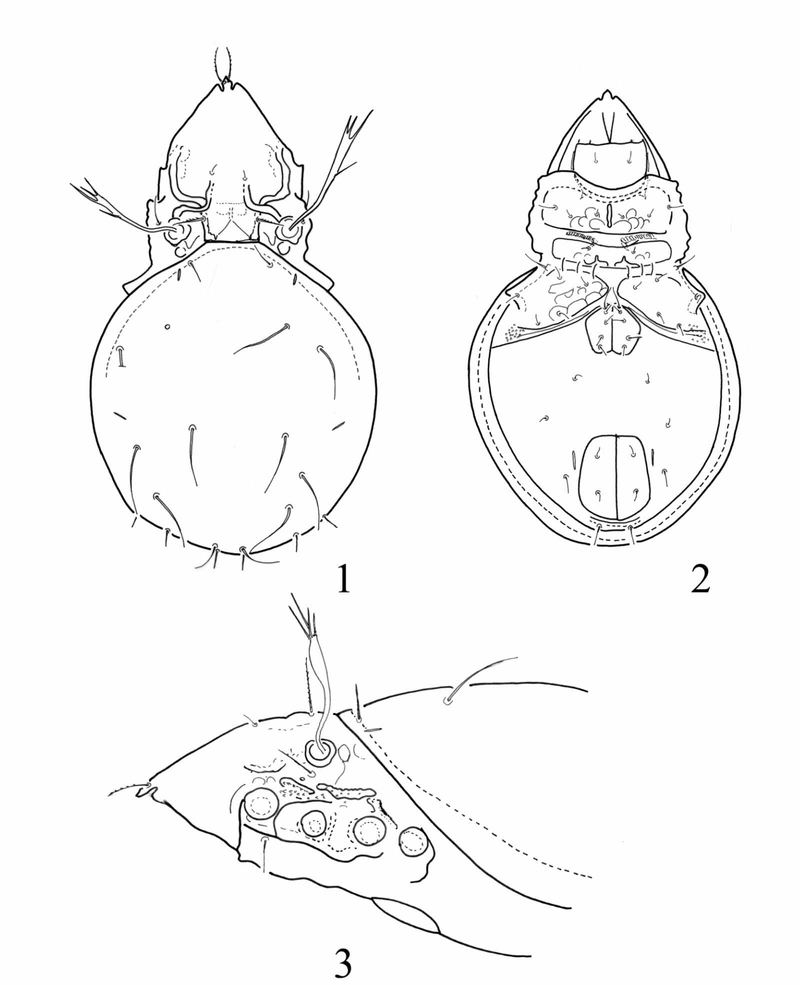
(Figs. 1–5)

Material examined. Holotype: Greece, Crete, Ano Kera. 23.VI.2008. Leg. S. Mahunka & J. Világi (HNHM 08/23). 2 paratypes from the same sample. Holotype (1767-HO-2008) and 1 paratype (1767-PO-2008): HNHM, 1 Paratype: MHNG.

Diagnosis. Rostral apex well protruding anteriorly, triangular bearing rostral setae. Costula short, weakly developed, ending far from the lamellar setae. Interbothridial lath straight, not divergent, located near to each other. Sensillus long, without true head. Distal end with 5 very long branches, much longer than the diameter of the widest part of the sensilus. Notogastral setae mostly long. Exobothridial region well sclerotised and granulated. Epimeres with irregular maculae. Posterior border (*bo. 4*) of the epimeral region with furrow in which tubercles present. Five pairs of genital setae, arranged in one row.

Measurements. Length of body 252–270 μm, width of body 143–160 μm.

Prodorsum. Rostral apex triangular, well protruding from rostral part of prodorsum. Incisures small, lateral teeth rounded, much shorter than rostral apex. Rostral setae arising on median apex. Prodorsal surface with weak costulae, one pair of short, thick, but narrower ones located basally and a pair of S-shaped ones laterally. A pair of thin, divergent lines present medially (Fig. 1). No lath or costula reaching to the insertion of lamellar setae. Basal part of the median costulae straight, run parallel with each other, bearing interlamellar setae (Fig. 5). Ratio of prodorsal setae: *ro* > *exa* > *in* > *le* (Fig. 3), setae *in* thicker than the others, finely barbed. Sensillus gradually dilated distally, without true head, this part bearing 5 very long bristles on its margin. A pair of well developed, singular posterobothridial tubercles present.



Figures 1–3. *Dissorhina cretensis* sp. n. 1 = body in dorsal view, 2 = body in ventral view, 3 = body in lateral view

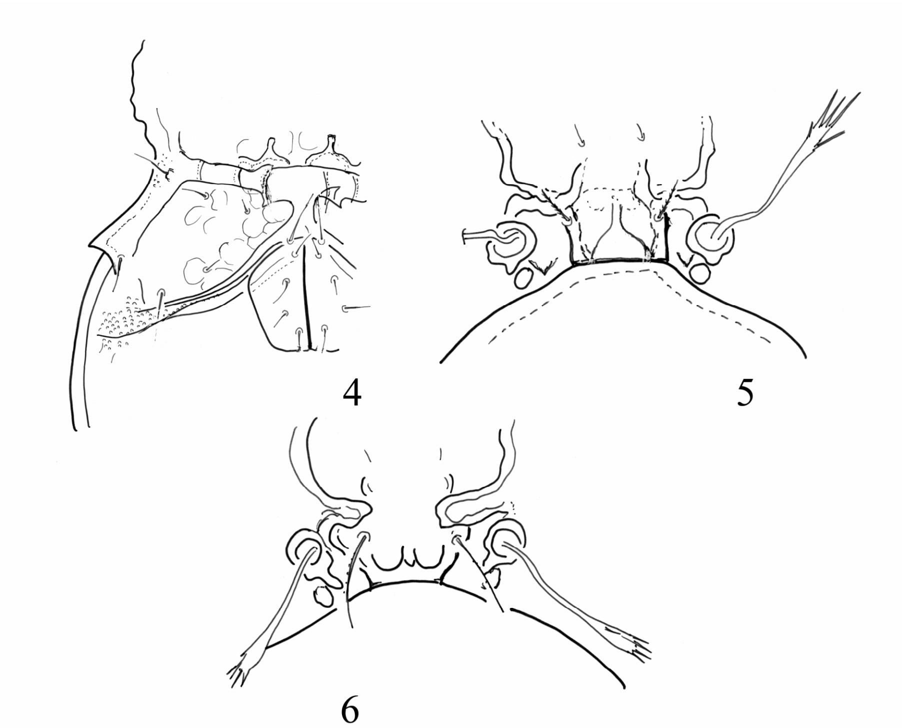
Notogaster. Comparatively wide, dorsosejugal suture straight medially. Ten pairs of mostly long notogastral setae present, setae c_2 minute, p_1, p_2 and p_3 shorter than the others. Setae *la* arising far anteriorly from *lm*, h_1 bent outwards, h_2 bent inwards. All setae smooth.

Lateral part of podosoma. Pedotecta I very small, setae *1c* arising far from the lateral margin. Some granulate areas present in this part, some well sclerotised crests also seen above the legs (Fig. 3).

Ventral parts (Fig. 2). Apodemes and epimeral borders different in size. *Ap. 2* not connected medially, sternal apodema reduced, only a short, anterior part of it observable. *Ap. sej.* also narrowing medially, bearing three pair's transversal crests, like bridges on them. Posterior sternal apodema also absent, one pair of characteristic formation located medially. *Ap. 4* well developed, wide, a pair of posteroepimeral furrow with small tubercles (Fig. 4) in them observable. Epimeral surface ornamented by weak polygonal pattern, epimeral setae short, mostly smooth. All setae – except setae *3c* and g_5 - in the anogenital region short and simple. Lyrifissures *iad* in paraanal position. Setae ad_1 arising on a weak transversal crest, located in posteromarginal position.

Remarks. The shape of the sensillus of the new species is unique in the genus *Dissorhina* Hull, 1916.

Etymology. Named after its origin, Crete.



Figures 4–5. *Dissorhina cretensis* sp. n. 4 = median part of the body in ventral view, 5 = basal part of prodorsum.
Figure 6. *Dissorhina peloponnesiaca* Mahunka, 1974. Basal part of prodorsum

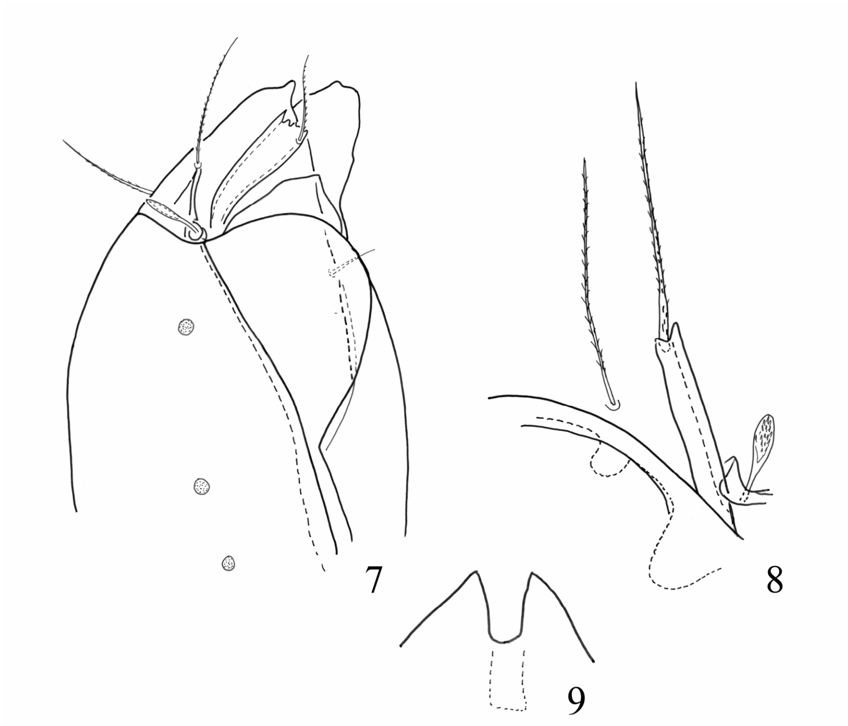
Chamobates dentotutorii Shaldybina, 1969
(Figs. 7–9)

Species characterised by the U-shaped incisure of the rostral apex are difficult to tell apart, and their differentiation necessitates the thorough study of further types. The species described first from the species group, *C. interpositus* Pschorn-Walcher, 1953, and the other species belonging to this group (*C. dentotutorii* Shaldybina, 1969, *C. kieviensis* Shaldybina, 1980 and *C. bispinosus* Mahunka, 1987) could be differentiated by the number of agenital setae, and the shape of the following anatomic parts also differ among them: the distal end of the tutorium, the incisure of the rostral apex, and the sensillus. *C. bispinosus* Mahunka, 1987 and *C. kieviensis* Shaldybina, 1980 both possess two pairs of aggenital setae, while the rest of the species possess only one pair. The discernible difference between *interpositus* and *dentotutorii* is the following: on the distal end of the tutorium there are many dents in the case of *dentotutorii,* while in *interpositus* this margin is simple, concave, without dents.

The specimens collected on Crete can be identified as *C. dentotutorii* based on the following traits: the shape of the sensillus, the presence of the spur on the pteromorpha and, above all, it is proved by the wider and flatter incisure on the apex of the rostrum. To facilitate identification I give some detailed drawings.

Genus *Ocesobates* Aoki, 1965

The genus was described by Aoki (1965), with the type species: *Ocesobates kumadai* Aoki, 1965. The description is detailed and completely adequate. After a short while, Sellnick (1974) from Northern Europe and Shaldybina (1974) from the Russian Far East also described independently new species. Sellnick did not realise the great similarity of his own oribatid with *Ocesobates* Aoki, 1965 genus, and erected a new genus: he described the specimens under the name *Cha-*



Figures 7–9. *Chamobates dentotutorii* Shaldybina, 1969. 7 = body in lateral view, 8 = bothridial part of prodorsum, 9 = rostrum

mozetes boedvarssoni Sellnick, 1974 gen. n., sp. n. Shaldybina realised that her species belonged to the genus *Ocesobates* Aoki, and described it as *O. bregetovae* Shaldybina, 1974. Some years later Gjelstrup (1978) again described a similar species from Northern Europe, and at the same time erected a new genus for it, *Danobates insignitus* Gjelstrup, 1978 (see also Subías, 2008). Meanwhile the species was also detected in Spain (Pérez-Iňigo, 1993).

From among the known taxa of the genus based on the description of Aoki (1965) the genus and its type is clearly defined. The type species differs from all the other species in the genus by its rounded median apex of the rostrum. The other species are characterised by a U-shaped incisure at the rostral apex. Unfortunately I could not obtain the types of these species, and the question of priority between the species of Sellnick and that of Shaldybina could not be resolved. The specimens found in Crete show a high similarity to them with the only difference in having thicker ends of interlamellar setae, but this feature is not mentioned by any other author.

The specimens from Crete are described and depicted below, and according to the alphabet I provisorily regard the description of Sellnick as valid.

Ocesobates boedvarssoni (Sellnick, 1974)

(Figs. 10–14)

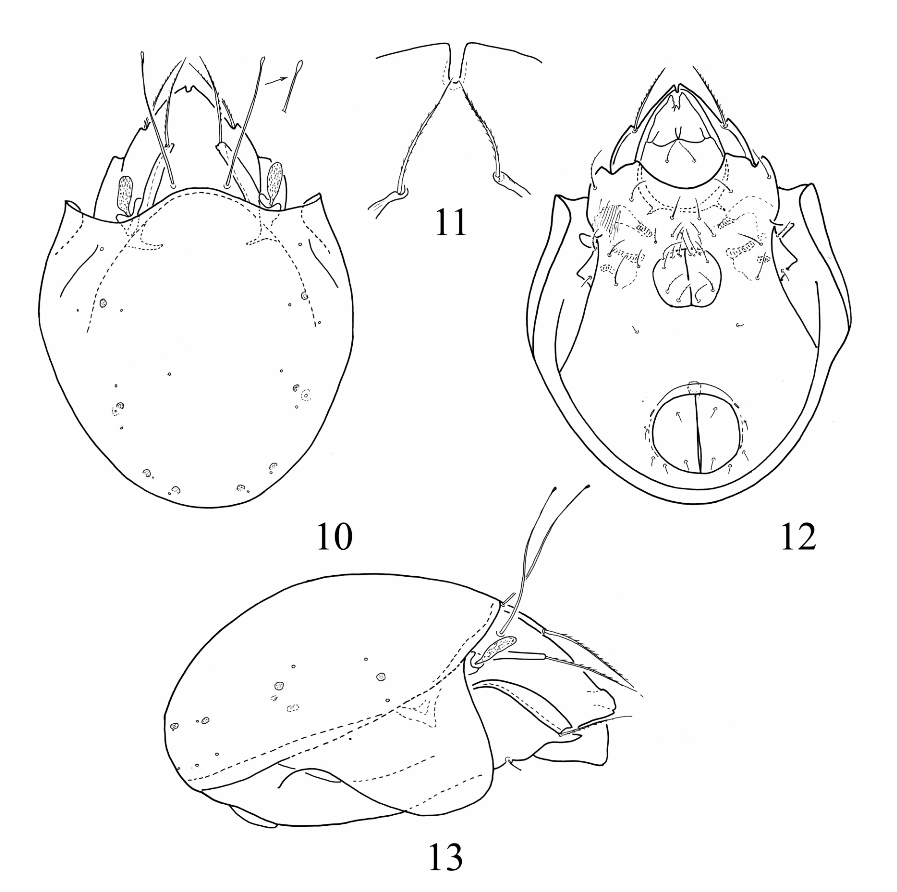
Diagnosis. Rostral apex with U-shaped incisure. Lamellae short, simple, its apices blunt at tip bearing lamellar setae. Tutorium well-developed, with pointed apex. Interlamellar setae very long with dilated distal end. Sensillus short with large, asymmetrical head. On the notogaster four pairs of round porose areae, 10 pairs of setal alveoli and a distinct glandular opening present. Epimeral setae very thin and long, anterior genital setae also conspicuously long. All legs three- and heterodactylous.

Measurements. Length of body 326–371 µm, width of body 252–283 µm.

Prodorsum. Rostrum conical, rostral apex with deep, U-shaped median incisure (Fig. 11), its lateral teeth sharply pointed. Lamellae simple, short, without sharply pointed apices, its distal end blunt at tip, slightly wide, lamellar setae arising on them (Fig. 10). Rostral, lamellar and firstly, interlamellar setae long, latter's longer than the length of prodorsum. Distal end of the interlamellar setae with minute, distinct broadened end (Fig. 10). Tutorium long, well observable also in dorsal view. Bothridium cup-shaped, sensillus very large, mostly asymmetrical, proclinate, its head much longer than peduncle. Surface of the head with distinct, minute barbs.

Notogaster. Pteromorphae large, with a longitudinal line on both. All notogastral setae reduced, their alveoli well visible. Four pairs of porose areas present, all nearly equal in size. Lyrifissures *im* fine, located laterally, in transversal position.

Lateral part of podosoma. Lamellae short, much shorter than the tutorium. Tutorium with sharp distal apex. Pteromorpha very large, tongue-shaped, its lateral margin rounded (Fig. 14).



Figures 10–14. *Ocesobates boedvarssoni* (Sellnick, 1974). 10 = body in dorsal view, 11 = rostral part of prodorsum, 12 = body in ventral view, 13 = porose area postanalis, 14 = body in lateral view

Ventral parts (Fig. 12). Epimeral surface striated laterally. Apodemes weakly developed, their form typical for the genus. All epimeral setae thin, setiform, comparatively long and finely barbed. Setae *1c* longest of all. Circumpedal carina long, reaching to the lateral margin of ventral plate. Genito-anal setal formula: 6–1–2–3. Setae in genital region strong, setiform, barbed. Three pairs of genital setae arising along the anterior margin of genital plates. Setae in the anal region much shorter, sometimes minute or represented only by their alveoli, all smooth.

Legs. All legs three- and heterodactylous.

Remarks. The studied specimens belong to the "*boedvarssoni*" species group, but I think all similar species do belong to this one. I am not able to find one or more features differing from the description of Shaldybina (1974). The descriptions of Sellnick (1974) and Gjelstrup (1978) are much more simple than the preceding one, but they correspond to the time given. Therefore I consider all these species to be synonyms of *boedvarssoni*.

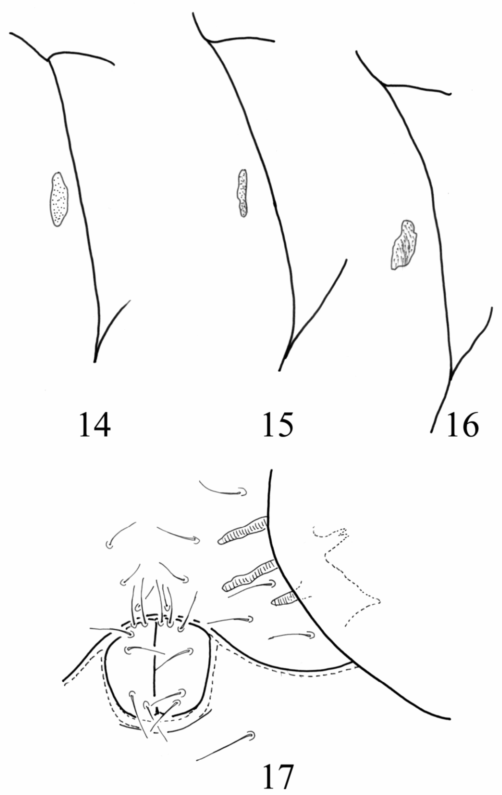
Humerobates rostrolamellatus **Grandjean, 1936**

(Figs. 15–18)

In his description Grandjean (1936) only gave a somewhat superficial figure of the ventral side of the new species, from which the size and shape of the setae is not rather indistinct. The epimeral and genital setae of the specimens collected in Crete are much longer (Fig. 18) compared to those given by Grandjean, or by the publications afterwards.

In a large series of specimens collected in Crete I found that the genital setae are considerably longer in every individual than those depicted in the figure by Grandjean. The distal end of the tutorium is simple, concave.

The porose areas of the notogaster exhibit large differences both in shape and especially in their length, and it is very evident in the case of the *Aa* area (Figs. 15–17). The shape and development of the translamella is also very varied. The considerable variance in this trait is a proof for the variability of this species, and possibly indicates its capability of adaptation. Therefore the status of the closely related taxa should be validated with the study of the types. This is exemplified by the findings of Pérez-Iñigo (1972). When describing his subspecies he found only the following traits as differences between the subspecies and its parent species (*H. rostrolamellatus guadarramicus*): the single dent at the distal edge of the tutorium, and the longer genital setae.



Figures 15–18. *Humerobates rostrolamellatus* Grandjean, 1936. 15–17 = variation of the porose area *Aa*, 18 = lateral part of genital region

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The first species of the genus *Megabunus* Meade, 1855 (Opiliones: Phalangiidae) in the Balkan region

D. MURÁNYI[1]

Abstract. *Megabunus pifkoi* sp. n., the first Balkanian species of the genus *Megabunus* Meade, 1855, is described from two localities in Albania. The new species is compared with all other members of the genus, and some additional closely related Balkanian Phalangiinae taxa. General diagnosis, key to the species and notes on the distribution of the species belonging to *Megabunus* are given.

INTRODUCTION

During the last few years, Balkanian researches of the Hungarian Natural History Museum revived on the traditions of more than hundred years of history (Fehér *et al.,* 2004). Albania is one of the main target of both the zoological and botanical collecting expeditions, and numerous results were already published both in zoology (Mollusca: Erőss *et al.,* 2006; Fehér, 2004; Fehér *et al.,* 2001; Riedel *et al.,* 1999; Sudai & Fehér, 2006. Acari: Kontschán, 2003; Mahunka & Mahunka-Papp, 2008. Collembola: Traser & Kontschán, 2004. Odonata: Murányi, 2007b. Plecoptera: Murányi, 2007a. Reptilia: Korsós *et al.,* 2008). Botany (Barina & Pifkó, 2008a, 2008b) and additional groups will be elaborated soon (e.g. Amphipoda, Psocoptera).

The harvestmen fauna of Albania is rather poorly known. The literature was recently discussed by Mitov (2000) who gave the first data of ten species from the country, rised the number of species recorded for Albanian to 41. During a botanical collecting trip to South Albania in April 2008, a remarkable new *Megabunus* Meade, 1855 species was found in the Dhëmbel Mts. In July, additional specimens were captured in the Jablanica Mts. As the presence of this genus in the Balkan is quite surprising, I describe this species separetely from the faunistical elaboration of the rest of the material compiled during the last years.

As already asserted by Karaman (2002), it is difficult to discuss the validity and relationship of the genera of Phalangiinae, especially in the Balkans. Moreover, Novak (2004, 2005) showed that the real features of some poorly known species do not agree with the original descriptions. Thus, I diagnose herein the genus *Megabunus,* propose a key to the species included and discuss the affinities of the new species with some other Balkanian taxa belonging to different but closely related genera.

MATERIAL AND METHODS

The specimens were collected by singling on rocks, and are stored in 70% ethanol and deposited in the Soil Zoological Collections, Department of Zoology, Hungarian Natural History Museum (HNHM).

Ovipositor of the allotype was cleared in 10% KOH and prepared on slide in glycerin gelatine. SEM photos were made using golden-palladium coating after critical point drying.

Distributional data of the *Megabunus* species was discussed and depicted after Martens (1978), completed by those of Chemini (1985) and Muster *et al.* (2005), and confirmed by Blick & Komposch (2004), Novak & Gruber (2000) and Stol (2007).

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TAXONOMY

Megabunus Meade, 1855

Megabunus Meade, 1855: 406.; Roewer 1923: 853.; Schenkel 1927: 265.; Martens 1978: 273.; Chemini 1985: 4.

The genus was established with the type species *M. insignis* Meade, 1855 (*Phalangium diadema* Fabricius, 1779, syn. fide Roewer 1923) by Meade (1855). Subsequently, Roewer (1923) transferred *Platylophus rhinoceros* Canestrini, 1872 and *Platybunus armatus* Kulczyński, 1887 to the genus, and few years later Schenkel (1927) described *M. lesserti* Schenkel, 1927. Martens (1978) redescribed on all the four species included and described a fifth one, *M. vignai* Martens, 1978. In the eighties, a sixth species *M. bergomas* Chemini, 1985 was described by Chemini (1985).

Diagnosis. Small Phalangiinae, legs short or moderatelly long; ocular tubercle big. Cheliceral lamella smooth. Pedipalpal patella and tibia bear large apophyses, femur bears a small apical one; length of ventral tubercles on pedipalpal femur longer than half width of the femur; pedipalpal tibia with tubercles. Trunk of penis moderatelly long, more or less slender with wide base; head of penis large. Receptacula seminis monovesicular.

Distribution. (Fig. 28). The morphologically rather isolated *Megabunus diadema* (Fabricius, 1779) is separated geographically as well, it is known from the Pyrenees, the NW European isles and coasts. The other five formerly described species occur in the Alps exclusively, but none of them known to coexist. *M. rhinoceros* (Canestrini, 1872) occurs in the massifs of the Western part of the Swiss and Italian border zone, *M. vignai* Martens, 1978 in the Martime Alps, *M. bergomas* Chemini, 1985 in the massifs east to the Como Lake, *M. lesserti* Schenkel, 1927 in the NE Alps, while *M. armatus* (Kulczyński, 1887) in the SE Alps. The first Balkanian species is *M. pifkoi* sp. n. that hitherto known only from two Albanian ranges.

Megabunus pifkoi sp. n.

(Figs. 1–30)

Material examined. Holotype male: Albania, Përmet county, Dhëmbel Mts, Këlcyre, limestone rocks 2.1 km W of the city, N 40.297110° E 20.173340°, 382 m a.s.l., 19.04.2008, leg. Z. Barina, Z. Drahos, R. Gőgh, D. Pifkó (HNHM). Allotype female: same locality and date (HNHM; ovipositor prepared on slide). Paratypes: same locality and date: 1 ♂ (HNHM; partly prepared for SEM); Albania, Librazhd county, Jablanica Mts, Qarishtë, limestone rock sin alpine grassland on Mt. Lapa 5 km E of the village, N41.25054° E20.50384°, 2001 m, 04.07.2008, leg. Z. Barina, D. Pifkó, A. Vojtkó: 2 ♂ 1 ♀ (HNHM).

Diagnosis. Ground colour of body dark; spinulation of the dorsal thoracic areae reduced; ocular tubercle big, with moderatelly large processes; legs relatively long and unmodified. Chelicera and cheliceral lamella smooth; length of ventral tubercles on pedipalpal femur reach the width of the femur, dorsal surface weakly armed; pedipalpal tibia with large ventral tubercles. Penis uniformly pale brown; trunk of penis slightly bent, not widened apically; head of penis pointed. Receptacula seminis rather elongated.

Desription. Body length: holotype 3.9 mm, male paratypes 3.9–4.4 mm, allotype 5.2 mm, female paratype 5.4 mm; body width: holotype 2.5 mm, male paratypes 2.4–2.5 mm, allotype 3.1 mm, female paratype 3.2 mm.

Body (Figs. 1–7). Shape and proportions are typical for the genus.

Setation. Dorsal part covered with angular scales and rounded warts mixed with a few setae (Fig. 4), ventral part only with scales and setae. Seatae in the thoracic areae arranged in four lines diverging towards the posterior edge, a transverse row on the posterior edge and two setae before and beneath the defensive gland's opening (Fig. 5). Setae on the abdominal area arranged in transverse rows; ventral setae dense and in irregular arrangement.

Table 1. Length of the leg segments of *Megabunus pifkoi* sp. n. in mm; measurements of paratypes are in parentheses, abbreviations: Fe – femur, Pt – patella, Ti – tibia, Mt – metatarsus, Ta – tarsus

Leg	Fe	Pt	Ti	Mt	Ta	full length
Males						
Pp	1.6(1.1–1.5)	0.7(0.7–0.9)	1.0(0.9–1.0)		1.8(1.5–1.7)	5.1(4.2–5.1)
I	4.5(4.1–4.3)	1.0(0.9–1.0)	3.5(2.9–3.1)	4.3(4.7–4.9)	7.0(5.2–5.4)	20.3(17.8–18.7)
II	8.2(7.0)	1.8(1.2)	6.6(5.0)	5.7(4.3)	13.1(12.8)	35.4(30.3)
III	5.0(4.0–4.4)	1.0(0.9–1.0)	3.8(3.0–3.1)	4.9(3.4–3.8)	9.1(6.5–7.9)	23.8(17.8–20.2)
IV	7.1(6.3)	1.1(1.0)	5.0	6.1	12.9	32.2
Females						
Pp	2.1(2.0)	1.0(1.0)	1.1(1.0)		2.1(1.9)	6.3(5.9)
I	(3.9)	(0.9)	(3.0)	(2.8)	(5.7)	(16.3)
II	(7.3)	(1.3)	(5.8)	(5.0)	(11.6)	(31.0)
III	4.4(4.4)	1.1(1.0)	3.4(3.3)	3.6(3.8)	7.5(6.8)	20.0(19.3)
IV	6.8	1.5	4.9	4.1	12.4	29.7

The ocular tubercle big, setae placed on moderately large processes more or less arranged in lines along the lateral margins (Figs. 6–7).

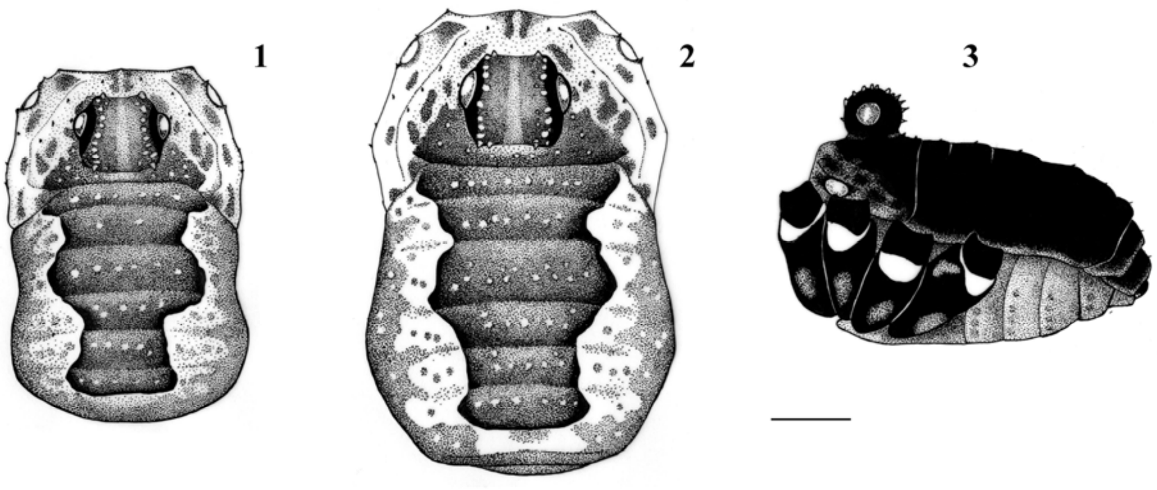
Colour (Figs. 1–3). Dorsal part dark, one of the male paratypes entirely black with the exceptions of pale patches on the thoracic areae; females paler and with a characteristic longitudinal pattern on the abdominal areae which can be seen also on the rest of the males. Anterior part of he thoracic areae mostly pale with a dark patch on the medioventral edge, patches along the lateral margin and between the setae lines; dorsal part mostly back with small pale spots only around the setae. Longitudinal dark pattern of the abdominal area begins at the anterior margin and reaches the apical fourth; it is flareing in the middle. The pattern bears small pale spots mostly around the setae while the remaining, pale parts of the abdominal area bears dark spots mostly around the seatae again. The ocular tubercle is brown, the projections are pale and a somewhat paler longitudinal medial line usually also present; lateral areas around the eyes black. Ventral part pale or at least paler than the dorsal part (Fig. 3), with transverse rows of dark spots on the abdominal area; basal sides of the genital operculum usually darker.

Chelicerae (Figs. 8–9, 14). Robust, lack any process.

Setation. Surface smooth, scales present only on the lateral sides of the basal segment. Setae arranged on the dorsal surface of the basal and the distal segments, and in the medial part of the inner lateral surface of the distal segment; neither movable nor fixed finger bearing no setae (Figs. 8–9). Teeth on the fingers altered by a few larger and further smaller ones (Fig. 9). Cheliceral lamellae smooth.

Colour (Fig. 14). Ground colour of the basal segment white, the proximal part of the lateral and ventral surface light to dark brown and the dorsal surface bearing dark patches. Proximal half of the distal segment brown with darker patches on the sides and a white patch on the dorsal surface; the apical half light brown. Fingers light brown but their apical parts are black. Dark colouration more pronounced on the black male paratype.

Pedipalps (Figs. 10–12, 15–20). Proportions of the segments are typical for the genus. Trochanter, femur, tibia and tarsus bear well developed tubercles on the ventral surface. Coxa bears a small apophysis on the apical part of the ventral surface, femur bears a small apical apophysis on the inner lateral surface. Patella and tibia bear well developed apical apophyses directed forward on the inner lateral part of the segments; these are rounded, the one on the patella overhang the apical edge with half of the segment length, apo-



Figures 1–3. *Megabunus pifkoi* sp. n., habitus. 1 = holotype male, body dorsal; 2 = allotype female, body dorsal; 3 = paratype male (black form), Jablanica Mts, body lateral (scale 1 mm)

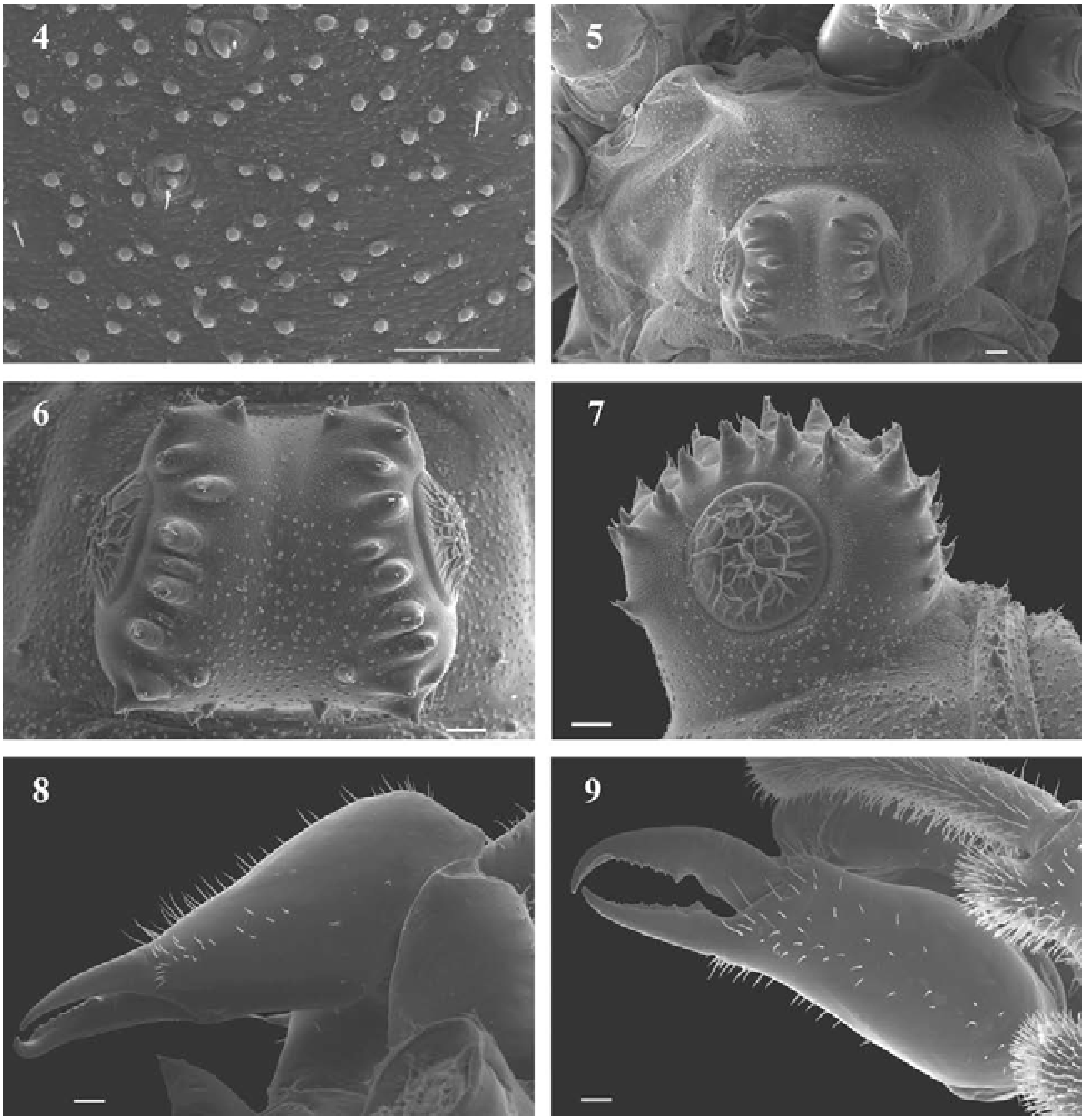
physis of the tibia slightly overhanging. Apophyses similarly developed in the males and females.

Setation. Surface of the pedipalps covered with minute scales, bearing both simple and ciliated setae, and large spines placed on well developed tubercles (Figs. 15–18). Coxa bears simple setae only, most of these arranged on the apophysis. Trochanter bears simple setae and one or two spines placed on moderately large tubercles, these arranged in the apical part of the ventral surface. Femur has simple setae arranged in two longitudinal lines on all the four surfaces, those on the ventral surface placed on small prominences, the ones on the apical half of the dorsal and outer lateral surfaces mixed with sharp, triangular teeth-like outgrows of the surface. Spines on tubercles arranged in a line on the outer ventral surface, the row consists of five to six large and one or two smaller ones; the length of the larger reach the width of the femur. Ciliated setae placed only on the apophysis.Ventral and dorsal surface of the patella mostly bald, outer lateral surface covered with simple setae, larger ones arranged in lines on the margins; triangular teeth-like outgrows of the surface also exist herein. Inner surface and the apophysis covered with dense setation of ciliated setae (Fig. 19). Simple setae on the tibia arranged in longitudinal rows on the margins and a transverse row on the apical end; triangular teeth-like outgrows scarce. Outer ventral surface bears two large and a smaller tubercle with strong spine; apophysis covered with dense ciliated setae (Fig. 20). Setation of the tarsus dense and not with a regular arrangement; ciliated setae occur mostly on the inner lateral surface, setation denser in the apical part. Outer ventral surface bears four or five moderately large tubercles with spines. Tarsal claw smooth and ordinary developed.

Colour (Figs. 10–12). Coxa pale; trochanter brown with paler ventral side, tubercles white. Most of the femur dark, proximal and apical parts paler and two longitudinal pale lines are more or less pronounced on the margins of the dorsal surface; tubercles white, apophysis pale. Ground colour of patella and tibia are white, but both bear conspicuous longitudinal dark patches. Setated part of apophyses brownish, or at least not as white as the ground colour; tubercles white. Tarsus pale, the apical part dark.

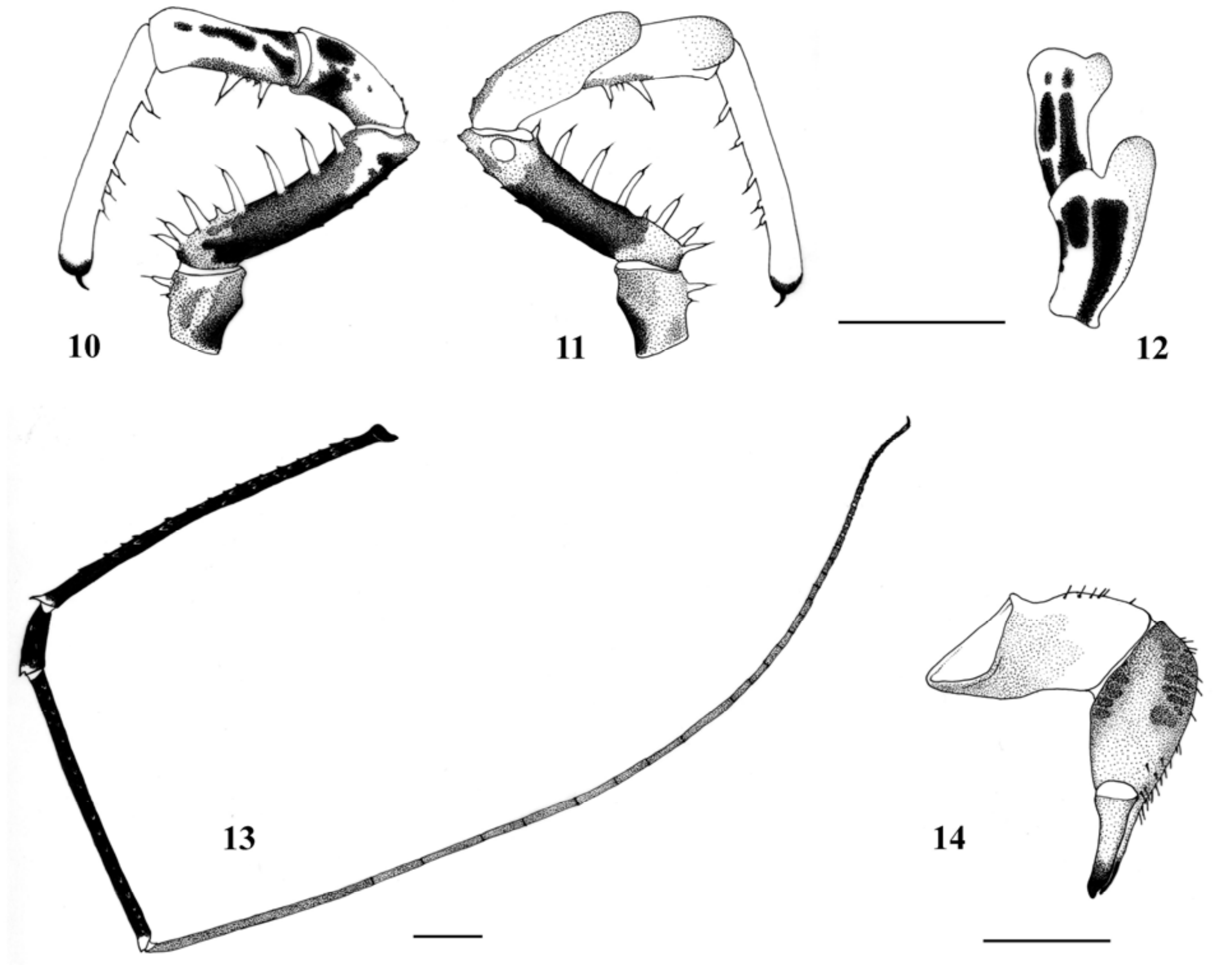
Legs (Fig. 13). Relatively long, the second pair about seven times longer than the length of the body in males, six times in females.

Setation. Surface covered with minute scales, bearing setae, triangular teeth-like outgrows and some larger apical teeth or spine. Coxa bears sparse, irregular setation, some of the setae placed



Figures 4–9. *Megabunus pifkoi* sp. n., body and chelicerae. 4 = surface of the abdominal area, dorsal; 5 = thoracic area, dorsal; 6 = ocular tubercle, dorsal; 7 = ocular tubercle, lateral; 8 = chelicera, inner lateral; 9 = chelicera, frontal (scale 0.1 mm)

on small prominences on the frontal margin of forecoxa; one or two weakly developed triangular teeth also present on the lateral apical part, mediodorsal apical teeth present on the first two coxae, weakly developed one also should exist on the third coxa. Trochanter bears only a few setae and triangular teeth. Femur has very parse setation but covered with many triangular teeth in an irregular arrangement, and a paired larger teeth on the dorsal apical margin. The slightly swollen patella has only a few setae and triangular teeth, but paired dorsal apical teeth conspicuous and sometimes surrounded with one or two smaller teeth. Tibia has sparse setation and weakly devel

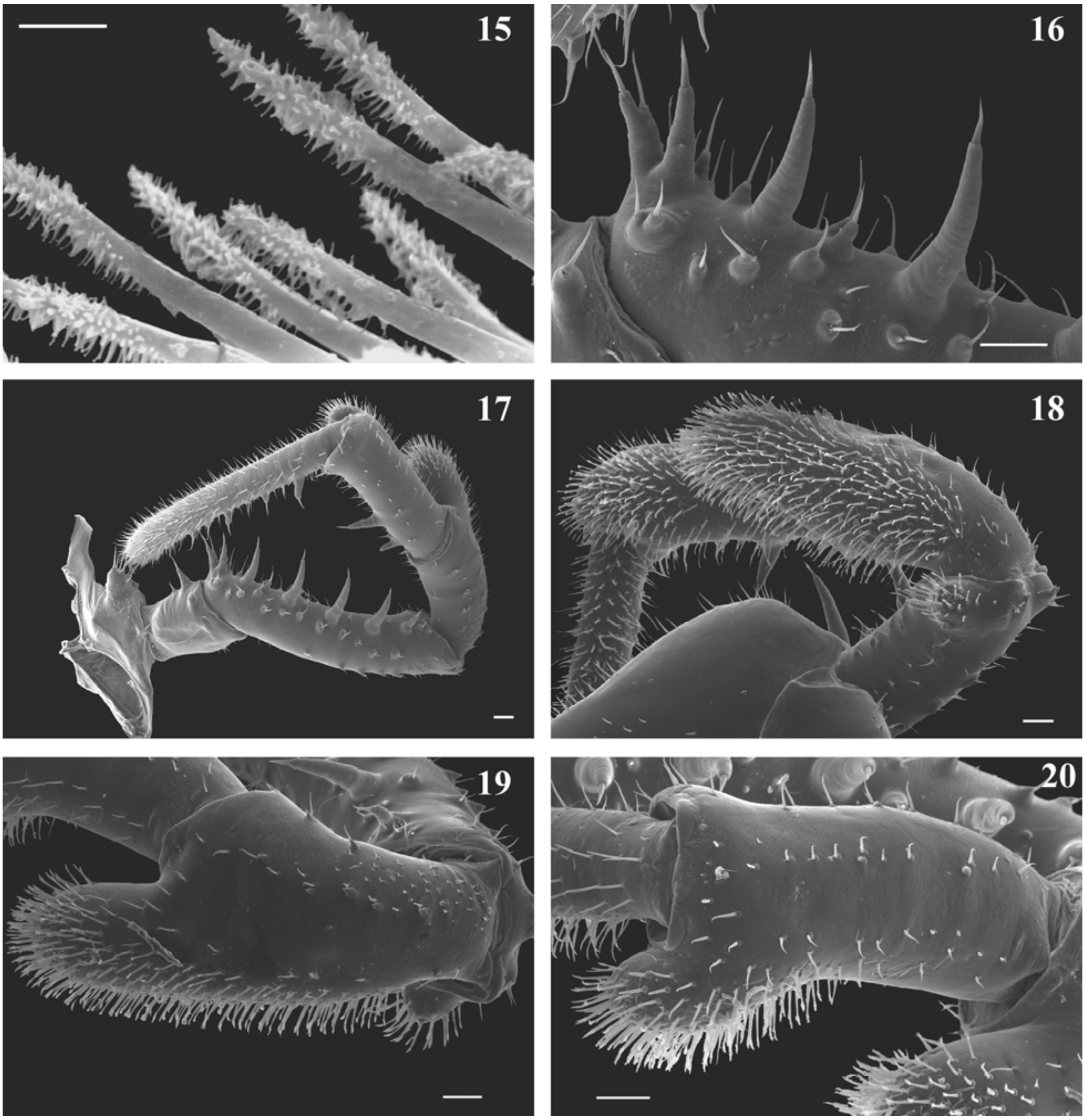


Figures 10–14. *Megabunus pifkoi* sp. n., pedipalpus, 2nd leg and chelicerae. 10 = pedipalpus, outer lateral; 11 = pedipalpus, inner lateral; 12 = pedipalpal patella and tibia, dorsal; 13 = 2nd leg, lateral; 14 = chelicera, outer lateral (scale 1 mm; setae of the pedipalpus and the leg omitted)

oped triangular teeth, the dorsal apical surface is covered with dense, short setae. Metatarsus lacks triangular teeth but has dense setation on the ventral, and scarce setation on the dorsal surface; the ventral apical margin bear a a paired spine. Tarsal articles are densely and evenly setated, with some stronger and longer setae erecting from the rest; paired spine on the ventral apical margin also present. Claw smooth and ordinary developed.

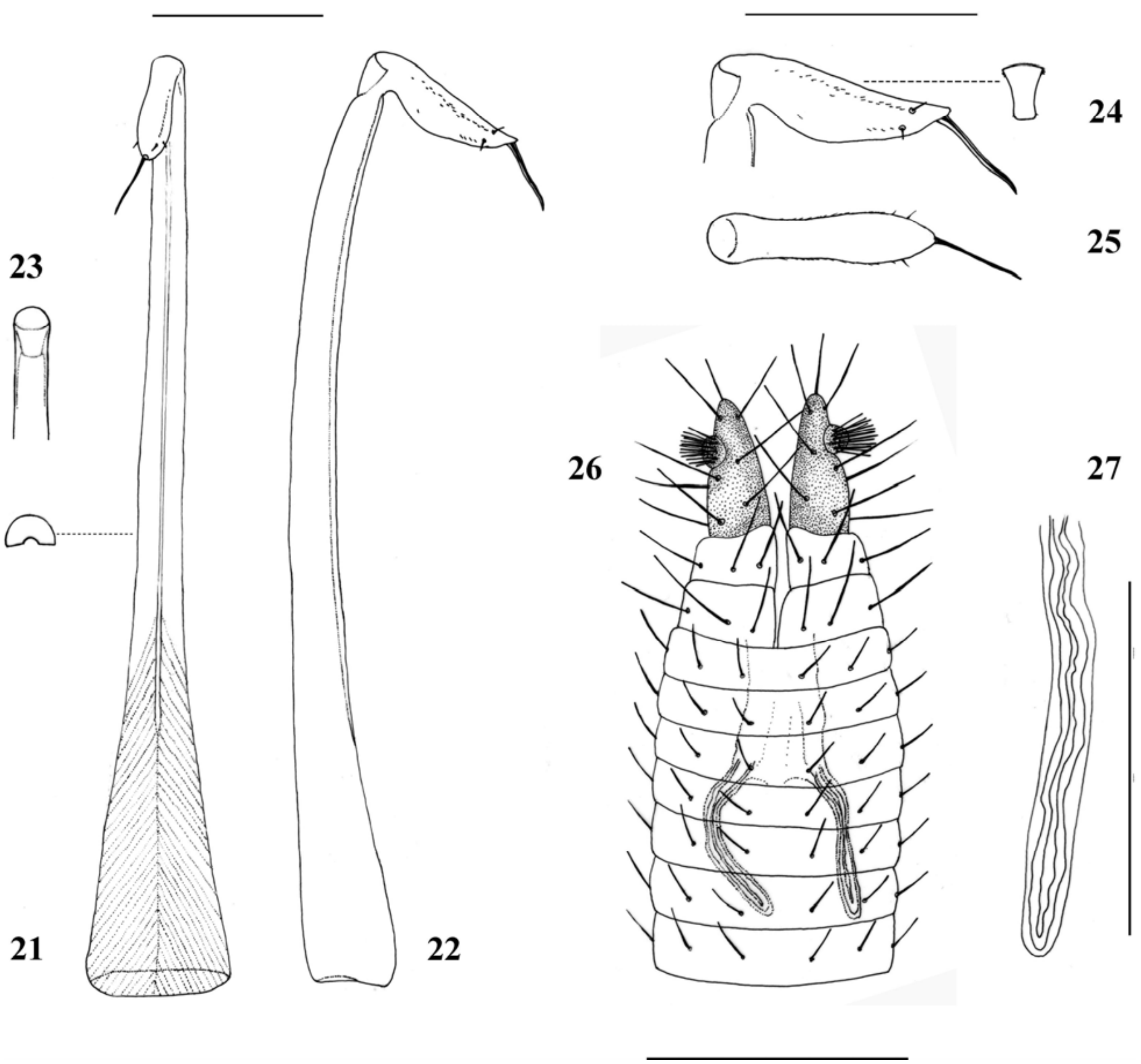
Colour. Proximal half of the coxa mostly pale with irregular dark patches, apical part dark brown to black; this pattern concerns also to the much smaller dorsal surface. Trochanter dark with four pale spots on the dorsal surface. Femur uniformly dark brown to black, but the dorsal apical part is white around the apical teeth; integument also white and with the white dorsal apical part make an impression of a certain white ring on the distal margin of the segment. Patella, tibia and those integuments have a similar colouration to the femur. Metatarsi and tarsi uniformly brown and slightly paler than the previous segments, terminal articles have a somewhat darker impact.

Penis (Figs. 21–25). Length 2.7–2.8 mm, width of the base 0.4 mm; colour uniformly pale brown. Trunk slightly bent, base triangularly widened and gradually narrows towards the apical



Figures 15–20. *Megabunus pifkoi* sp. n., pedipalpus. 15 = ciliated setae on the apophysis of patella; 16 = tubercles with spines on the ventral surface of femur; 17 = pedipalpus, outer lateral; 18 = patella and tibia, inner lateral; 19 = patella, dorsal; 20 = tibia, dorsal. (Scale 0.01 mm in Fig 15, and 0.1 mm in Figs. 16–20)

end which is not widened again. Musculature present in the basal third; a shallow ventral sulcus derived from the basal fourth along the ventral side, makes the cross section depressed along the apical three fourth instead of oval in the basal portion and the basal opening (Figs. 21–23). Head elongated, dorsal edge slightly depressed, ventral margin abruptly diverge in the basal two fifth then gradually converge towards the apex forming a pointed head. Tongue-shaped in dorsal view, cross section rectangular. Apical spine long, reaches more than half the length of the head;

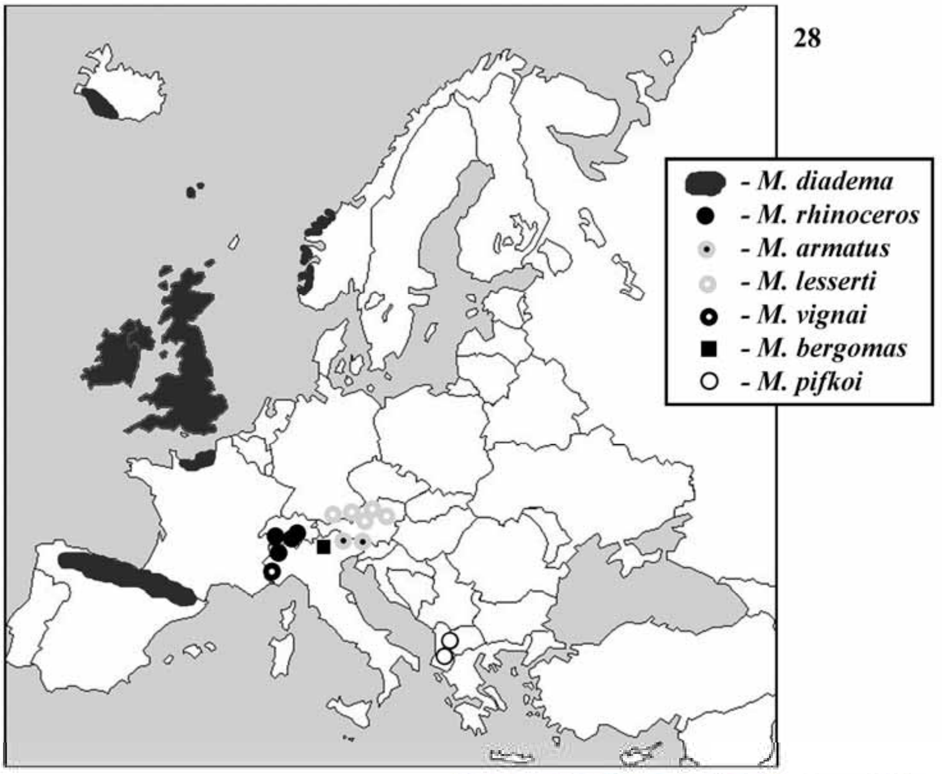


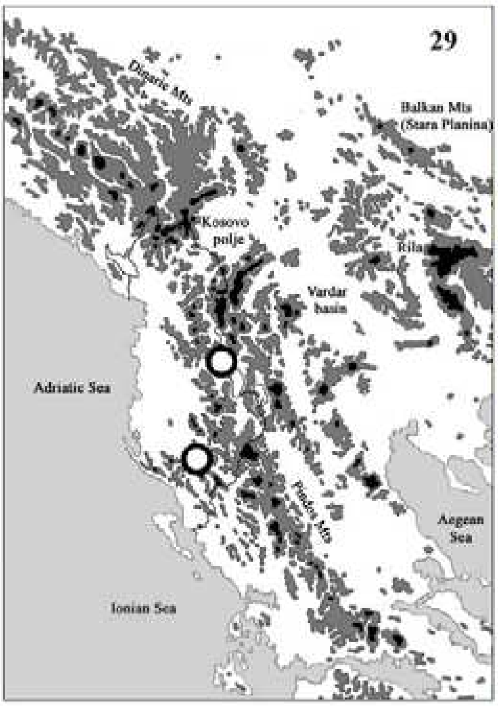
Figures 21–27. *Megabunus pifkoi* sp. n., genital organs. 21 = penis and its cross section, dorsal; 22 = penis, lateral; 23 = apical part of penis, ventral; 24 = head of penis and its cross section, lateral; 25 = head of penis, dorsal; 26 = apical part of ovipositor, ventral; 27 7 receptacula seminis, ventral (scale 0.5 mm in Figs. 21–26, and 0.25 mm in Fig 27)

minute spicules occur all along the dorsal, and partly along the ventral margins; paired apical setae present (Figs. 24–25).

Ovipositor (Figs. 26–27). Shape and proportions are typical for the genus; apical segment brown, the rest are whitish (Fig. 26). Receptacula seminis located in segments 6–9, rather elongated, monovesicular (Fig. 27).

Affinities. Among the species of genus *Megabunus* Meade, 1855, the new species differs from the West and Nort European *M. diadema* (Fabricius, 1779) by the much smaller processes on ocular tubercle, trunk of penis not widened in apical end, longer receptacula seminis, longer legs and dark body colour. From the West Alpine *M. rhinoceros* (Canestrini, 1872), *M. vignai* Martens,





Figures 28–30. Distributions and habitat. 28 = distribution of the genus *Megabunus* Meade, 1855; 29 = known localities of *Megabunus pifkoi* sp. n. (grey: areae above 1000 m; black: areae above 2000 m); 30 = type locality of *Megabunus pifkoi* sp. n. (photo Z. Drahos)

1978 and *M. bergomas* Chemini, 1985 it differs by the reduced spinulation of the dorsal thoracic areae and longer legs. In addition, it differs from *M. rhinoceros* by the uniformly pale brown and slightly bent penis, longer receptacula seminis and longer tubercles on pedipalpal tibia; from *M. vignai* by slightly bent penis and longer tubercles on pedipalpal tibia; from *M. bergomas* by smooth chelicera and weakly armed dorsal surface of pedipalpal femur. It is much closely related to the East Alpine *M. lesserti* Schenkel, 1927 and *M. armatus* (Kulczyński, 1887), but differs from both by the trunk of penis which is not widened apically, by the longer receptacula seminis and dark body colour. In addition, it differs from *M. lesserti* by longer tubercles on pedipalpal tibia, from *M. armatus* by pointed penial head and longer legs. Among the Balkanian species included in different genera, pedipalpus and chelicera of *Platybunus kratochvili* Hadži, 1973 similar to those of the new species, on the basis of the original description; nevertheless, it differs well by the size and the processes of the ocular tubercle and the modified femur of the first leg (Hadži 1973: Fig 67). As this species has small apical apophysis on the pedipalpal femur, it is most probably not a member of genus *Platybunus* C. L. Koch, 1848 but possibly the genus *Megabunus*; to judge its status the examination of the type specimens would be necessary. Genus *Stankiella* Hadži, 1973 also shares some similarities with the genus *Megabunus* but differs with the small teeth on the cheliceral lamella, and both species included have only small ventral projections on pedipalpal segments.

Ecology and distribution. The species was found in two mountain systems of Albania: the Dhëmbel Mts belong to the Pindos system of Southern Albania and Northwestern Greece while the Jablanica Mts belong to the system of Central-East Albania and Eastern Macedonia (Fig. 29). These systems are well separated and their fauna are quite different (e.g. Korsós *et al.,* 2008). Thus, it is highly probable that the species has a wider distributional area in SW Balkans. Both known localities are exposed limestone rocks with sparse shrub (Fig. 30); the East Alpine species of the genus live in similar habitats (Martens, 1978; Muster *et al.,* 2005). At the Dhëmbel Mts locality there were no additional harvestmen collected, in the Jablanica Mts the specimens were collected together with an unmatured male *Metaplatybunus* Roewer, 1911 specimen.

Etymology. The species is dedicated to my friend and colleague, Dániel Pifkó (Department of Botany, HNHM), the collector of the type series. Used as the genitive of a noun of male gender.

Key to the species belonging to *Megabunus*

1. Processes of the ocular tubercle nearly as long as the tubercle .... *M. diadema*
   Processes of the ocular tubercle shorter than half length of the tubercle 2
2. Spinulation of the dorsal thoracic areae well developed .. 3
   Spinulation of the dorsal thoracic areae reduced 5
3. Trunk of penis with marked dark pattern .... *M. rhimoceros*
   Trunk of penis uniformly pale brown 4
4. Trunk of penis erect, narrow in cross section ..... *M. vignai*
   Trunk of penis slightly bent, wide in cross section .... *M. bergomas*
5. Head of penis blunt, legs short .... *M. armatus*
   Head of penis pointed, legs relatively long 6
6. Trunk of penis widened in the apical end, receptacula seminis short .... *M. lesserti*
   Trunk of penis not widened in the apical end, receptacula seminis long .... ***M. pifkoi***

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Spatial and temporal distribution patterns of zooplankton assemblages (Rotifera, Cladocera, Copepoda) in the water bodies of the Gemenc Floodplain (Duna-Dráva National Park, Hungary)

K. SCHÖLL and A. KISS[1]

Abstract. The Gemenc Floodplain, situated between the 1498th and 1470th river-kilometres of the River Danube, is part of the Danube–Dráva National Park in Hungary. The floodplain is one of the largest in Europe with an area of 18,000 hectares, and within its territory various typical side arms and backwaters can be found. The area needs hydrological revitalization because of the sinking river bed, caused by the regulation of the main arm at the end of the 19th century. In order to assess the conditions of the intervention, an exhaustive knowledge about the hydrobiological relations of the different water bodies will be necessary. The aim of our study was to explore connections between the hydrological events, the physical–chemical parameters of the water-bodies, and the abundance of the planktonic crustacean and rotifer assemblages.

INTRODUCTION

Compared to the extent informations about limnology of stagnant waters, our knowledge about the ecological and hydrobiological functions of rivers and floodplains is scant. The definitions of conservation and restoration possibilities of river-floodplain systems are inadequate. Therefore the research of rivers and still remaining floodplains is a pressing need, especially under the current conditions of growing human interference, with mostly adverse effects (e.g. regulation, water-use, pollution)(Tockner *et al.,* 2000).

The importance of retentive inshore habitats and adjacent floodplain water-bodies for the growth and abundance of lotic zooplankton is well established (Baranyi *et al.,* 2002, Reckendorfer *et al.,* 1999, Zimmermann-Timm *et al.,* 2007). The quantitative influence of the floodplain on the zooplankton community depends on the abiotic (flow velocity, physical and chemical parameters) and biotic characteristics (competition, predation, presence of macrophytes) of each tributary. Most of these parameters is defined by the overall discharge of the main arm and is therefore temporally variable (Lair, 2005). Before the necessary conservation work can start, it is important both to understand how the affected floodplain ecosystems function and to increase our knowledge about the relation between local hydrological and ecological parameters (Berczik & Buzetzky, 2006).

The Danube is the second largest river in Europe with a length of 2860 km and a catchment area of about 817,000 km^2. As a consequence of the 19th century regulation of the Middle-Danube the length of the river bed decreased, its shape stabilized, causing most of the adjacent floodplains to become uninundated areas outside the dams. The increased flow velocity at the shortened reach of the river caused significant erosion in the river bed, what led to the drying out of the floodplains and to the weakening of the lateral interactions (Guti, 2001). The floodplain of Gemenc covers 18,000 hectares (180 km^2), leaving it the only notable floodplain of the Middle-Danube today. It is also one of the largest in Europe, with a unique natural value (Zinke, 1996). As it lies entirely within the dam-system, the characteristic hydrological processes of the river-floodplain system can go on unperturbed. We can observe in the area every characteristic "functional unit" (eu-, para-, plesio- and paleopotamal) of an ecological succession, providing a great opportunity to compare them simultaneously (Roux *et al.,* 1982; Guti, 2001).

To understand the ecological and hydrobiological functions of the floodplains, the Hungarian

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Danube Research Station has started the Gemenc Research Project, which covers the investigation of zooplankton assemblies, too (Berczik, 2003; Schöll, 2006; Dinka & Berczik, 2005; Kiss, 2006). Besides the faunistical characterisation of the Gemenc foodplain, the aims of our study include the comparison of the zooplankton assemblies in the main riverbed and the floodplain water bodies (spatial-temporal fluctuations, differences in diversity and abundance), the investigation of the dynamic connections between assemblages of the river and affluent arms (connectivity, colonisation, constancy), and uncovering the effects of floods on the floodplain zooplankton populations.

In this paper we present our results on the abundance patterns of zooplankton assemblages collected from the different water body types of the Gemenc floodplain between 2002–2004.

MATERIALS AND METHODS

The investigated area

The Gemenc floodplain is situated on the right bank of the Danube, between the 1503rd and 1469th river kilometres. It is 30 km long and 5-10 km wide (Tamás & Kalocsa, 2003a). In this reach of the Danube the mean annual discharge is 2400 m^3s^{-1}, with a minimum of 618 m^3s^{-1} and a maximum of 7940 m^3s^{-1} (Marosi & Somogyi, 1990). Total amplitude of water level fluctuation reaches 9 m. The stream gradient is about 5 cm km^{-1} in the main arm, with a 0.8–1.2 m s^{-1} flow velocity at MQ. In 2002 the river started to cover the floodplain after it reached a 500 cm water level in the main riverbank (Tamás & Kalocsa, 2003b).

In order to compare the different planktonic assemblies, our sampling covered a wide range of water bodies, with different properties: the main arm (D1489), two parapotamal type side arms, the 15 km long Rezéti-Holt-Duna (RDU) and 5 km long Vén-Duna (VDU), the plesiopotamal Grébeci-Holt-Duna (GDU) and the paleopotamal oxbow Nyéki-Holt-Duna (NYHD) (Fig. 1).

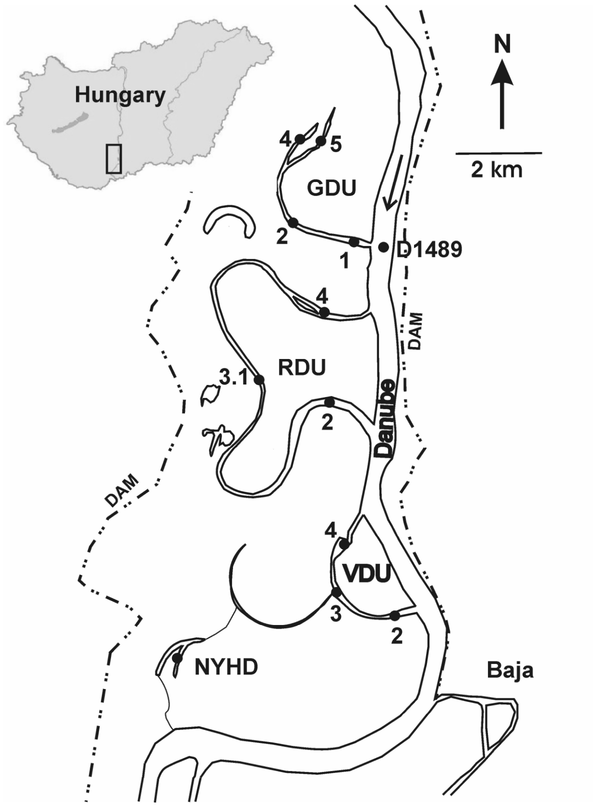

Figure 1. The investigated area and sampling sites

Sampling and data analysis

Zooplakton samples were collected by filtering 20 L (Rotifera) and 50 L (Crustacea) of water through of a 40 µm (rotifers) or 70 µm (Crustacea) mesh size net from the surface of the water. Samples were immediately preserved in 4% formalin solution. Rotifers were identified according to Koste (1978), and then counted in Sedgewick-Rafter chambers at 40–100× magnification using a light-microscope. Microcrustaceans were enumerated by using inverted microscopy and the adult individuals were identified at species level according to Dussart (1967, 1969), Gulyás & Forró (1999), Gulyás & Forró (2001). Juvenile stages of copepods were also counted and incorporated in total density.

The hydrophysical and hydrochemical parameters as well as hydrological conditions of the water bodies were monitored simultaneously. Water temperature (ºC), conductivity (µS cm^{-1}), pH, dissolved oxygen (mg l^{-1}) and oxygen saturation (%) were measured in the field (in situ) by WTW Multi 340i .

Spearman's rank correlation with Bonferroni correction was used to test the relationship between the main physical and chemical parameters and biological variables. All statistical analysis was performed by the Statistica 7.0 software package (Statsoft, 2005). The multivariate analysis was calculated using the PAST software-package (Hammer *et al.,* 2001).

RESULTS

The water level fluctuation of the main arm was 827 cm during the investigated period (Fig. 5–7). In the course of our observations, the water regime varied significantly from year to year, what could have had an important impact on zooplankton assemblages.

During our observations at Gemenc, 38 Cladocera, 23 Copepoda and 75 Rotifera taxa were found (Kiss, 2006; Schöll, 2006). The range of the zooplankton density was 0-455,750 ind.*100 L^{-1} in the case of rotifers, 0-1,366 ind.*100 L^{-1} in the case of cladocerans, and 0-6,436 ind.*100 L^{-1} in the case of copepods (Figs. 2–4, Table 1). There were significant differences between the zooplankton abundance and the spatial and temporal patterns of assemblages in the various water bodies. The minimum of the density and the biomass was generally recorded during late fall, while the maximum every year was in July.

The minimum density was usually recorded in the main arm and the Vén-Duna. At the VDU4 site, which is the border on the main arm, for all three examined planktonic groups minimal densities were observed. The maximum density was usually recorded in the Grébeci-Holt-Duna and the Rezéti-Holt-Duna. The density peak was in the GDU4 site (the farthest from the Danube) for crustaceans, and the RDU3.1 site, situated in the middle of the side arm, for rotifers (Figs. 2–4.). The ratio of copepods was larger than the ratio of cladocerans in each sampling site except the main arm. The observed higher ratio of cladocerans in the main arm was due to the high density of the small-sized *Bosmina longirostris*, a species typical for the Danube. The average density of the two planktonic microcrustacean groups gradually increased in the Grébeci-Holt-Duna diverging from the main arm. Similarly, the average density of copepods in the Rezéti-Holt-Duna gradually decreased distally from the main arm.

The average abundance of all three zooplankton groups was higher in 2003 than in 2002 and 2004, in a significant proportion of the sampling sites (Table 1). The ratio of predator or omnivorous species (*Thermocyclops*, *Mesocyclops*, *Cyclops*) in the Copepoda assemblages was high in all sampling sites, but there was no relationship between the fluctuation of Rotifera and Copepoda density.

The main arm

Rotifera

The density of rotifer assemblages in the main arm was between 500 és 139,000 ind.*100 L^{-1} but usually was below 10,000 ind.*100 L^{-1}. The average density was 5725 ind.*100 L^{-1} in 2002, 43,685 ind.*100 L^{-1} in 2003 and 22,900 ind.*100 L^{-1} in 2004 (Table 1). The maximum values were recorded usually in May and June; the minima were always in autumn. The highest density (07. 05. 03. – 139,000 ind.*100 L^{-1}, 07. 01. 04. – 94,250 ind.*100 L^{-1}) was measured at middle water. Two weeks prior to the higher abundance values the water level was medium (300–350 cm). The minimum abundance values were recorded in cold water or at low water levels.

Crustacea

The abundance of Crustacean assemblages was between 1 and 470 ind.*100 L^{-1} (Cladocera: 1–422 ind.*100 L^{-1}, Copepoda: 0–86 ind.*100 L^{-1}) in the main arm. Here assemblages with low density were typical and the dominance of *Bosmina longirostris* (Cladocera) was observed. The temporal density dynamics of the two examined Crustacean groups were considerable different.

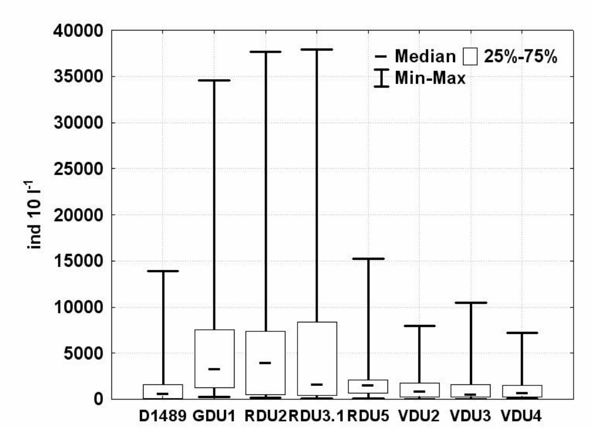

Figure 2. The average density of rotifer species at the sampling sites (for the abbreviations of sampling sites see the Methods section)

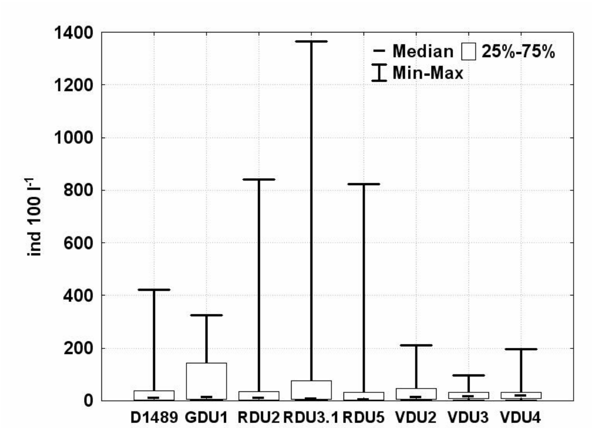

Figure 3. The average density of Cladocera species at the sampling sites

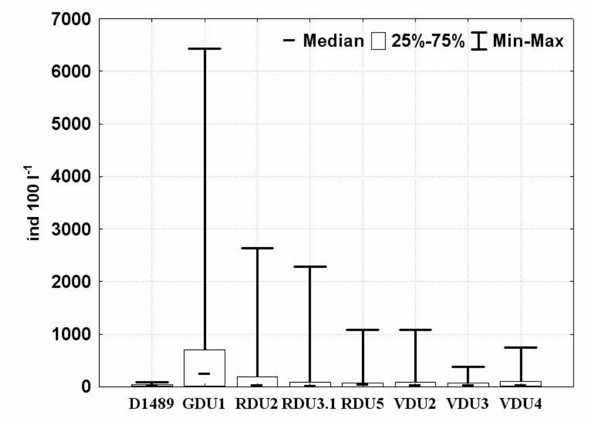

Figure 4. The average density of Copepoda species at the sampling sites

In case of Cladocera, the density peak was in the warmer period, in cold water (<15 Cº) period the density was generally low. The density of copepods fluctuated less and the density maxima were observed in spring. The average density of cladocerans was considerable higher in 2004 than in 2002 and 2003, but in case of copepods there were no differences among the sampling years.

Grébeci-Holt-Duna

The connection of this plesiopotamal type side arm with the main arm depends on the water level of the Danube. The highest densities of zooplankton assemblages were recorded in periods following higher water levels in the main arm. The influx of water during such periods was followed by the fall of water levels, and as a result the influent water from the main arm gradually became stagnant water in the side arm. It is noteworthy that when the water levels of the river fall below 200 cm (measured on the water-gauge of Baja), only the GDU1 sampling site was accessible.

Rotifera

The pooled density fluctuated between 3000 and 455,750 ind.*100 L^{-1}. The highest densities were recorded in the Grébeci-Danube. There were notably differences between the sampling years. Generally, during the whole sampling period, the abundance decreased passing on the river mouth (Table 2). In the Grébeci-Danube the pooled density increased with rising temperature (N: 36, R: 0.49, t: 3.30, p: 0.013)

Crustacea

The density of crustacean assemblages fluctuated between 9 and 6762 ind.*100 L^{-1} (Cladocera: 1-5268 ind.*100 L^{-1}, Copepoda: 7-5800 ind.*100 L^{-1}). Similarly to rotifer assemblages, the highest densities for these taxa were recorded in this Danube-section. However, the temporal variation of the two crustacean groups was different.

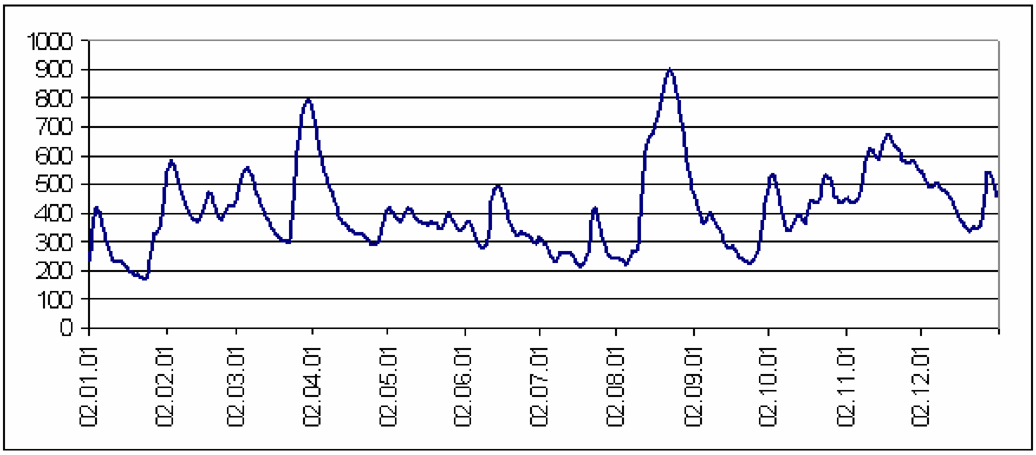

Figure 5. Water level fluctuation (cm) in 2002 (Gauge Baja, rkm 1478)

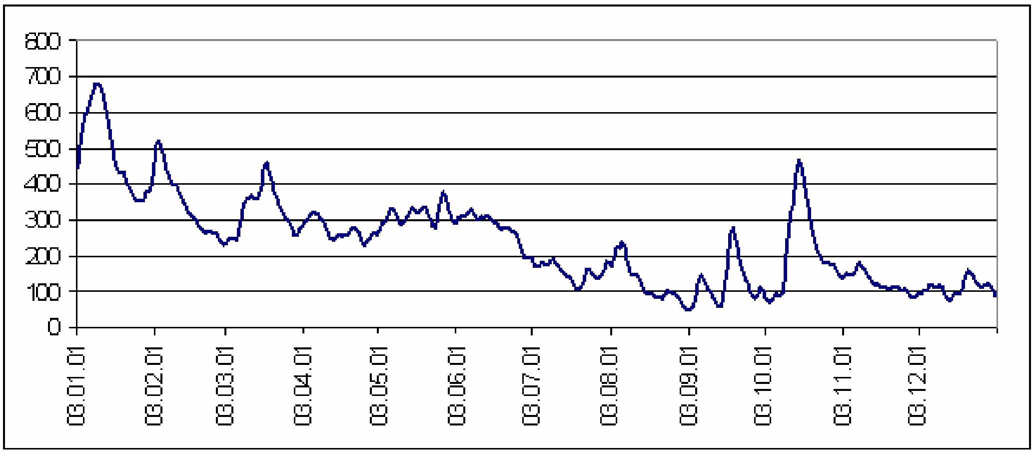

Figure 6. Water level fluctuation (cm) in 2003 (Gauge Baja, rkm 1478)

Figure 7. Water level fluctuation (cm) in 2004 (Gauge Baja, rkm 1478)

The density peak of cladocerans was when the temperature of the water was relatively warm, while high densities of copepods were observed both in cold and warm water periods. In general, during the three sampling years the average densities decreased passing on the river mouth for both cladocerans and copepods, but there were differences between the three sampling years (Table 2).

Rezéti-Holt-Duna

Rotifera

The pooled density for rotifers was between 0 and 379,500 ind.*100 L^{-1} in this parapotamal type side arm. The average density increased downstream, and the highest densited were recorded on the RDU2 sampling site locating close to the river mouth (Table 3). When water levels were low, the flow velocity of the water in the side arm decreased and matched the stagnant water conditions on certain sections of the side arm. In such situations the abundance of the evolving Rotifer assemblages was significantly higher than in the case of higher water levels in the main arm, such as during intensive flow periods (Schöll & Dinka, 2005; Schöll, 2006). We observed an inverse relationship between the water-level of the main arm and the abundance of the rotifer assemblages in the Rezéti-Holt-Duna (N: 36, R: -0.81, t: 8.14, $p<10^{-8}$), and a positive correlation between the temperature and the density of assemblages (N: 36, R: 0.47, t: 3.10, p: 0.018). This correlation was even more significant in downstream areas of the side arm and was highest on the RDU2 site (Dinka *et al.,* 2006).

Crustacea

The density of the microcrustacean assemblages was between 3–3650 ind.*100 L^{-1} (Cladocera: 0–1366 ind.*100 L^{-1}, Copepoda 0–2636 ind.*100 L^{-1}). For copepods, the average pooled density decreased passing on the river mouth, however this tendency was not consistent through all sampling years. In the case of the Cladoceran assemblages there was no relationship between density fluctuations and the distance from the river mouth.

Vén-Duna

Rotifera

In this relatively short (5 km) side arm with permanent flow the density of rotifer assemblages was low (2650–48,333 ind.*100 L^{-1}), similar to the main arm. There were no significant differences between the different sampling sites of the side arm. During the three sampling years we observed similar abundance values in 2002 and 2004, while a density peaks was obvious in 2003, when the water level was low in the main arm (Table 4).

Positive correlation (N: 41, R: 0.57, t: 4.37, p< 0.0005) was shown between pooled densities and water temperatures.

Crustacea

The density of the planktonic microcrustaceans was between 2–1298 ind.*100 L^{-1} (Cladocera: 0-212 ind.*100 L^{-1}, Copepoda: 2–1086 ind.*100 L^{-1}). The amount of the Copepods in the Crustacean assemblages was significantly higher than Cladocerans. The density peaks were observed at the end of the summer and in the fall for both examined groups. The density of the assemblages was notably higher in 2003 than in 2002 and 2004 (Table 4). There was no relationship between the average density of assemblages and the distance from the Danube.

Nyéki-Holt-Duna

Rotifera

The sampling in the Nyéki-Holt-Duna was started only in 2003. Significant difference was shown between the density values during the two years of observation (Table 5).

There was no significant correlation between the abundance of the assemblages and the measured physico-chemical parameters of the water.

Crustacea

The density of the microcrustaceans has varied between 260 and 320 ind.*100 L^{-1} (Cladocera: 6-300 ind.*100 L^{-1}, Copepoda: 40-4026 ind.*100 L^{-1}). Similarly to rotifers, the average density values of the two sampling years were different because of the higher abundance of copepod assemblages in 2003 (Table 5).

Comparison of the examined water bodies with multidimensional statistical methods on the basis of the abundance values

Rotifera

In the cluster constructed based on density values of the Rotifera assemblages we could distinguish two main groups. The sampling sites of the Vén-Duna (VDU2, VDU3, VDU4) and the RDU5 site of the Rezéti-Holt-Duna situated in the proximity of the main arm were clustered as one group computing the mostly similar sites. The D1489 observation site, situated in the main arm also grouped with the aforementioned sites.

The further two down-stream sites of the Rezéti-Holt-Duna (RDU3.1, RDU2) were different from the first group, and from the GDU1 site in the Grébeci-Holt-Duna, which also differed from all other examined water bodies (Fig. 8).

Crustacea

The similarity between the sampling sites was higher for crustaceans than for rotifers (Fig. 9). However, similarly to the Rotifers, the most distinct sites were GDU1 and RDU2. Clustering of the other sites was not as obvious as for rotifers.

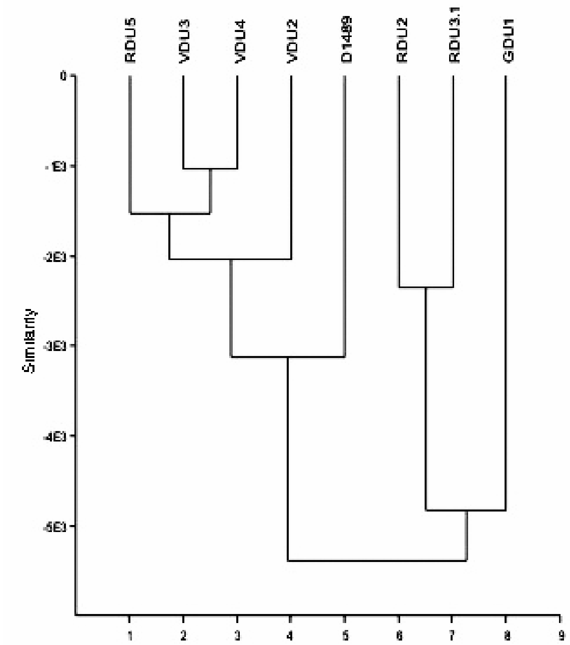

Figure 8. The similarity of the sampling sites on the basis of Rotifera densities (UPGMA, Euclidean distance)

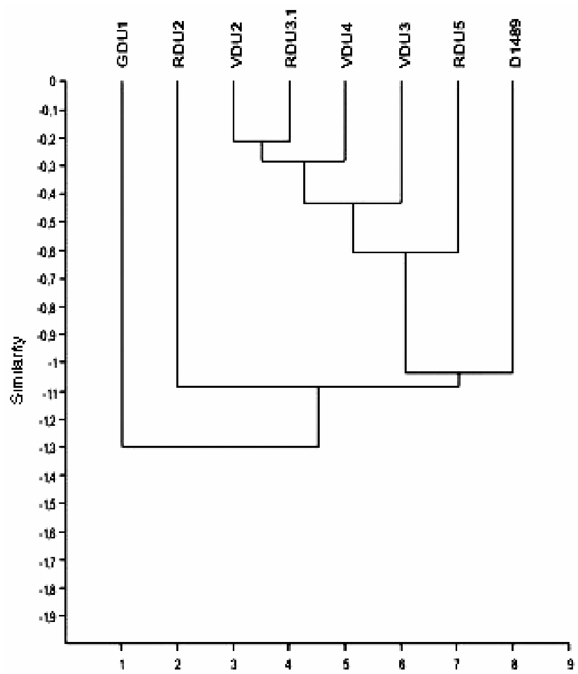

Figure 9. The similarity of the sampling sites on the basis of microcrustacean densities (UPGMA, Euclidean distance)

DISCUSSION

It is assumed that due to the limiting effect of the water flow the density of crustacean and rotifer assemblages is higher in river side arms and water bodies with slower flow, than in the main arms and faster-flowing segments of the side arms (Baranyi *et al.,* 2002). If the residence time of the water in the side arms increases, the density of the forming planktonic assemblages can be higher (Ruttner-Kolisko, 1972). As the generation time of the zooplankton is notably longer than that of the phytoplankton, the slower flowing or stagnant water segments in the river system should be especially important for the ecology of the zooplankton. In contrast, some earlier investigations did not find any relationship between the residence time of the water, the depth of light penetration and the biomass of the phytoplankton, which is the most important food-source for the zooplankton (Chételat & Pick, 2006).

As the Danube's water streams down into the side arms, its speed and the amount of suspended matter decreases, while the depth of light penetration increases. As a consequence, the biomass of the phytoplankton increases, providing better food-supply for the local zooplankton assemblages. We hypothesise, that the density of assemblages forming in the longer side arms with more varied habitats and slower flow is higher than in the shorter, fast-flowing water bodies, more similar to the main arm.

Our results show a significant deviation in the pooled densities for all three examined zooplankton groups (rotifers, copepods and cladocerans). The highest values were observed usually in summer, while the minima were in late autumn, in the cold water period. There were notable differences between the sampling years. The densities were usually low in the faster flowing water bodies (in the main arm and the Vén-Duna), and high in the Rezéti-Holt-Duna, with slower water flow, and the periodically stagnant Grébeci-Holt-Duna (due to the considerable deviation of the data, these differences were not significant). Compared to water bodies with permanent connection to the Danube, the density of rotifers was lower, while the density of crustaceans was higher in the usually stagnant Nyéki-Holt-Duna.

These observations can be partially explained by the fact, that the ability of rotifers to reproduce in waters with flow velocities above 0.4 m/s is very low, or indeed nil. In other words, the hydrological conditions of the water bodies can affect both directly and indirectly the structure of the assemblages (Ruttner-Kolisko, 1972; Rzoska, 1978). In water bodies with long water residence times, like the Nyéki-Holt-Duna, the importance of the biotic interactions increases and crustaceans with longer generation time constitute a significant part of the zooplankton assemblages (Baranyi *et al.,* 2002, Kiss 2006). For all these reasons, high density rotifer assemblages could develop in water bodies where the intensity of the flow and the frequency of the flow events are not inhibited, but at the same time the residence time of the water is not long enough to favour planktonic crustaceans. Although the generation time of this group is slower than the one of the rotifers, they are better suited to resist biotic interactions (exploitative and interference competition). The occurrence of crustacean assemblages with diverse composition in the paleopotamal-type Nyéki-Holt-Duna is also caused by the lack of constant fish populations. Yearly desiccation events also affected significantly the structure of the zooplankton.

We found a very strong negative correlation between the water levels of the main arm and the density of the assemblages in the Rezéti-Holt-Duna. This could be due to the gradually slowing flow in this 15 km long side arm during the low water period. The slower flow provides better conditions for rotifers to reproduce, the water is warmer, and the depth of light penetration also increases, therefore the chances for reproduction of phytoplankton is also better. The effect of the turbidity on biotic factors influencing rotifer assemblages was shown for other large rivers too (Lair, 2005; Pollard *et al.,* 1998). Decreasing turbidity also favours planktonic crustaceans, which therefore compete with rotifers for resources;

however rotifers are better equipped to tolerate the unfavourable influences of the flow.

Inside in the individual side arms we found no obvious trends; the lowest density and the lowest biomass were usually observed near the junction from the main arm, indicating similar physico-chemical characteristics to the Danube.

Significant positive correlation was shown between the temperature and the pooled density in the side arms (Grébeci-Holt-Duna, Rezéti-Holt-Duna, Vén-Duna) with permanent connection to the main arm. This correlation could be explained, if higher temperatures would increase the reproduction of the rotifers (Galkovskaya, 1987).

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Table 1. Average density of the three examined zooplankton groups in the examined side arms and the main arm

	site	2002	2003	2004	mean
ROTIFERA Ind* $100L^{-1}$	***D 1489***	5725	43685	22900	24103
	GDU	68177	153792	185299	135756
	RDU	13946	59687	32025	35219
	VDU	6986	35986	7817	16929
	NYHD	-	68563	15161	41862
CLADOCERA ind.*$100L^{-1}$	***D 1489***	*4.0	37.3	94.6	57.3
	GDU	35.4	214.0	950.7	416.5
	RDU	3.0	314.2	114.4	118.7
	VDU	11.6	49.7	26.3	31.0
	NYHD	-	106.7	195.0	142.0
COPEPODA ind.*$100L^{-1}$	***D1489***	*18.0	34.5	31.6	30.2
	GDU	502.0	566.0	2724.2	1311.6
	RDU	9.7	582.5	288.3	251.8
	VDU	23.0	183.8	39.9	99.0
	NYHD	-	1578.0	365.0	1092.8

Table 2. Abundance values in the Grébeci-Holt-Duna

	site	2002	2003	2004	mean
ROTIFERA ind.*100L^{-1}	***GDU1***	38187	15625	88900	47571
	GDU2	52812	230500	163167	148826
	GDU4	113531	215250	303830	210870
	mean	68177	153792	185299	
CLADOCERA Ind.*100L^{-1}	***GDU1***	7.8	196.0	160.0	100.5
	GDU2	66.0	396.0	668.7	371.4
	GDU4	40.0	68.0	2023.3	787.3
	mean	35.4	220.0	950.6	
COPEPODA ind.*100L^{-1}	***GDU1***	747.3	467.0	2449.3	1089.1
	GDU2	26.0	1206.0	2454.7	1235.4
	GDU4	613.8	124.0	3268.7	1548.1
	mean	462.4	599.0	2724.2	

Table 3. Abundance values in the Rezéti-Holt-Duna

	site	2002	2003	2004	mean
ROTIFERA ind.*100L^{-1}	***RDU5***	9000	42750	12500	21417
	RDU3.1	8775	74375	41125	41425
	RDU2	24062	61937	42450	42816
	mean	13946	59687	32025	
CLADOCERA ind.*100L^{-1}	***RDU5***	2.6	34.0	214.5	81.1
	RDU3.1	4.8	465.5	40.5	170.3
	RDU2	2.0	232.5	93.4	100.5
	mean	3.1	244.0	116.1	
COPEPODA ind.*100L^{-1}	***RDU5***	15.0	563.0	44.0	161.7
	RDU3.1	9.8	899.3	52.5	246.4
	RDU2	4.4	497.5	672.4	383.9
	mean	9.7	653.3	256.3	

Table 4. Abundance values in the Vén-Duna

	site	2002	2003	2004	mean
ROTIFERA ind.*100L^{-1}	***VDU4***	8854	24875	5500	13076
	VDU3	7250	48333	2650	19411
	VDU2	4854	34750	15300	18301
	mean	6986	35986	7817	
CLADOCERA ind.*100L^{-1}	***VDU4***	10.8	77.0	17.2	32.0
	VDU3	8.0	38.7	33.2	26.2
	VDU2	12.4	70.5	28.6	34.8
	mean	10.4	20.7	26.4	
COPEPODA ind.*100L^{-1}	***VDU4***	33.6	303.5	37.2	112.0
	VDU3	19.5	196.0	35.2	70.2
	VDU2	15.2	324.0	47.2	114.9
	mean	22.8	274.5	13.3	

Table 5. Abundance values in the Nyéki-Holt-Duna

	Site	2003	2004	mean
ROTIFERA (ind.*100L^{-1})	***NYHD3***	68563	15161	41862
CLADOCERA (ind.*100L^{-1})	***NYHD3***	106.7	195.0	142.0
COPEPODA (ind.*100L^{-1})	***NYHD3***	1578.0	365.0	1092.8

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Two new and a known species of the genus Miconchus Andrássy, 1958 (Nematoda: Anatonchidae) from West Bengal, India

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Abstract. Two new and a known species of the genus *Miconchus* Andrássy, 1958 from the district South 24-Parganas, West Bengal, India are described and illustrated. Fifteen female and ten male representatives of *Miconchus aquaticus* Khan, Ahmad and Jairajpuri, 1978 were collected. *Miconchus rectangularis* n. sp. is characterized by medium sized body (female: 1.77-1.82 mm); buccal cavity very narrow, rectangular in shape, wall of buccal cavity straight; dorsal tooth and two sub-ventral teeth medium in size, situated at 31% from the base of buccal cavity and at same level; gonads amphidelphic; tail conoid, arcuate, gradually tapering at the end, tail-tip rounded, spinneret terminal. *M. bulbicaudatus* n. sp. is characterized by medium sized body (female: 2.1-2.2 mm); broad buccal cavity; dorsal tooth and two sub-ventral teeth small, situated at 31% from the base of buccal cavity and at same level; gonads amphidelphic; tail conoid, arcuate, gradually tapering at the end; tail-tip rounded with a bulbous structure encircled by caudal papillae at its base, spinneret terminal.

One known and two new species belonging to the genus *Miconchus* Andrássy, 1958 (subfamily Miconchinae Andrássy, 1976, family Anatonchidae Jairajpuri, 1969) are described. The specimens were collected during a survey to the district South 24-Parganas, West Bengal, India, from different blocks, in the years 2006–2007. Both male and female representatives were found in *Miconchus aquaticus,* but for the two new species, only females were collected. The new species are named as *Miconchus rectangularis* and *Miconchus bulbicaudatus.*

MATERIALS AND METHODS

The nematode specimens were extracted by a modified Baermann's funnel technique (Christie and Perry, 1951), fixed in hot diluted 4% FA (formalin-acetic acid mixture; Seinhorst, 1966), mounted on slides in anhydrous glycerin and sealed. Preserved specimens were observed under different magnifications with an Olympus BX-51 trinocular light microscope. Figures were drawn with the aid of a camera lucida attached to the microscope. Images were captured with a CCD digital camera (CoolSnapPro) integrated with the microscope. Body dimensions were tabulated using de Man's formula (de Man, 1880).

DESCRIPTIONS OF SPECIES

Miconchus aquaticus Khan, Ahmad & Jairajpuri, 1978

(Tables I–II, Figs. 1–2)

Measurements in Tables I–II.

Female. Body long, habitus curved. Cuticle moderately thick all over the body, but of variable thickness at lip region, mid-body and caudal region. Width of lip region more or less same as the adjacent body width. Dorsal tooth situated at mid to upper third area of buccal cavity, two sub-ventral teeth present, geusids prominent at the base of buccal cavity. Excretory pore situated behind the nerve ring. Oesophageal glands prominent; oesophagus cylindrical and muscular. Cardia simple, length and width of cardia more or less same. Gonads amphidelphic, ovary reflexed, oviduct

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Table I. Morphometric data of female *Miconchus aquaticus* (all measurements are in µm, except L, in mm)

	Mean	Range
L	2.1	2.1-2.2
a	31.7	29.7-33.8
b	4.5	4.4-4.7
c	16.3	15.8-16.9
c'	3.1	3-3.1
V%	65.2	54-68.7
G1	19	18.3-19.7
G2	18.9	12.3-21.4
Cuticle thickness at head region	4.9	4.7-5
Cuticle thickness at mid-body	3.4	3.3-3.6
Cuticle thickness at tail region	4.9	4.7-5.1
Lip height	10.5	9.8-11
Lip diameter	37.7	36.8-41.7
Mid-body diameter	66.2	63.7-71.1
Anal diameter	41.9	41.7-42.9
Length of buccal cavity	46.8	44.1-50.2
Diameter of buccal cavity	26	24.5-29.4
Position of dorsal tooth from the base of buccal cavity	16.7	15.9-17.2
% of dorsal tooth of total buccal cavity length	56.5	34.2-88.5
Position of first sub-ventral tooth from the base of buccal cavity	15.2	14.7-15.9
Position of second sub-ventral tooth from the base of buccal cavity	15.7	14.7-17.2
Position of amphid from the anterior end	11.8	11.2-12.3
Diameter of amphidial aperture	4.7	4.5-4.9
Position of excretory pore from anterior end	169.7	159.4-183.8
Length of oesophagus	463.5	448.4-480.2
Length of cardia	13.2	12.1-14.2
Diameter of cardia	24.5	23.7-25.7
Position of nerve ring from anterior end	145.5	139.7-154.4
D	39.8	36.3-42.4
AS1	57.1	52.4-60.2
AS2	62	55.6-67.7
PS1	75.1	72.4-80.2
PS2	79.1	75-85
Glandularium	345.6	320.3-368.6
Anterior gonad	398.4	385.7-415
Uterus	202.2	188.7-215.8
Oviduct	148.4	136.6-155.4
Ovary	47.8	42.4-59.6
Posterior gonad	425	399.4-460.5
Uterus	192.4	187.2-198.3
Oviduct	168.2	145.7-189.5
Ovary	64.1	55.7-73.7
Vulval Length	1365.1	1161.3-1450.4
Total length of vagina	23.3	22.6-23.8
Pars proximalis vagina	17.9	17.5-18.4
Pars refringes vagina	4.7	4.3-5.4
Pars distalis vagina	0.6	0.4-0.9
cw	11.1	10.5-12
Rectum length	32.2	30.3-35
Tail length	128.4	125-132.3
% of tail of total body length	6.1	5.9-6.3

Table II. Morphometric data of male *Miconchus aquaticus* (all measurements are in µm, except L, in mm)

	Mean	Range
L	2.1	1.8-2.5
a	35.7	32-38.2
b	4.5	4.2-4.9
c	16.9	16-18.1
c'	2.3	2.1-2.5
T%	39.3	35.7-42.5
Cuticle thickness at head region	3.6	3.4-3.9
Cuticle thickness at mid-body	6.1	5.4-6.9
Cuticle thickness at tail region	7.4	6.6-8.1
Lip height	12.7	11.7-14.3
Lip diameter	38.7	36.5-43
Mid-body diameter	61.3	56.4-66.2
Anal diameter	50.1	46.6-52
Length of buccal cavity	46.3	44.1-48.6
Diameter of buccal cavity	19.8	15.6-29.4
Position of dorsal tooth from the base of buccal cavity	17.6	17.2-18.5
% of dorsal tooth of total buccal cavity length	38.5	36.3-44.4
Position of first sub-ventral tooth from the base of buccal cavity	14.8	14.58-14.90
Position of second sub-ventral tooth from the base of buccal cavity	16.3	14.7-17.6
Position of amphid from the anterior end	11.9	11.2-12.3
Diameter of amphidial aperture	4.7	4.5-4.9
Position of excretory pore from anterior end	169.8	159.4-183.8
Length of oesophagus	465.8	428.8-490
Length of cardia	13.2	12.1-14.2
Diameter of cardia	24.6	23.7-25.7
Position of nerve ring from anterior end	139.7	136.4-142.1
D	40.1	36.3-42.4
AS1	59.2	56-63
AS2	62.6	59-66.4
PS1	75. 7	72.4-82.3
PS2	80.4	75-85
Glandularium	346	320.3-368.6
Spicules	81.1	73.5-94.3
Gubernaculum	22.9	19.6-25
Ventro-median supplements	15	15-15
Lateral guiding pieces	19.12	17.2-21.3
Pre-rectum	263.7	254.7-271.2
Rectum length	49	45.7-55.7
Tail length	115.3	110.3-122.5
% of tail of total body length	5.6	4.6-6.8

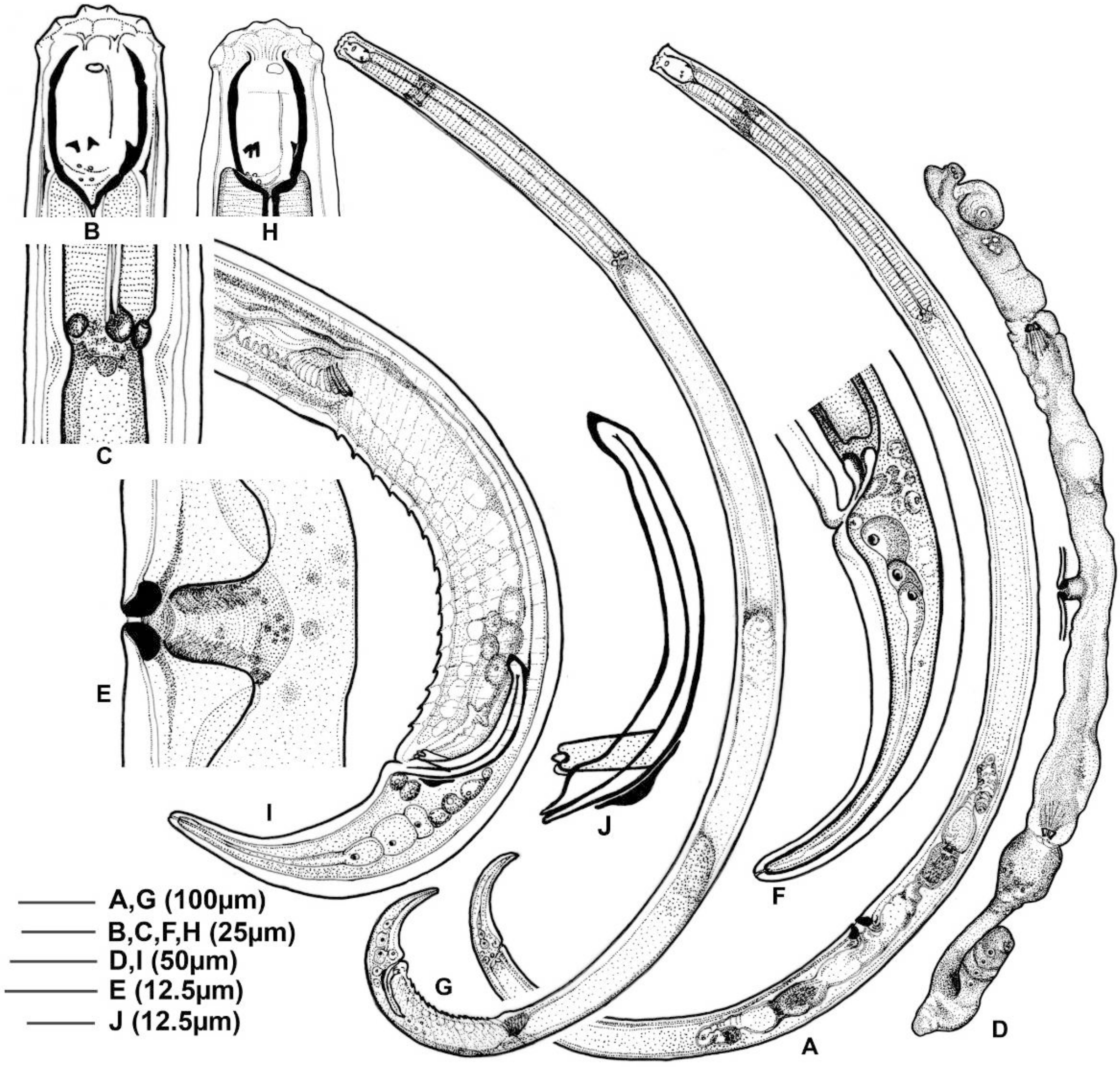

Figure 1. Camera lucida drawings of female and male *Miconchus aquaticus* Khan, Ahmad & Jairajpuri, 1978. Female: A: whole body; B: head; C: oesophago-intestine junction; D: gonad; E: vulval region; F: tail. Male: G: whole body; H: head; I: caudal region; J: spicules, gubernaculum and accessory pieces

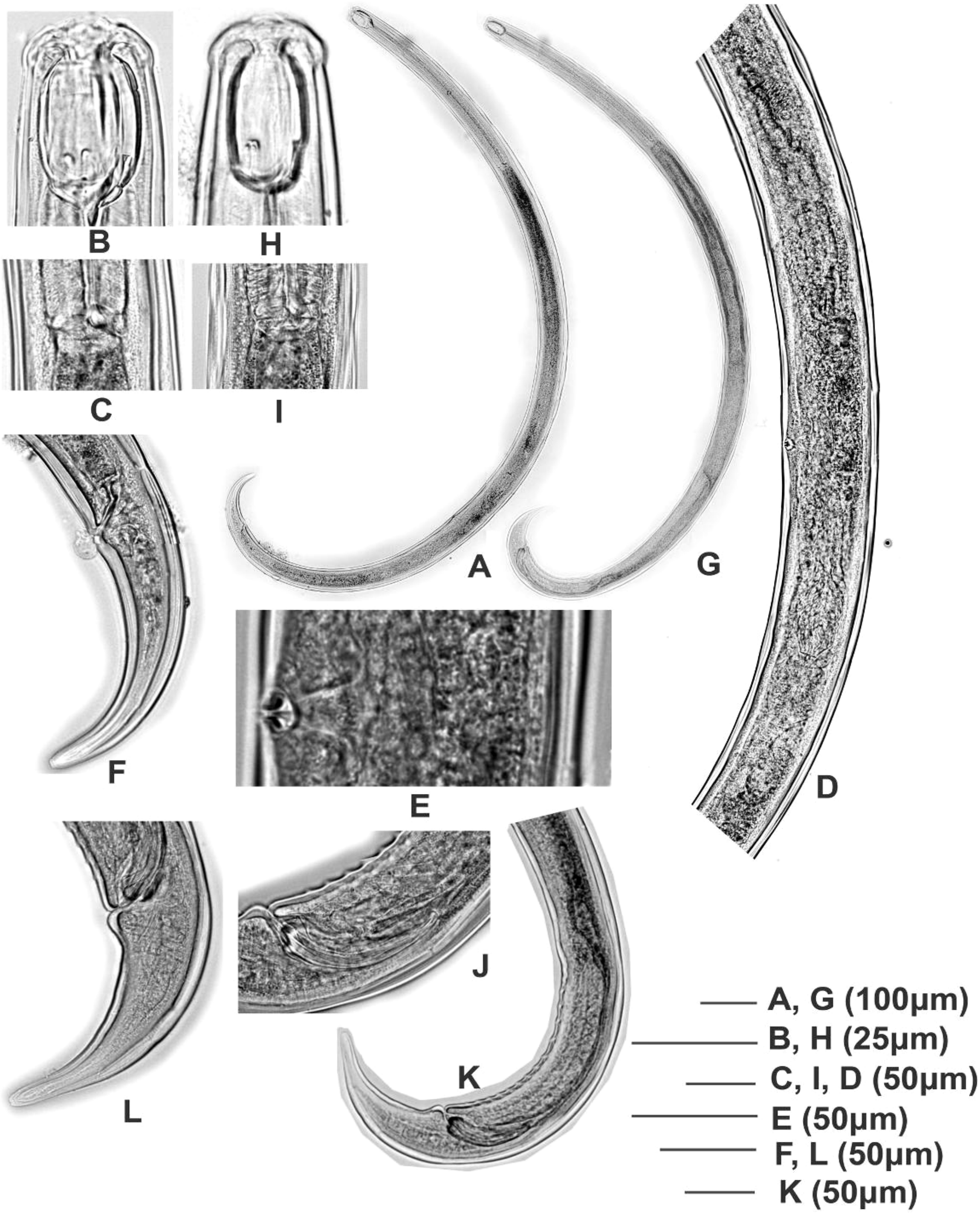

Figure 2. Photomicrographs of female and male *Miconchus aquaticus* Khan, Ahmad & Jairajpuri, 1978. Female: A: whole body; B: head; C: oesophago-intestine junction; D: gonad; E: vulval region; F: tail. Male: G: whole body; H: head; I: oesophago-intestine junction; J: spicules, gubernaculum and accessory pieces; K: caudal region; L: tail

smaller than uterus. Vagina with distinct parts, *pars proximalis vaginae, pars refringens vagina,* but *pars distalis vaginae* very small. Rectum just less than one anal diameter long. Caudal pore absent. Tail conoid, arcuate, tip rounded, caudal glands and spinneret present.

*Male***.** General characters of all males are as same as female. All the adult males bear matured double testes, spicules, gubernaculum, accessory pieces. Rectal glands and ejaculatory glands are strongly developed.

Materials examined. Fifteen females and ten males were collected from the district South 24-Parganas, West Bengal, India.

Locality and associated plants. The above species was found in the rhizospheric soil of *Litchi chinensis* Sonn., *Psidium guajava* L., *Oryza sativa* L., *Solanum melongena* L., *Rosa sinensis* L., *Mangifera indica* L. and *Rubus* sp. located at the district South 24-Parganas (22°22.64' N, 88°25.7' E), West Bengal, India during the survey in the years 2006–2007.

Remarks. The genus as well as the species is reported for the first time from West Bengal, India. The specimens match well with the specimens described by Jairajpuri and Khan (1982) from Rajasthan except the value of *c* and *V*, which are lower in female and *T* higher in male in present observation. The male specimens of West Bengal have fewer supplements (15 *vs* 17–21). The measurements of males and females fit well with the measurements given by Andrássy (1994).

Miconchus rectangularis n. sp.

(Table III, Figs. 3–4)

Measurements in Table III.

Female. Body medium in length, habitus curved. Cuticle moderately thick all over the body but of variable thickness at lip region, mid-body and caudal region. Lip region wider than the adjacent body width, lip region has a prominent constriction. Buccal cavity very narrow, rectangular in shape, wall of buccal cavity straight, width of it is 1/3 of its length. Dorsal tooth and two sub-ventral teeth medium in size, situated at 31% from the base of buccal cavity and at same level, geusids prominent. Excretory pore behind the nerve ring is prominent. Oesophageal glands prominent; oesophagus cylindrical and muscular. Cardia tongue-shaped. Gonads amphidelphic, ovary reflexed, never reach at oviduct-uterus junction, sphincter prominent at oviduct-uterus junction. Vagina with three distinct parts, *pars proximalis vaginae, pars refringens vaginae* and *pars distalis vaginae*. Rectum less than one anal diameter long. Caudal pore single. Tail conoid, arcuate, gradually tapering at the end, tail-tip rounded, caudal glands three in number, spinneret opening terminal.

Male. Not found.

Differential diagnosis and relationships. Body medium sized, buccal cavity heavily sclerotized and unusually narrow, more or less flattened at the base, dorsal tooth medium sized and pointed forward, gonads didelphic, tail conoid with terminal spinneret.

The genus *Miconchus* has 29 valid species. Among them, *M. exilis* (Cobb, 1917) Andrássy, 1958 and *M. kansasensis* Mulvey & Dickerson, 1970 are more close to the proposed new species as all of them has the buccal teeth midway of buccal cavity and the tail is shorter than in the other species where it is 2–3 anal diameters long. The new species differs from *M. exilis* as follows: the body is somewhat shorter (1.77–1.82 *vs* 2 mm), value *a* much lower (26–26.5 *vs* 43), *c* much lower (24.6–24.7 *vs* 56), *c'* higher (2–2.1 *vs* 1.8) and *V* lower (71.3–72.3 *vs* 78 %). The proposed new species is also close to *M. kansasensis* but differs from that: body longer (*vs* 1.4–1.6 mm), *c* higher (*vs* 15–18) and *c'* lower (*vs* 3). Furthermore, it significantly differs in the shape of buccal cavity which is quite narrow and rectangular (*vs* barrel-shaped) and in the distinct constriction in lip region (*vs* slightly expanded); it has caudal glands with prominent terminal spinneret (*vs* without caudal glands and terminal opening).

Table III. Morphometric data of female *Miconchus rectangularis* n. sp. (all measurements are in µm, except L, in mm)

	Holotype (♀)	Mean	Paratype range
L	1.82	1.8	1.77-1.82
a	26.5	26.3	26-26.5
b	3.9	3.8	3.5-3.9
c	24.7	24.7	24.6-24.7
c'	2.1	2.1	2-2.1
V%	72.3	72	71.3-72.3
G1	17.5	17.5	17.5-17.5
G2	17.6	17.5	17.2-17.6
Cuticle thickness at head region	2.5	2.4	2.3-2.5
Cuticle thickness at mid-body	3.4	3.3	3.3-3.4
Cuticle thickness at tail region	6.6	6.4	6-6.6
Lip height	9.8	9.7	9.5-9.8
Lip diameter	39.2	39.5	39.2-40.1
Mid-body diameter	68.6	67.9	66.6-68.6
Anal diameter	34.3	34.1	33.5-34.3
Length of buccal cavity	51	51.1	51-51.2
Diameter of buccal cavity	17	17	16.9-17
Position of dorsal tooth from the base of buccal cavity	15.9	16	15.9-16.2
% of dorsal tooth of total buccal cavity length	31.2	33.1	32.5-34.2
Position of first sub-ventral tooth from the base of buccal cavity	15.9	16.1	15.9-16.6
Position of second sub-ventral tooth from the base of buccal cavity	15.9	16	15.9-16.2
Position of amphid from the anterior end	10.3	10.5	10.3-11.1
Diameter of amphidial aperture	2.5	2.4	2.3-2.5
Position of excretory pore from anterior end	174	172.5	169.7-174
Length of oesophagus	468	466	462-468
Length of cardia	17.2	17.2	17.2-17.2
Diameter of cardia	27	27	27
Position of nerve ring from anterior end	129.9	130.2	129.9-131
D	24.1	23.9	23.5-24.1
AS1	55	53.4	50.4-55
AS2	58.2	56.6	53.3-58.2
PS1	75.4	75.1	73-76.8
PS2	77.7	78.7	77.7-79.6
Glandularium	110.3	109.8	108.8-110.3
Anterior gonad	317.8	318.1	317.8-318.8
Uterus	143.6	142.8	141.2-143.6
Oviduct	108.1	108.8	108.1-110.2
Ovary	66.1	66.5	66.1-67.3
Posterior gonad	319.4	319.7	319.4-320.2
Uterus	121	121	121
Oviduct	145.2	144.2	142.3-145.2
Ovary	53.2	54.5	53.2-57
Vulval Length	1313.2	1314.2	1313-1316
Total length of vagina	25	24.7	24-25
Pars proximalis vagina	18.4	18.1	17.5-18.4
Pars refringes vagina	5.9	6	5.9-6
Pars distalis vagina	0.7	0.6	0.5-0.7
cw	12.5	12.4	12-12.5
Rectum length	26.3	26.4	26.3-26.4
Tail length	73.5	73.3	72.8-73.5
% of tail of total body length	4	4.1	4-4.1

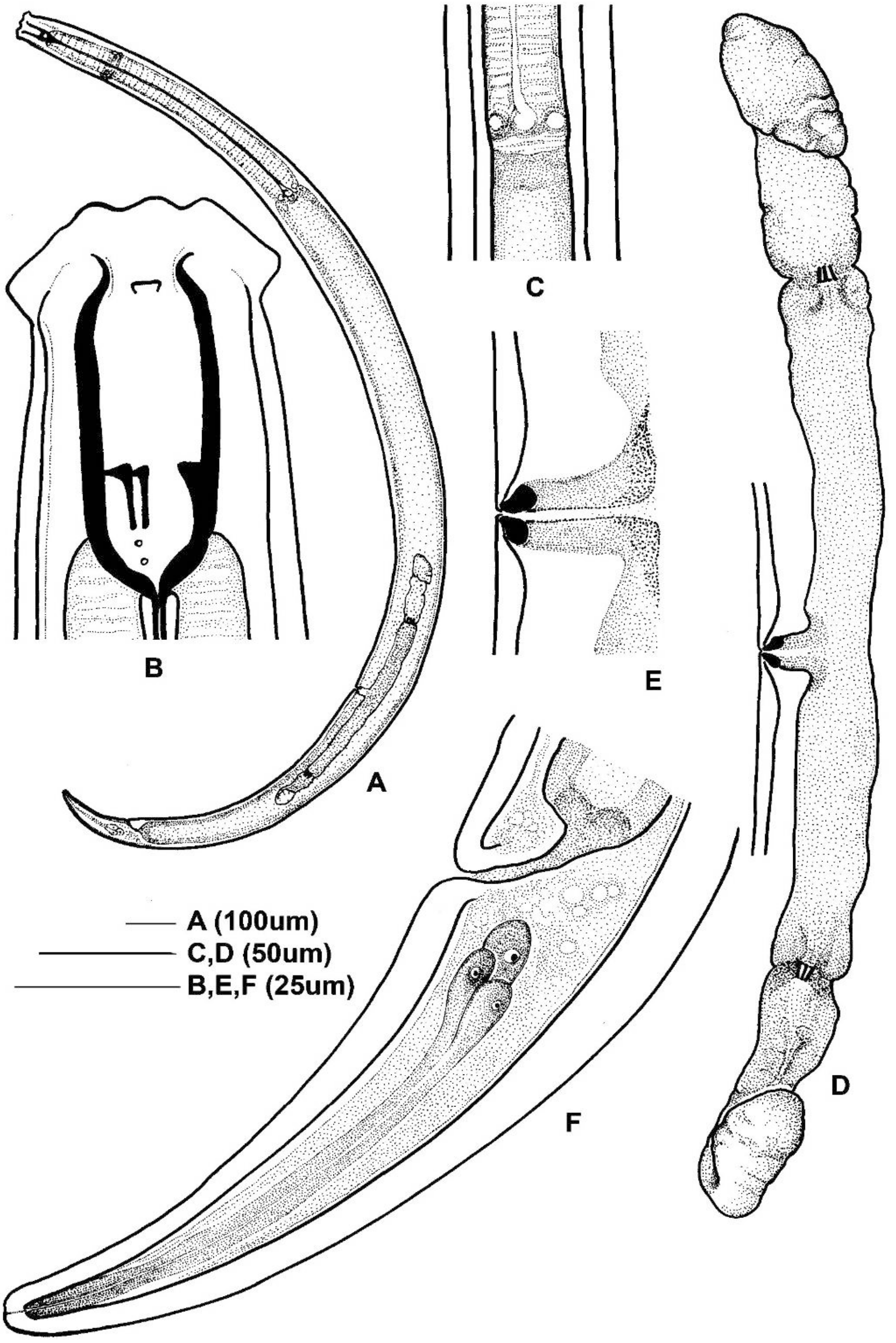

Figure 3. Camera lucida drawings of female *Miconchus rectangularis* n. sp.
A: whole body; B: head; C: oesophago-intestine junction; D: gonad; E: vulval region; F: tail

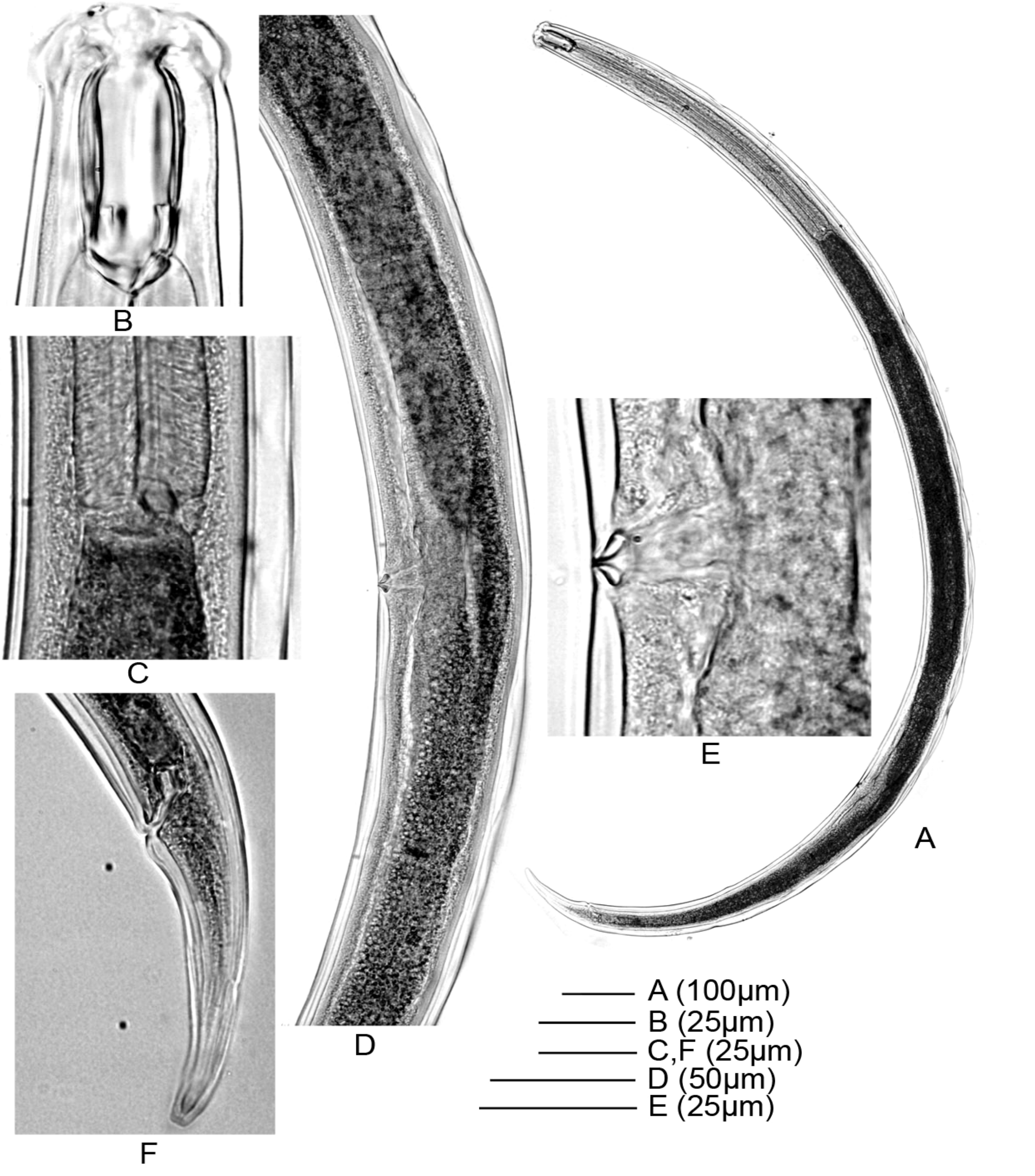

Figure 4. Photomicrographs of female *Miconchus rectangularis* n. sp.
A: whole body; B: head; C: oesophago-intestine junction; D: gonad; E: vulval region; F: tail

Materials examined (type specimens): Slides containing holotype and two paratypes of *M. rectangularis* n. sp. have been deposited at National Zoological Collection of Zoological Survey of India, Kolkata, India with following registration numbers: WN 988 and WN 989.

Type habitat and locality: During survey tour to the district South 24-Parganas (Block-Sonarpur) in February 2006, the present species was collected from the rhizospheric soil of *Litchi chinensis* Sonn.

Etymology: The new species is named after the rectangular shape of its buccal cavity.

Miconchus bulbicaudatus n. sp.

(Table IV, Figs. 5–6)

Measurements in Table IV.

Female. Body medium in length, habitus curved. Cuticle moderately thick all over the body but of variable thickness at lip region, mid-body and caudal region, width of lip region and the adjacent body is same. Buccal cavity much broad, length of the buccal cavity is 1.9 times of its width. Dorsal tooth and two sub-ventral teeth small and situated at 31% from the base of buccal cavity and at same level; geusids prominent. Excretory pore behind the nerve ring is prominent. Oesophageal glands prominent; oesophagus cylindrical and muscular. Cardia tongue-shaped. Gonads amphidelphic, ovary reflexed, never reach at oviduct-uterus junction, sphincter prominent at oviduct-uterus junction. Vagina with three distinct parts, *pars proximalis vaginae, pars refringens vaginae* and *pars distalis vaginae*. Rectum less than one anal diameter long. Tail conoid, arcuate, gradually tapering at the end, tail-tip rounded with a bulbous structure at its tip, caudal papillae prominent encircling the base of bulbous structure, caudal glands three in number, spinneret opening terminal.

Male. Not found.

Differential diagnosis and relationships. Body medium sized, buccal cavity heavily sclerotized and roomy, more or less flattened at the base, dorsal tooth medium sized and pointed forward, gonads paired, tail conoid with a small bulbous structure on its tip.

Among the representatives of the genus *M. exilis* (Cobb, 1917) Andrássy, 1958 and *M. kansasensis* Mulvey & Dickerson, 1970 are more close to the proposed new species in having the buccal teeth midway of buccal cavity and the tail shorter than the other species (3.1–3.2 *vs* 2–3 anal diameters long). The new species differs from *M. exilis* as follows: the body is somewhat longer (L = 2.1-2.2 *vs* 2 mm), other measurements like *a* higher (38.3–40.2 *vs* 26.5), *b* higher (4.1–4.3 *vs* 3.7), *c* much lower (14.2–14.7 *vs* 56), *c’* higher (3.1–3.3 *vs* 1.8) and *V* lower (63.5–66.5 *vs* 78 %). The proposed new species is also differs from *M. kansasensis:* body longer (*vs* 1.4–1.6 mm), *a* higher (*vs* 25–31), *c* lower (*vs* 15–18) and *c’* higher (*vs* 1.8), *V* lower (*vs* 70–72%). Moreover, the buccal cavity is much broader in the present species (*vs* barrel-shaped) and the lip region is constricted (*vs* slightly expanded); it has caudal glands with prominent terminal spinneret (*vs* without caudal glands and terminal opening). The present species also has a significant bulbous outgrowth on tip of the tail with prominent caudal papillae encircling the base of bulbous structure.

Materials examined (type specimens). Slides containing holotype and three paratypes of *M. bulbicaudatus* n. sp. have been deposited at National Zoological Collection of Zoological Survey of India with following registration numbers: WN 986 and WN 987.

Type habitat and locality. During survey tour to the district South 24-Parganas (Block-Mograhat II) in February 2006, the present species was collected from the rhizosphere of *Mangifera indica* L.

Etymology. The epithet *bulbicaudatus* refers to the structure of tail tip.

Table IV. Morphometric data of female *Miconchus bulbicaudatus* n. sp. (all measurements are in µm, except L, in mm)

	Holotype (♀)	Mean	Paratype range
L	2.1	2.1	2.1-2.2
a	39.5	39.4	38.3-40.2
b	4.3	4.2	4.1-4.3
c	14.3	14.3	14.2-14.7
c'	3.2	3.2	3.1-3.3
V%	65.7	65.4	63.5-66.5
G1	10.3	10.5	10.2-11
G2	9.8	9.7	9.5-9.8
Cuticle thickness at head region	4.7	4.7	4.7-5
Cuticle thickness at mid-body	7.7	7.7	7.4-8.2
Cuticle thickness at tail region	8.6	8.5	8.2-8.7
Lip height	9.8	9.3	8.6-9.8
Lip diameter	38.8	39.4	38.8-40.2
Mid-body diameter	53.9	53.8	53.2-54.2
Anal diameter	46.6	46.8	46.4-47.7
Length of buccal cavity	49	48.8	48.6-49
Diameter of buccal cavity	26.3	25.8	25.2-26.3
Position of dorsal tooth from the base of buccal cavity	26.1	26.1	25.7-26.5
% of dorsal tooth of total buccal cavity length	53.3	54.3	53.3-55.4
Position of first sub-ventral tooth from the base of buccal cavity	26.6	26	25.5-26.6
Position of second sub-ventral tooth from the base of buccal cavity	26.1	26.3	26.1-26.5
Position of amphid from the anterior end	9.8	9.8	9.5-10.2
Diameter of amphidial aperture	4.2	4.3	4.2-4.4
Position of excretory pore from anterior end	181.3	180	178.7-181.3
Length of oesophagus	494.9	491.2	486.4-494.9
Length of cardia	40.3	40.4	39.7-41.3
Diameter of cardia	35.5	35.1	34.5-35.5
Position of nerve ring from anterior end	147	146.5	145.6-147
D	25.7	25.6	24.8-26.4
AS1	51	51.9	51-53.4
AS2	52.35	54.5	52.4-56
PS1	69.6	72.4	69.6-75.7
PS2	76.4	76.3	75.3-77.7
Glandularium	360.2	357.2	354-360.2
Anterior gonad	262.9	265.9	262.9-274.6
Uterus	67.7	67.9	67.22-68.7
Oviduct	72.6	73.5	72.6-75.4
Ovary	122.6	124.5	121-132
Posterior gonad	287.1	283.3	277.6-287.1
Uterus	73.4	70.4	64.6-73.4
Oviduct	73.4	72	70.1-73.4
Ovary	140.3	140.9	140.3-141.8
Vulval Length	1400	1395.9	1385-1400
Total length of vagina	22.1	21.8	21.5-22.1
Pars proximalis vagina	16.6	15.9	14.7-16.6
Pars refringes vagina	5.1	5.5	5.1-6.5
Pars distalis vagina	0.4	0.4	0.3-0.5
cw	10.2	10.5	10.2-11.1
Rectum length	26.8	26.9	26.8-27.1
Tail length	149.5	150.1	149.5-151.2
% of tail of total body length	7	7	6.8-7.2

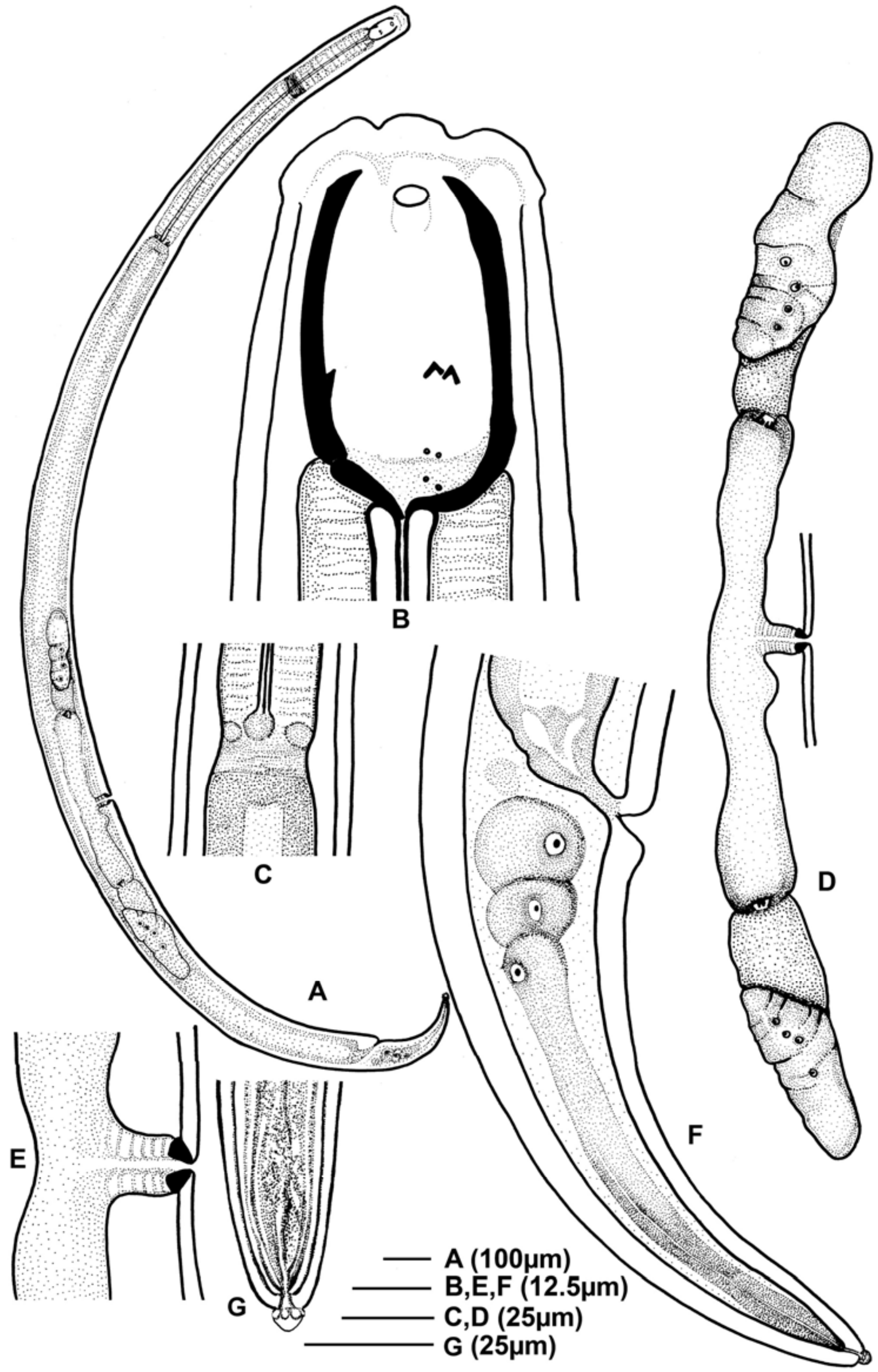

Figure 5. Camera lucida drawings of female *Miconchus bulbicaudatus* n. sp. A: whole body; B: head; C: oesophago-intestine junction; D: gonad; E: vulval region; F: tail; G: tail terminus showing bulbous outgrowth with caudal papillae encircling its base

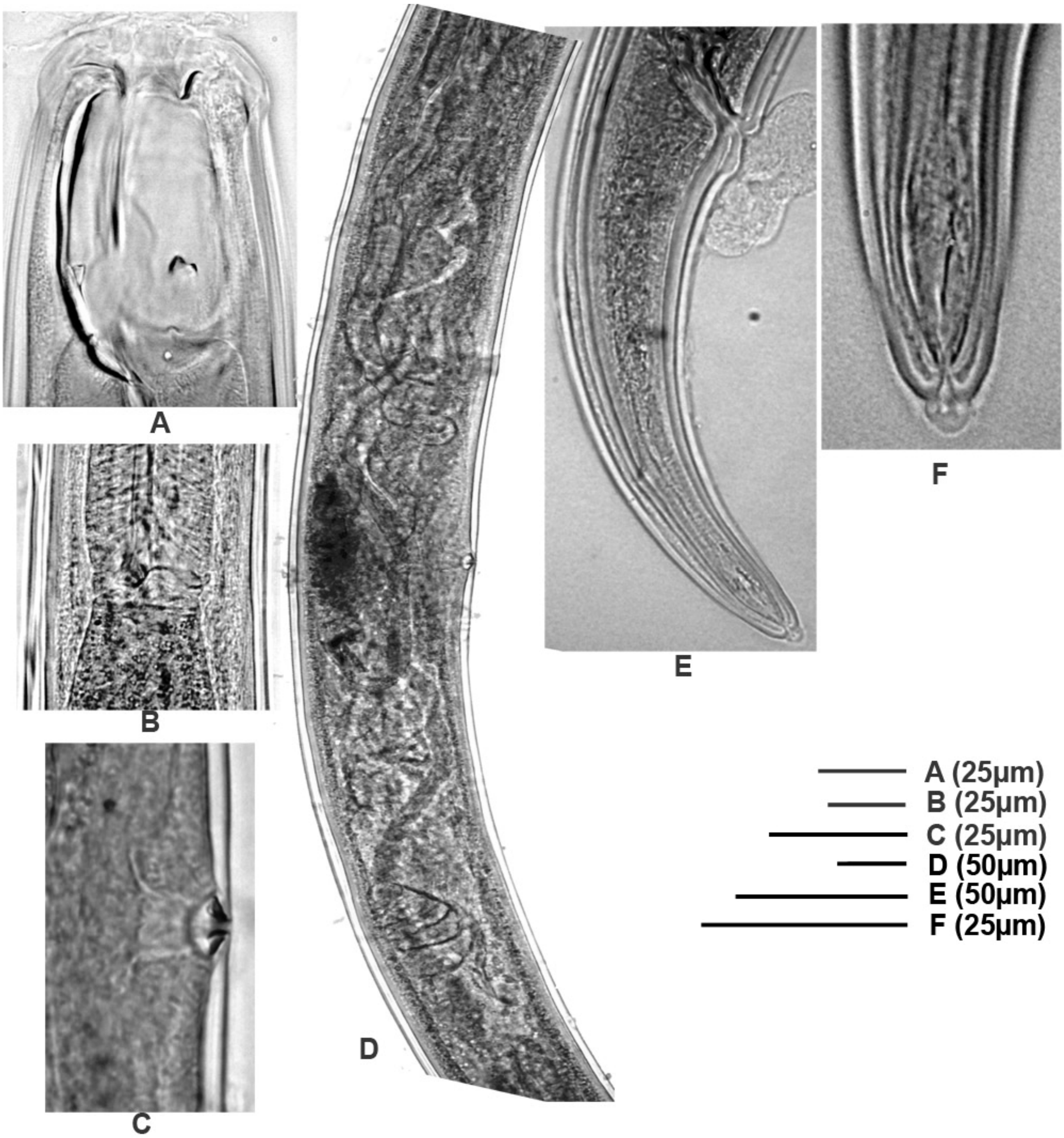

Figure 6. Photomicrographs of female *Miconchus bulbicaudatus* n. sp. A: head; B: oesophago-intestine junction; C: vulval region; D: gonad; E: tail; F: tail terminus showing bulbous outgrowth with caudal papillae encircling its base

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Lepidocyrtus mariani sp. n., a new springtail species from Hungary (Collembola: Entomobryidae)

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Abstract. *Lepidocyrtus mariani* sp. n. is described from Hungary. The new species is close to *Lepidocyrtus flexicollis* Gisin, 1965 sensu Mateos, 2008 but differs in the interocular chaetotaxy by the presence of the seta q and by the high number of setae on the manubrial plate: 10–18 in *L. flexicollis*, about 30 in the new species.

INTRODUCTION

In the course of the third „Hungarian Biodiversity Day" on May 31, 2008, springtails of the Bakony Mts. were sampled around the Village of Porva. Among the springtails collected, a relatively large *Lepidocyrtus* specimen of unusual appearance was found which proved to represent a species new to science.

Lepidocyrtus is one of the largest genera within the order Collembola. On the global scale Bellinger *et al*. (1996–2007) listed 225 species, and another one was added by Mateos (2008b). The European fauna contains 26 species (Mateos 2008b). Among the 15 species recorded for Hungary (Dányi & Traser 2008) two have the locus typicus in this country (Traser 2000, Traser & Christian, 1992).

Taxonomic features of the genus *Lepidocyrtus* have been discussed by several authors (e.g. Mari Mutt 1986, Snide, 1967, Soto-Adames 2000). Just recently, Mateos (2008a, 2008b) reviewed the conventional and introduced several new diagnostic characters. By means of these a number of ignored species will probably be brought forward.

MATERIAL AND METHODS

On May 31, 2008, soil, litter and moss samples were collected in the neighbourhood of Porva, Bakony Mts., and subsequently Berlese-extracted into 75% ethanol. For microscopic inspection Collembola were embedded in Gisin's medium (lactic acid:gelatin = 100:8). Drawings were made with a camera lucida.

We use terms and codes in the sense of Mateos (2008b): Dorsal macrochaetae and labial chaetotaxy according to Gisin (1963, 1964a, 1964b), except for head macrochaetae row A (following Barra 1975), and head macrochaetae R1s (following Wang *et al*. 2003). Dorsal chaetotaxy of thorax and abdomen according to Szeptycki (1979), except for seta d2 (abd. II) (following Snider 1967), seta m7a (abd. III) (following Wang *et al.* 2003), and seta p8p (abd. III) (following Mateos 2008a, 2008b). Abbreviations: ant. = antennal segment; abd. = abdominal segment; cx. = coxa; I–VI = segment numbers.

Lepidocyrtus mariani sp. n.

(Figs. 1–23, Tab. 1)

Material examined. Holotype: Male, collected on May 31, 2008 in Porva, mounted on two slides in the collection of the senior author at the Institute of Silviculture and Forest Protection at the University of West Hungary (Nr. B–11: trunk; Nr. B–12: legs and head).

Locus typicus. Hungary, Bakony Mts., Porva, moss on the trunk of an alder tree near the stream Hódos-ér (47°18'42"N, 17°47'30"E).

Diagnosis. A relatively large (>3mm) pale *Lepidocyrtus* species with strongly protruding mesothorax. Dorsal head and body macrochaetae as R_0R_1--1/00/0101+3s. Praelabral setae smooth,

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labial (basomedial) setae all ciliated: M_1*M_2R*E L_1L_2 (asterisked setae shortened). The new species resembles *L. flexicollis* Gisin, 1965 in chaetotaxy and body shape; differential characters are summarised in Table 1.

Description. Holotype body length 3.5 mm (without head nor furca). Mesothorax strongly protruding, head posture orthognathous (Fig. 1). Colour pale, except the dark ocular areas and some blue shade on the coxae. Scales, mostly light brown in alcohol, densely cover head and trunk, the legs to the claws and the antennae to the basal part of the 4th joints (Fig. 2). Ant. 4 without apical bulb (Fig. 3). Antennae 1.94 times longer than the cephalic diagonal.

Ratio of the four antennal joints = 1:1.7:1.5:2.3 (Fig. 2). 8+8 eyes as in Fig. 4.

Praelabral/labral setae smooth and in typical arrangement: 4/5,5,4 (Fig. 7). Labrum with apical 'V' shaped intrusion. Prelabral setae more curved than labral setae, their tips are bent down (Fig. 7). Lateral labral papillae smooth and bigger than the slightly armed median papillae. 3 sublobal and 3 hyaline setae on both sides. On the labial triangle, the setae of the 'a' row (a1–a5) smooth and the setae in the posterior row ciliated, as M_1*M_2R* EL_1L_2. M_1 and R shortened, about half as long as M_2 (Fig. 9). Labral papillae (Fig. 7) unequal in size, the lateral ones wider than the medial two.

Labial appendage with 5 papillae (Fig. 8). Ventral cephalic groove with 4+4 ciliated macrochaetae and with 4+4(5) scales (Fig. 9).

Dorsal macrochaetae formula R_0R_1--S_o/00/0101+3s. Number of R setae between the ocular areas about 18+18. Paired apical setae in front of R_0. Intraocular area with ciliated setae s, t, p, q and 3–4 scales. Chaetotaxy of abd. II–III as in Figs. 15–17, of abd. IV as in Fig. 18–22. On abd. IV T6 thin ciliated macrochaeta, E3 inserted below F2. Ratio of C1–B4 setae distance and B4–B6 setae distance about 0.47 on abd. IV. No additional pseudopori on abd. IV. Trichobotrium T2 of abd. IV with accessory fan-shaped seta s. The dorsal macrochaetae of abd. IV B4, B5, C1, D3, E2, E3, E4, F1, F2 and F3 strong, with big insertion; T6, T7, D2, De3, D3p, E1, E4p, Fe4 and Fe5 shorter or longer, but always thinner and with smaller insertion.

Dorsal surface of coxae as in Figs 10a–c. Cx. I with 1 pseudoporus and 9 smooth macrochaetae. Cx. II with 3 pseudopori and 14+10 smooth macrochaetae in two rows. Cx. III with 2 pseudopori and 17 smooth macrochaetae.

Trochanteral organ with about 40 smooth straight setae arranged in a rectangular field (Fig. 11). Unguis with paired basal teeth, one inner tooth in subapical position but without apical tooth. The big external tooth of the dorsal side with small basal appendage. Lateral teeth each with an external denticle (Fig. 12). Unguiculus lanceolate with smooth outer margin. Spatulate tibiotarsal tenent hair as in Fig. 12. Furca with scales on dorsal and ventral surfaces (Figs 13a–b). Ratio manubrium:dens:mucro = 23:21:1. Manubrial plate with 2(3) inner setae, about 30 external setae and 3 pseudopori (Fig. 14).

Etymology. The new species is named in honour of the old Scout and zoologist Dr Miklós Marián (born in Szeged, 1914), who was the first teacher in zoology of the senior author showing the way to his studies. Dr Marián contributed much to the discovery of the herpetofauna of the Bakony Mountains during the 1980ies.

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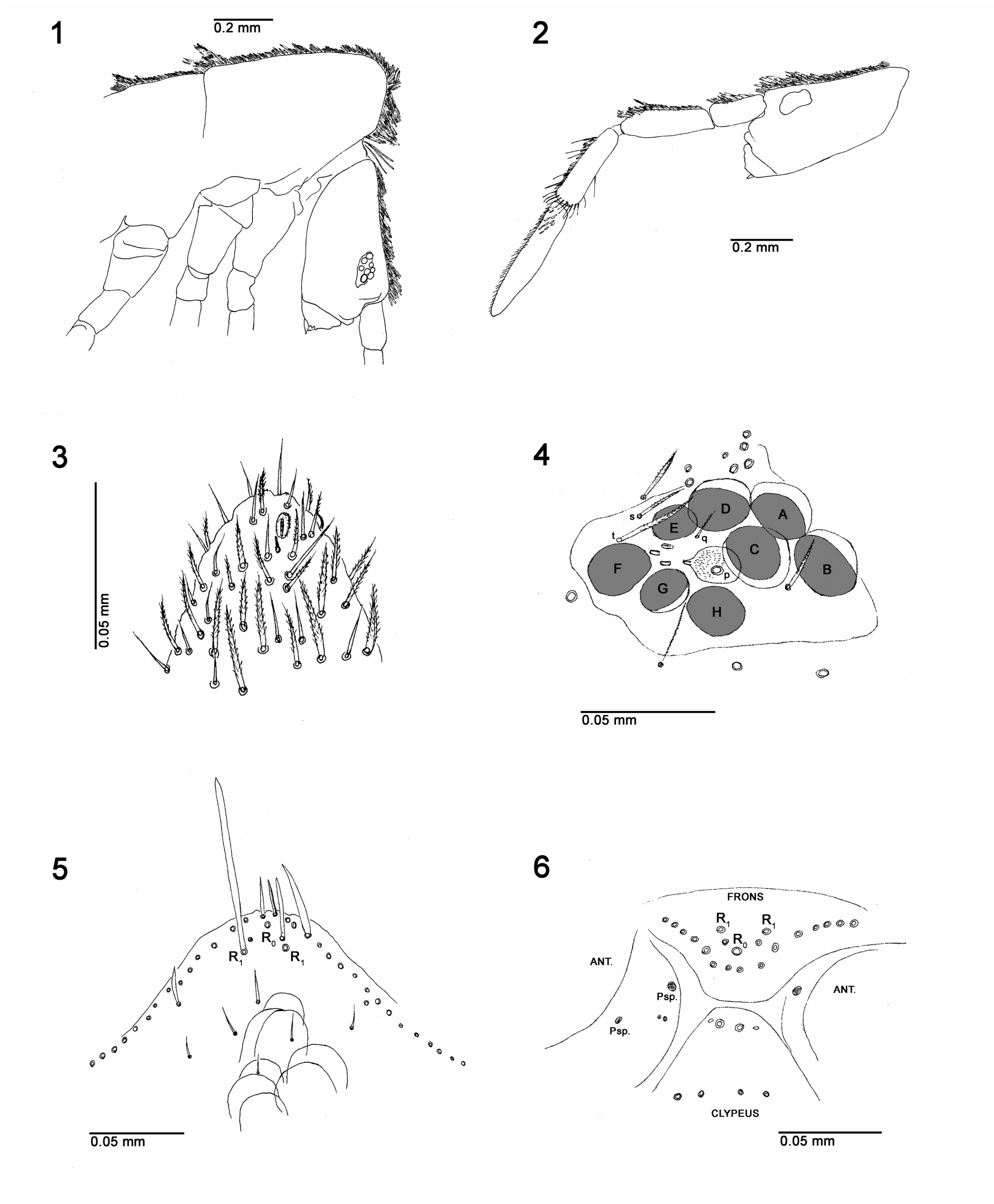
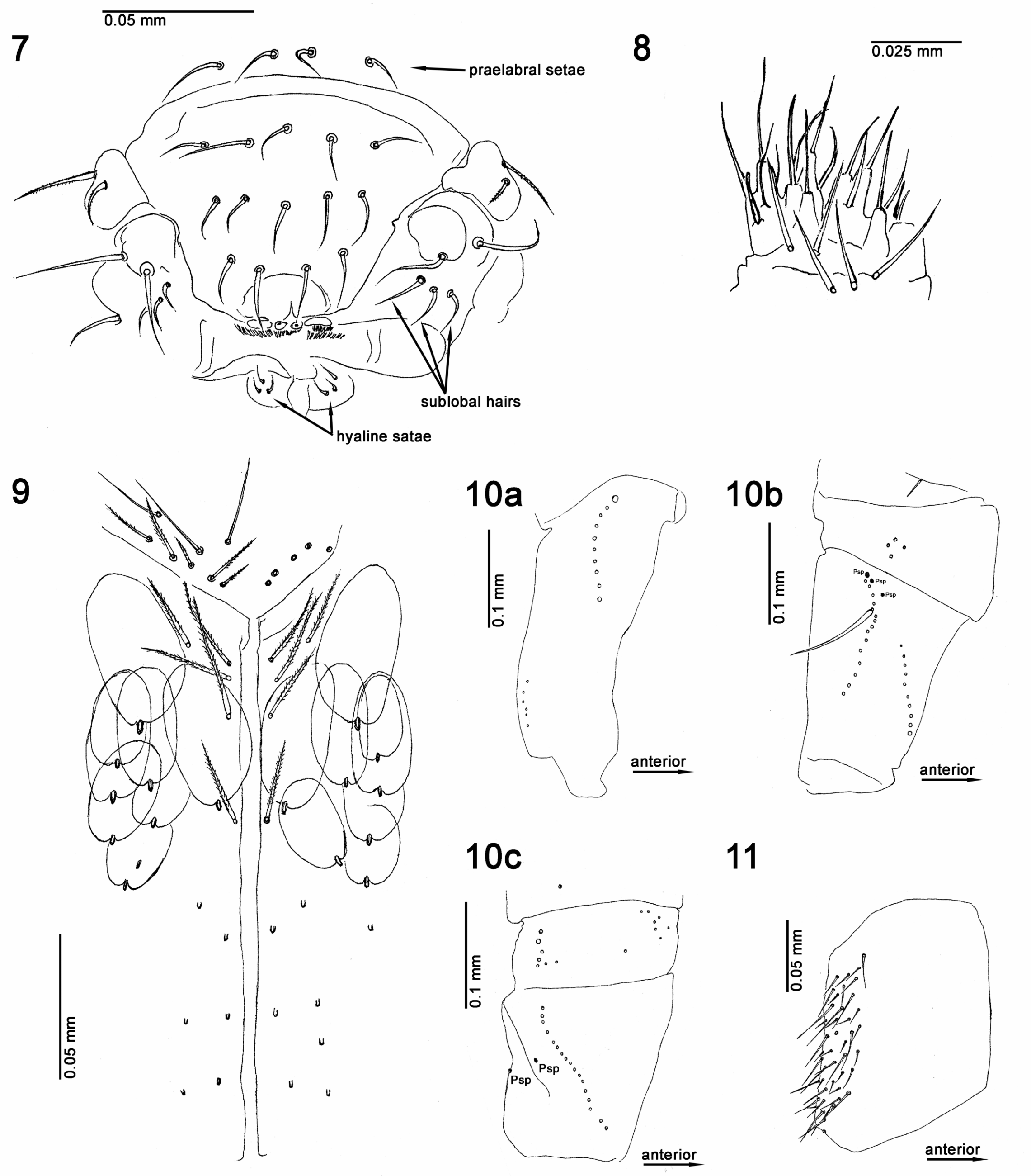
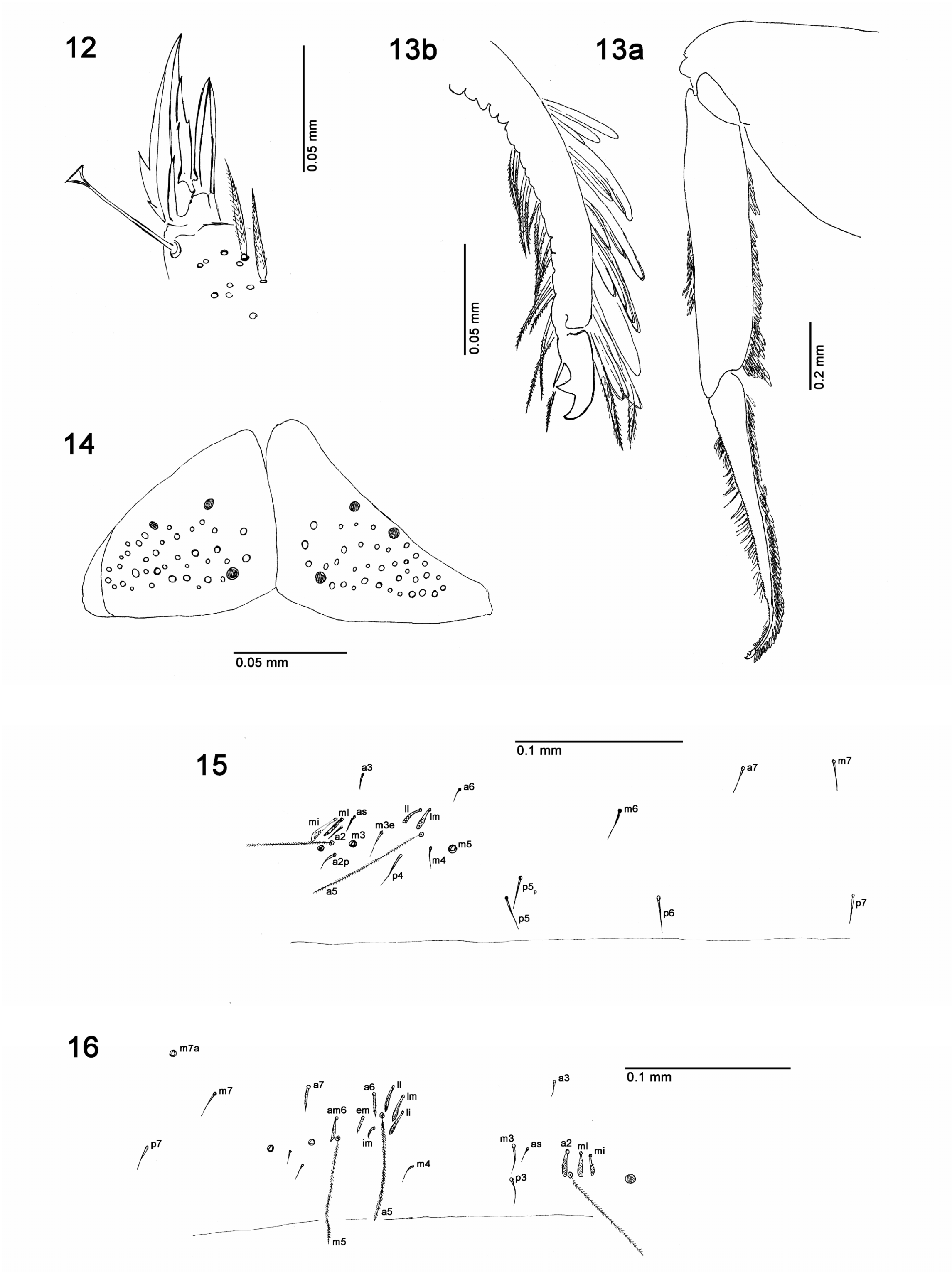


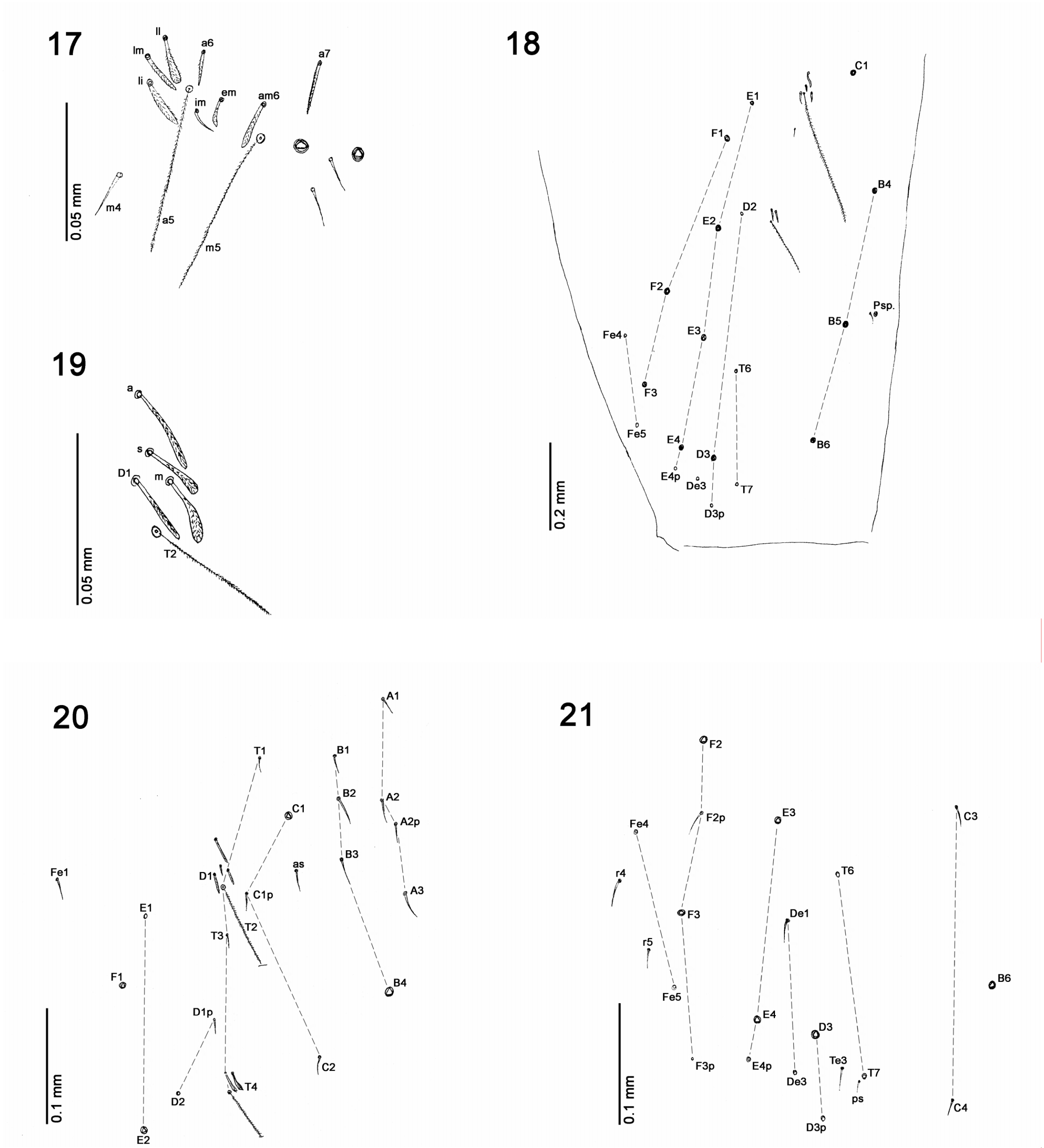
Figures 1–6. *Lepidocyrtus mariani* sp. n., 1 = shape of head and mesothorax, 2 = head and ant. I–IV, 3 = apex of ant. IV., 4 = ocular area, 5 = apex of the head, dorsal view, 6 = apex of the head, frontal view. Psp. = pseudoporus



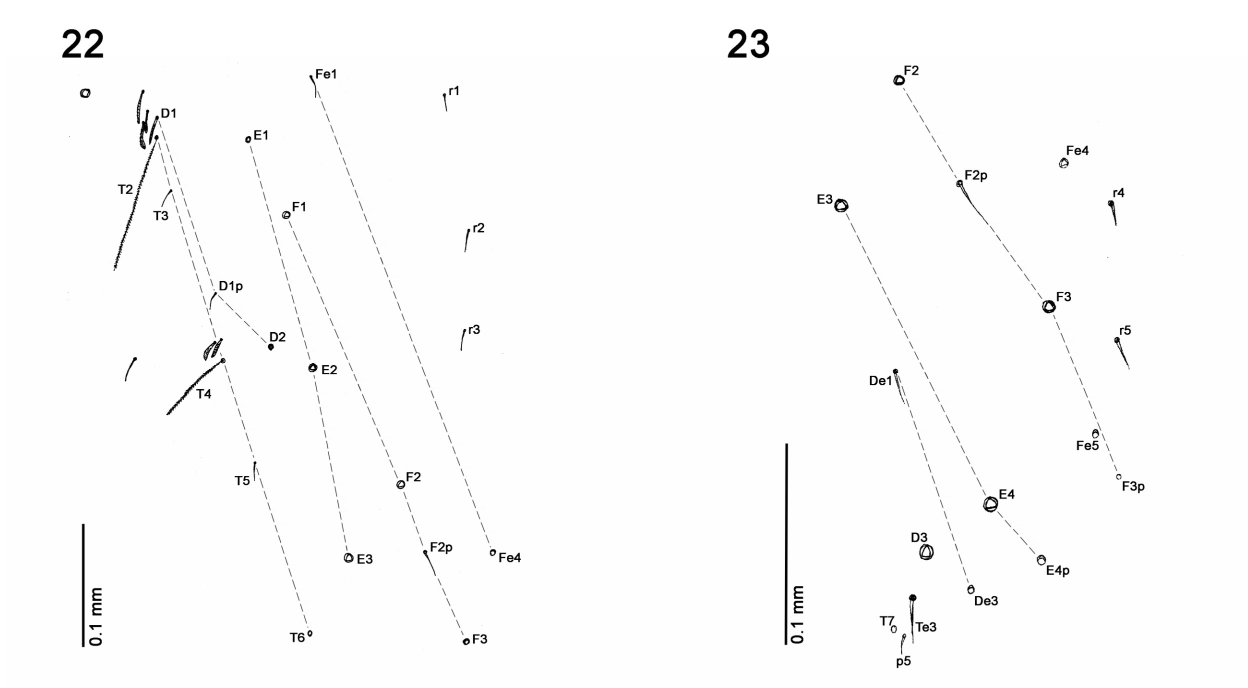
Figures 7–11. *Lepidocyrtus mariani* sp. n., 7 = mouth region in frontal view, 8 = labial appendage, 9 = labial triangle and medial cephalic groove, 10 = pattern of the macrochaetae on coxae I—III. (Figs a–c, respectively) (Psp = pseudoporus), 11 = trochanteral organ on leg III



Figures 12–16. *Lepidocyrtus mariani* sp. n., 12 = foot complex with claw III, 13 = manubrium and mucro, 14 = manubrial plate, 15 = chaetotaxy pattern of abd. II (right side), 16 = abd. III chaetotaxy (left side)



Figures 17–21. *Lepidocyrtus mariani* sp. n., 17 = abd. III chaetotaxy around a_5—m_5 trichobothria, 18 = abd. IV chaetotaxy with the macrochaetae (left side), 19 = anterior trichobothrium on abd. IV with the sensillae, 20 = abd. IV trichobothrial complex (left side), 21 = abd. IV chaetotaxy between F_2—D_3 macrochaetae (left side)



Figures 22–23. *Lepidocyrtus mariani* sp. n., 22 = abd. IV chaetotaxy, distally from the trichobothrial complex (right side), 23 = abd. IV chaetotaxy around $E_3F_3D_3$ macrochaetae (right side)

Table 1. Distinguishing characters of *Lepidocyrtus mariani* sp. n. and *L. flexicollis*

Features	*Lepidocyrtus mariani sp.n.*	***Lepidocyrtus flexicollis*** **Gisin, 1965 sensu Mateos, 2008a**
Interocular chaetotaxy	s, t, q, p (q present)	q absent
Number of interocular scales	3–4	1–2
Edge of unguiculus	smooth	serrated
Apical tooth on the claws	absent	present
Paired medial setae behind R_0 and in front of R_1 on the apex of the head	ciliated short macrochaetae	smooth mesochaetae
Setae in front of R_0 on the apex of the head	paired	unpaired
Abd. IV chaetotaxy: D3p	slim macrochaeta	mesochaeta
Abd. IV chaetotaxy: A2, A2p, B3 mesochaetae	present	absent
Abd. III chaetotaxy around a5–m5 trichobothria	a7 ciliated mesochaeta	a7 smooth mesochaeta
Abd. III chaetotaxy around a5–m5 trichobothria	a6 thin ciliated, not fan-shaped	a6 fan-shaped
Abd. III chaetotaxy around a5–m5 trichobothria	im not fan shaped	im fan-shaped
Number of the setae on the manubrial plate	more than 30	10–18
Number of the pseudopori on the manubrial plate	3	2
Geographic distribution (as known)	continental Central Europe	Mediterranean, Canary Islands and the mainland of Spain

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Zerconid mites (Acari: Mesostigmata: Zerconidae) from Crete, Greece, with description of two new species

ZS. UJVÁRI[1]

Abstract. Three species of zerconid mites were collected from eigth localities in Crete, Greece. One of them (*Prozercon yavuzi* Urhan, 1998) is already known, the remaining two species, *Prozercon rekaae* sp. n. and *Zercon cretensis* sp. n. proved to be new to science. With 20 figures.

INTRODUCTION

Crete is situated in the eastern part of the Mediterranean. As one of the biggest islands of the region, it forms a border between the Cretan Sea and the Lybian Sea. Until the lower Miocene the Balkan Peninsula was connected to Asia Minor by the ancient Aegis. At the end of Miocene the Aegean plate submerged, so the continuous continental bridge was broken and several islands were separated from Asia Minor and the Greek mainland, including the Cretan Archipelago. From the beginning of Pleistocene extensive uplift of the area has joined many of the small islands forming the present Crete (Simaiakis *et al.,* 2004).

Members of the family Zerconidae are widely prevalent in the Holarctic region and represented by 35 genera and more than 300 species. They are free-living predators, occurring mostly in moss and leaf litter, constituting an important part of the soil fauna.

Our knowledge on the zerconid fauna of Southeast Europe is quite unbalanced. Only a few papers were published on zerconid mites of the Balkan Peninsula (Willmann, 1941; Balogh, 1961; Košir, 1974; Koyumdjieva, 1986, 1993; Błaszak & Polańska, 1998; Kontschán, 2006; Ujvári, 2008). On the contrary, the fauna of Asia Minor (Turkey) is well known (Urhan 1999, 2007b, 2008a; Urhan & Ayyildiz 1992, 1994b, 1996a, 1996b, 1996c; Urhan & Ekiz, 2002; Urhan et al., 2007), and several new species have been described from the region (Urhan, 1997, 1998a, 1998b, 1999, 2001a, 2001b, 2001c, 2001d, 2002, 2007a, 2007b, 2008a, 2008b; Urhan & Ayyildiz, 1992, 1994a, 1994b, 1996a, 1996b, 1996c, 1996d, 1996e, 1996f, 1996g).

No zerconid mites have been mentioned from Greece, neither from the islands of the Aegean Sea (including Crete) so far. However, it is important to note that the group is represented in North Africa (Athias-Henriot, 1961; Błaszak, 1979), and many of those species are considerably similar to the mites found on Crete.

MATERIALS AND METHODS

Specimens were separated under a stereo-microscope, cleared in lactic acid and impregnated with glycerin. Preparations were examined using light microscope, drawings were made with camera lucida. Mites are stored in 75% ethanol and deposited in the Soil Zoology Collections of the Hungarian Natural History Museum, Budapest. In the descriptions of new species, terminology of setae follows Sellnick (1958) and Błaszak (1974). Measurements are given in micrometers (μm), presented as mean.

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DESCRIPTIONS OF THE SPECIES

Prozercon yavuzi Urhan, 1998

(Fig. 1)

Material examined. E-1592, Crete, 2 km north of Knossos, moss from rocky hillside, 02.03. 2003, leg. Szűts, T.

Diagnosis. Female. Length of idiosoma: 348 µm; width: 271 µm (n =4). Podonotal setae pilose, except i_4. On opisthonotum, all I, Z, S setae plumose. Setae of Z and S row shorter than I-setae. Setae S_3 absent. Marginal R-row with 6 pairs of setae, R_1 longer, plumose, others smooth, thickened, pointed. Dorsal fossae weakly developed.

Remarks. This species was originally described from Turkey, and the present record is the first for Greece.

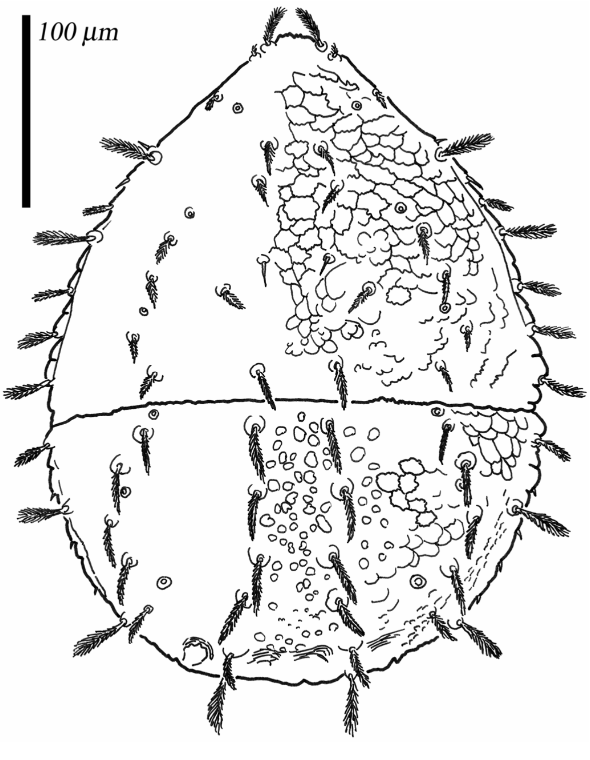


Figure 1. *Prozercon yavuzi* Urhan, 1998. Female, dorsal view of the idiosoma

Prozercon rekaae sp. n.

(Figs. 2–13)

Material examined. Holotype: female, E-1597, Crete, 5 km north of Knossos, *Platanus occidentalis* forest over Agia Irini stream, from leaf litter, 03.03.2003., leg. Szűts, T. Paratypes: 9 females and 2 males, same data as holotype. Other localities: 1 female: E-1595, Crete, 5 km north of Knossos, *Platanus occidentalis* forest over Agia Irini stream, from leaf litter, 03.03.2003., leg. Szűts, T.; 1 female: E-1592, Crete, 2 km north of Knossos, moss from rocky hillside, 02.03.2003., leg. Szűts, T.

Diagnosis: Podonotal setae of s- and z-setal rows smooth and needle-like. Opistonothal I-setae medium sized, I_1 smooth, I_2-I_5 slightly pilose, situated on large, bulb-like tubercules, not any of them reaching the following's bases. Z-setal row situated on large tubercules, Z_4 long, densely plumose. S_1 smooth, equal in length and appearance to setae Z_1 and situated lateral to them. S_2-S_4 approximately of equal size and appearance, brush-like and plumose. Dorsal fossae well sclerotized.

Description. Female. Length of idiosoma 335 µm, width 265 µm (n=8).

Dorsal side (Fig. 10). On podonotum, 22 pairs of different setae. The i-setal row with 6 pairs, z-row with 2 pairs, s-row with 5 pairs, p-row with 2 pairs, r-row with 7 pairs (p_2 visible on ventral view, not represented on dorsal fig.). Setae r_1, r_3-r_7 elongated, plumose, i_1, r_2 and r_3 short, pilose. All other setae short, smooth, needle-like. Pores po_1 posterior to insertions of setae s_1, po_2 antero-medially to insertions of s_3 (on the line connecting s_3 and i_4, nearer insertion of s_3), po_3 situated medially to the line connecting s_4 and s_5, equidistant from insertions of the two setae. Anterior 80% covered with irregular tile-like pattern, remaining posterior part covered with irregular spots. On opisthonotum, 23 pairs of different setae (Figs. 2–9), I-setal row with 6 pairs, Z-row with 5 pairs, S-row with 4 pairs, R-row with 8 pairs. Setae I_1 short, smooth, I_2-I_5 medium-sized, slightly pilose, not reaching the following's bases. Setae I_6 long, plumose and brush-like. Setae Z_1 smooth, medium-sized, similar to S_1. Setae Z_2 and Z_3 smooth, medium-sized, but longer than Z_1. Setae Z_1 not reaching the following's bases, so as Z_2. Setae Z_3 may reach the bases of Z_4. Setae Z_4 long, strongly plumose on distal half and brush-like, reaching the margin of opisthonotum. Z_5 pilose, may slightly plumose. Setae S_2-S_4 long, plumose, similar to I_6. Setae R_1-R_8 smooth, stout and pointed. Setae I_1-I_5, Z_1-Z_4 and S_1 situated on different-sized but quite large, bulb-like tubercules. Pores Po_1 near the insertions of Z_1 antero-medially to them. Pores Po_2 situated on the line connecting insertions of S_1 and Z_2 (or laterally, but equidistant from these two bases). Pores Po_3 close to insertions of Z_4, lateral to them. Po_4 close to insertions of S_4. Opisthonotum punctate, with irregular, small, spot-like cavities and pits as sculpturing. Dorsal fossae large, well-sclerotized.

Measurements of setae and longitudinal distances between their bases as in Table 1.

Ventral side (Fig. 11). shape and chaetotaxy of peritremal shield tipical for genus *Prozercon*. Lateral ends of peritremal shield reach R_4. Anterior margin of ventroanal shield with one pair of setae.

Table 1. Length of opisthonotal setae and longitudinal distances between their bases in *Prozercon rekaae* sp. n. female (values in µm)

I1	14-16 (15)	**Z1**	13-15 (14)	**S1**	12-14 (13)
I1-I2	33-36 (35)	**Z1-Z2**	33-36 (35)	**S1-S2**	35-37 (36)
I2	16-17 (17)	**Z2**	13-16 (15)	**S2**	30-33 (32)
I2-I3	28-33 (31)	**Z2-Z3**	30-32 (31)	**S2-S3**	37-42 (40)
I3	15-17 (16)	**Z3**	17-19 (18)	**S3**	28-32 (30)
I3-I4	27-26 (25)	**Z3-Z4**	22-24 (24)	**S3-S4**	38-43 (41)
I4	12-14 (13)	**Z4**	32-39 (36)	**S4**	28-35 (32)
I4-I5	19-24 (21)	**Z4-Z5**	39-44 (41)		
I5	9-12 (11)	**Z5**	26-27 (27)		
I5-I6	21-27 (23)				
I6	33-37 (35)				

Table 2. Length of opisthonotal setae and longitudinal distances between their bases in *Prozercon rekaae* sp. n. male (values in µm)

I1	10	**Z1**	11	**S1**	10
I1-I2	30	**Z1-Z2**	26	**S1-S2**	30
I2	12	**Z2**	12	**S2**	25
I2-I3	24	**Z2-Z3**	24	**S2-S3**	31
I3	13	**Z3**	15	**S3**	29
I3-I4	21	**Z3-Z4**	22	**S3-S4**	36
I4	12	**Z4**	17	**S4**	32
I4-I5	16	**Z4-Z5**	30		
I5	7	**Z5**	20		
I5-I6	19				
I6	31				

Table 3. Differences between *Prozercon rekaae* sp. n. and *Prozercon verruciger* Mašán & Fenďa, 2004

	Prozercon rekaae sp. n.	*Prozercon verruciger*
Setae I_1	Smooth, short	Pilose, medium-sized
Length of setae I_1-I_4	10-13 µm	18-25 µm
Setae Z_4	long, densely plumose, brush-like	medium-sized, pilose
Lenght and shape of setae I_6, S_2-$_4$	30-37 µm ending of setae plumose	24-30 µm densely plumose, brush-like
Situation of Z_1 and S_1	S_1 situated (postero-) laterally to Z_1	S_1 situated antero-laterally to Z_1
Situation of Po_2	lateral position to Z_2	anterior position to Z_2
Dorsal fossae	well-sclerotized	weakly indicated or absent
Lateral ends of peritremal shield	reaching R_4	reaching R_6
Size and shape of tubercules	quite divers in I-setal row	quite uniform in I-setal row
Setae I_5	not reaching posterior margin of the opisthonotum	reaching posterior margin of the opisthonotum

Male. Length of idiosoma 280 µm, width 220 µm (n=1).

Dorsum & venter (Figs. 12–13). Setae, pores and ornamentation of podonotum and opisthonotum as in female, except Z_4, which similar to Z_2 and Z_3, medium-sized and slightly pilose in male (r_2 short and smooth in male).

The size of setae and the longitudinal distance between their bases as in Table 2.

Etymology. The species is dedicated to my betrothed, Réka Farkas

Remarks. This species closely resembles *Prozercon verruciger* Mašán & Fenďa, 2004, recorded only from Slovakia and Hungary so far, but can be distinguished by many characters, summarized in Table 3.

Zercon cretensis sp. n.

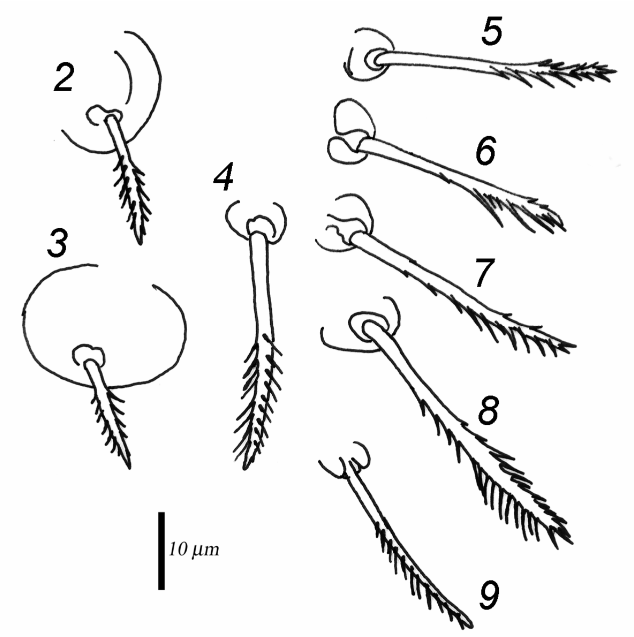
(Figs. 14–20)

Material examined. Holotype: female, E-1596, Crete, 5 km north of Knossos, *Platanus occidentalis* forest over Agia Irini stream, from leaf litter, 03.03.2003., leg. Szűts, T. Paratypes: 3 females, E-1595, Crete, 5 km north of Knossos, *Platanus occidentalis* forest over Agia Irini stream, from leaf litter, 03.03.2003., leg. Szűts, T. Other localities: 4 females, 1 nymph: E-1592, Crete, 2 km north of Knossos, moss from rocky hillside, 02.03.2003., leg. Szűts, T.; 8 females: E-1593, Crete, 2 km north of Knossos, lichen, mushroom and hifa from rocky hillside, 02.03.2003., leg. Szűts, T.; 2 females, 2 nypmhs: E-1594, Crete, 2 km north of Knossos, moss from rocky hillside, 02.03.2003., leg. Szűts, T.; 4 females: E-1597, Crete, 5 km north of Knossos, *Platanus occidentalis* forest over Agia Irini stream, from leaf litter, 03.03.2003., leg. Szűts, T.; 1 female: E-1598, Crete, 5 km north of Knossos, *Platanus occidentalis* forest over Agia Irini stream, from wash, 03.03.2003., leg. Szűts, T.; 13 females: E-1600, 2 kms from Agios Thomas, near road, from rock-moss.

Diagnosis. podonotal setae smooth, except $r_{5\text{-}7}$, which slightly pilose. On opisthonotum, $I_{3\text{-}6}$, $Z_{3\text{-}4}$, $S_{2\text{-}4}$ elongated, barely pilose, others smooth. Marginal R-row with stout, medium-sized setae, $R_{1\text{-}3}$ barely pilose, $R_{4\text{-}7}$ smooth. Setae I_5 shorter than I_3, I_4 and I_6. Dorsal cavities of general size and appearance. Podonotum and anterior half of opisthonotum reticulate, posterior half of latter punctate.

Description. Female. Length of idiosoma 455 µm, width 348 µm (n = 10).

Dorsum (Fig. 14). On podonotum, 22 pairs of different setae. The i-setal row with 6 pairs, z-row with 2 pairs, s-row with 5 pairs, p-row with 2 pairs, r-row with 7 pairs (p_2 visible on ventral



Figures 2–9. Opisthonotal setae of *Prozercon rekaae* sp. n. female. 2 = seta Z3, 3 = seta I4, 4 = seta I6, 5 = seta S2, 6 = seta S3, 7 = seta S4, 8 = seta Z4, 9 = seta Z5

view, not represented on dorsal fig.). Setae i_1, $r_{5\text{-}7}$ barely pilose, all other podonotal setae smooth, needle-like. Pores po_1 medially to insertions of setae s_1, po_2 situated under the line connecting s_3 and i_4, equidistant from these setae, po_3 situated under the line connecting s_4 and z_1, equidistant from insertions of these setae. Podonotum covered with irregular tile-like pattern. Opisthonotum with 22 pairs of different setae (Figs. 17–20), I-setal row with 6 pairs, Z-row with 5 pairs, S-row with 4 pairs, R-row with 7 pairs. Setae $I_{1\text{-}2}$ short, smooth, I_3-I_6 long, barely pilose. Setae I_3, I_4 and I_5 almost equal in length, I_5 shorter than others. Setae I_6 longest opisthonotal setae. Setae $Z_{1\text{-}2}$ smooth, longer than $I_{1\text{-}2}$. Setae Z_3 similar to $I_{3\text{-}4}$. Setae Z_4 similar to I_6. Setae Z_5 elongated, smooth, as long as setae I_5, but more slender. Setae S_1 equal in length and shape to $Z_{1\text{-}2}$. Setae S_2-S_3 long, barely pilose, similar to $I_{3\text{-}4}$. Setae S_4 similar to I_6. Setae R_1-R_7 elongated, stout, barely pilose, with rounded endings. About the pilose setae: $R_{5\text{-}7}$, $I_{3\text{-}5}$, $Z_{3\text{-}4}$, $S_{2\text{-}4}$, $R_{1\text{-}3}$ with very fine pilosity on the middle or on distal part, but not apically. Pores Po_1 near the insertions of Z_1 antero-medially to them. Po_2 situated on the line connecting insertions of setae S_2 and Z_2 (or slightly above it). Pores Po_3 near insertions of Z_4, just above the line connecting bases of Z_4 and I_5. Opisthonotum with irregular tile-like pattern (anterior 30–40%) and punctation (posteriorly). Dorsal fossae of general size and appearance, saddle-like, with smooth anterior margin.

Measurements of setae and longitudinal distances between their bases as in Table 4.

Venter (Fig. 15). shape and chaetotaxy of ventroanal shield is tipical for the genus *Zercon*. Anterior margin of ventroanal shield with one pair of setae.

Deutonymph (Fig. 16). Length of idiosoma 385 µm, width 281 µm (n = 1).

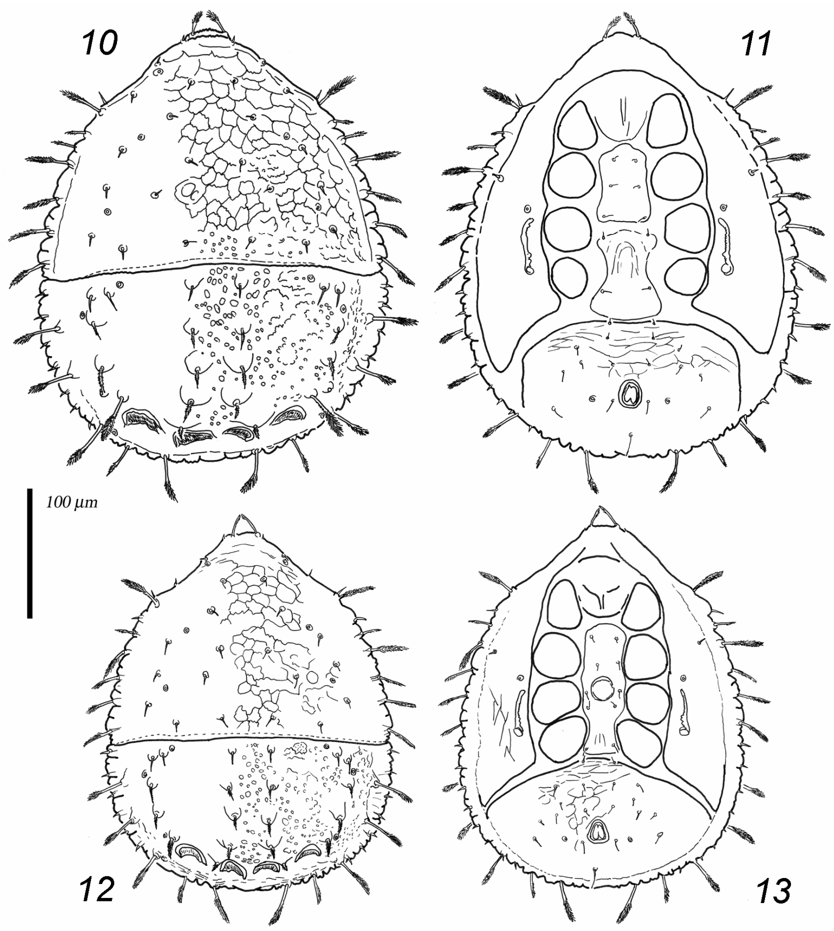
Podonotal setae smooth. On opisthonotum, setae $I_{1\text{-}5}$, $Z_{1\text{-}2}$ and R setae short, smooth. I_6, $Z_{3\text{-}4}$, $S_{1\text{-}4}$ elongated, more pilose, than in adult stage. Situation of podonotal and opisthonotal pores similar to adults. Chaetotaxy of venter as in adults. Dorsal idiosoma mostly without reticulation. Measurements of setae and longitudinal distances between their bases as in Table 5.

Etymology: This species is named after the Island of Crete, where it has been found.

Remarks. The species is most similar in appearance to the following species: *Zercon agnostus* Błaszak, 1979, *Z. ayyildizi* Urhan, 1997, *Z. turcicus* Urhan & Ayyildiz, 1994 (from Turkey), *Z. salebrosus* Błaszak, 1979 and *Z. saphenus* Błaszak, 1979 (from Tunisia). Differences between these species are given in Table 6.

DISCUSSION

The island is situated 100 kms from the Balkan Peninsula, 200 kms from Asia Minor and 300 kms from the northern coast of Africa. Because of the continental connections in the Miocene, the fauna of Crete is composed by three main elements: European, Mediterranean and Asiatic. Several papers discuss the different zoogeographical ef-



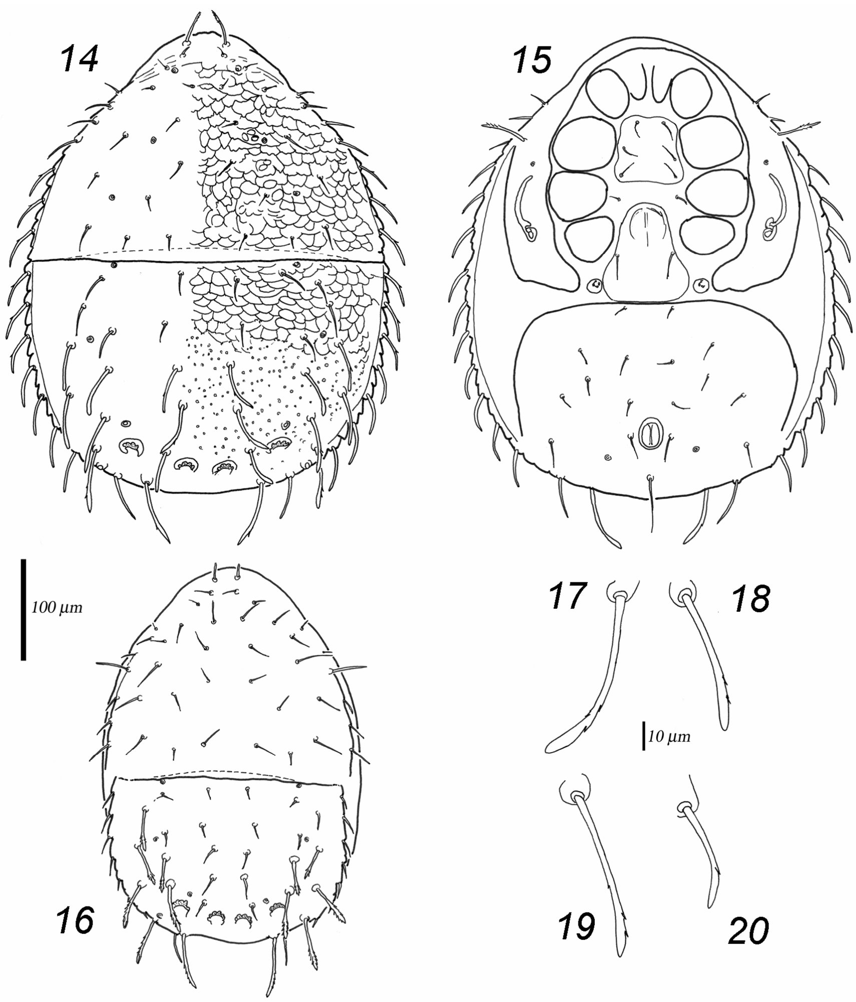
Figures 10–13. *Prozercon rekaae* sp. n.: 10 = female, dorsal idiosoma, 11 = female, ventral idiosoma, 12 = male, dorsal idiosoma, 13 = male, ventral idiosoma

Table 4. Length of opisthonotal setae and longitudinal distances between their bases in *Zercon cretensis* sp. n. female (values in µm)

I1	17-19 (18)	**Z1**	24-26 (25)	**S1**	26-30 (29)
I1-I2	45-54 (50)	**Z1-Z2**	50-60 (55)	**S1-S2**	36-45 (41)
I2	24-30 (26)	**Z2**	32-36 (34)	**S2**	49-52 (51)
I2-I3	42-51 (47)	**Z2-Z3**	33-40 (35)	**S2-S3**	43-52 (48)
I3	50-53 (52)	**Z3**	48-50 (49)	**S3**	52-57 (54)
I3-I4	39-45 (42)	**Z3-Z4**	39-46 (43)	**S3-S4**	59-62 (60)
I4	52-56 (54)	**Z4**	56-59 (58)	**S4**	62-63 (62)
I4-I5	34-43 (38)	**Z4-Z5**	59-61 (60)		
I5	48-51 (50)	**Z5**	43-46 (44)		
I5-I6	34-37 (35)				
I6	64-68 (66)				

Table 5. Length of opisthonotal setae and longitudinal distances between their bases in *Zercon cretensis* sp. n. deutonymph (values in µm)

I1	11	**Z1**	11	**S1**	30
I1-I2	36	**Z1-Z2**	36	**S1-S2**	37
I2	13	**Z2**	15	**S2**	37
I2-I3	27	**Z2-Z3**	26	**S2-S3**	38
I3	18	**Z3**	35	**S3**	45
I3-I4	27	**Z3-Z4**	29	**S3-S4**	35
I4	21	**Z4**	47	**S4**	49
I4-I5	27	**Z4-Z5**	44		30
I5	16	**Z5**	31		37
I5-I6	37		11		37
I6	58		36		38



Figures 14–20. *Zercon cretensis* sp. n. 14 = female, dorsal idiosoma, 15 = female, ventral idiosoma, 16 = deutonymph, dorsal idiosoma, 17 = seta I6, 18 = seta Z3, 19 = seta S4, 20 = seta R4

fects on the soil fauna (Ćurčić *et al.,* 2007; Simaiakis *et al.,* 2004), in general European, different Mediterranean and Balkanic elements have a greater presence.

Our knowledge on the distribution of zerconid mites, especially in Southern Europe and the Asian regions is considerably scarce. Hence any zoogeographical remarks must be made very cautiously. *Prozercon yavuzi*, as a species up to now known only from Turkey seems to be an East Mediterranean element. *Zercon cretensis* sp. n. morfologically most closely related to the East-Mediterranean and African species, also can be an East Mediterranean element, but because of the short distance between Crete and Africa, the opportunity of colonization from there should not be exculded. Regarding to the morphological aspect, *Prozercon rekaae* sp. n. is fairly unique in the group (because of the large opisthonotal tubercules resembles only a Slovakian species, *Prozercon verruciger* which has a North Carpathian distribution). For more solid information of zoogeographical history of zerconid species further examination of the region's fauna is required.

Table 6. Differences between *Zercon cretensis* sp. n., *Zercon agnostus* Błaszak, 1979, *Zercon ayyildizi* Urhan, 1997, *Zercon turcicus* Urhan & Ayyildiz, 1994, *Zercon salebrosus* Błaszak, 1979 and *Zercon saphenus* Błaszak, 1979

Zercon cretensis	*Zercon agnostus*	*Zercon ayyildizi*
setae I_2 short, smooth	setae I_2 long, barbed	setae I_2 long, broadened with hyaline ending
setae I_5 shorter than I_{3-4}, reaching the margins of idiosoma	setae I_5 shorter than I_{3-4}, never reaching the margins of idiosoma	setae I_5 longer than I_{3-4}, reaching the margins of idiosoma
setae Z_2 short, smooth	setae Z_2 short, pilose	setae Z_2 long, with hyaline tips
setae S_1 short, smooth	setae S_1 short, pilose	setae S_1 long, with hyaline tips
R_{1-3} barely pilose, other R-setae smooth	all R-setae barbed	all R-setae barbed, with hyaline tips
Po_2 on or above the line connecting bases of S_2 and Z_2	Po_2 under the line connecting bases of S_2 and Z_2	Po_2 on the line connecting bases of S_2 and Z_2
elongated setae with rounded endings	elongated setae with pointed endings	elongated setae with hyaline endings
elongated setae medially, barely pilose	elongated setae distally pilose	elongated setae distally pilose
dorsal fossae of general size and appearance	dorsal fossae of general size and appearance	dorsal fossae more sclerotized
Zercon salebrosus	***Zercon saphenus***	***Zercon turcicus***
setae I_2 short, with hyaline ending	setae I_2 short, smooth	setae I_2 short, smooth
setae I_5 shorter than I_{3-4}, never reaching the margins of idiosoma	setae I_5 longer than I_{3-4}, never reaching the margins of idiosoma	setae I_5 shorter than I_{3-4}, reaching the margins of idiosoma
setae Z_2 short, with hyaline tips	setae Z_2 short, smooth	setae Z_2 short, smooth
setae S_1 short, with hyaline tips	setae S_1 short, with hyaline tips	setae S_1 short, smooth
all R-setae barbed, with hyaline tips	all R-setae barbed, with hyaline tips	all R-setae barbed
Po_2 under the line connecting bases of S_2 and Z_2	Po_2 under the line connecting bases of S_2 and Z_2	Po_2 on the line connecting bases of S_2 and Z_2
elongated setae with hyaline endings	elongated setae with hyaline endings	elongated setae with hyaline endings
elongated setae distally, very finely pilose	elongated setae distally, very finely pilose	elongated setae on distal half pilose
dorsal fossae strongly sclerotized, in a row	dorsal fossae strongly sclerotized	dorsal fossae strongly sclerotized

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