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PERSCHELORIBATES PARATZITZIKAMAENSIS N. SP., WITH SUPPLEMENTARY DESCRIPTIONS OF SCHELORIBATES ELEGANS AND MONOSCHELOBATES PARVUS (ACARI, ORIBATIDA, SCHELORIBATIDAE) FROM ECUADOR

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ABSTRACT — A new oribatid mite species, Perscheloribates paratzitzikamaensis n. sp., is described from Ecuador. This species is morphologically similar to Perscheloribates tzitzikamaensis (Pletzen, 1965) from South Africa, however, it differs from the latter by the smaller body size, longer notogastral setae p1, the absence of a translamellar line and prolamellar lines represented only by short basal part. The supplementary descriptions of Scheloribates elegans Hammer, 1958 and Monoschelobates parvus Balogh and Mahunka, 1969 are presented on the basis of Ecuadorian specimens.

KEYWORDS — oribatid mites; Scheloribatidae; new species; supplementary description; Ecuador

INTRODUCTION

The present study is based on the oribatid mite material collected by Dorothee Sandmann (second author) and Franca Marian (third author) in 2008-2010 from Ecuador. This paper includes the data on the family Scheloribatidae (Acari, Oribatida).

Ecuadorian scheloribatid mites are poorly studied; only a few species have been recorded (Balogh 1988; Schatz 1998; Illig et al. 2007; Ermilov and Kalúz 2012, Ermilov et al. 2013).

In the course of the identification of scheloribatid mites from Ecuador we found one new species belonging to the genus Perscheloribates Hammer, 1973. The primary purpose of our paper is to describe and illustrate this species. Perscheloribates is a genus that was proposed by Hammer (1973) with Perscheloribates clavatus Hammer, 1973 as type species. Currently, it comprises more than 40 species, which are distributed in tropical regions. The main generic characters are summarized by Hammer (1973), Corpus-Raros (1980) and Balogh and Balogh (1990, 1992), including our additional opinion: rostrum rounded (rarely pointed or with incisions); rostral setae inserted dorso-laterally or laterally on prodorsum; interlamellar setae long or medium size; sensilli with dilated head (exceptionally setiform); prolamellar lines present or absent; pteromorphae well developed; notogaster with 10 pairs of setae, which are short (rarely medium size) or represented by alveoli; genital plates with four setae; aggenital setae present; lyrifissures in paraanal position; tarsi of all legs with one claw. An identification key for the Neotropical species of Pers-
*Scheloribates* has been presented earlier (Balogh and Balogh 1990, 2002).

The second purpose of our paper is to present detailed supplementary descriptions of *Scheloribates elegans* Hammer, 1958 and *Monoschelobates parvus* Balogh and Mahunka, 1969 on the basis of Ecuadorian specimens. *Scheloribates elegans* was briefly described by Hammer (1958) from Bolivia. Later, it was briefly redescribed by Corpus-Raros (1980) from the Philippines. *Monoschelobates parvus* was briefly described by Balogh and Mahunka (1969; see also Balogh and Balogh 1990) from Brazil.

**MATERIALS AND METHODS**

Specimens were collected by F. Marian and D. Sandmann in 2008 – 2010 from Southern Ecuador:
3) Ec-3: 4°60’S, 78°58’-79°10’W, Cajanuma, Podocarpus National Park, 3000 m. a.s.l., upper organic soil layer in mostly undisturbed rain forest, 1.IV.2009.

Specimens were studied in lactic acid, mounted in temporary cavity slides for the duration of the study and then stored in 90% alcohol in vials. Body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the ventral plate. Notogastral width refers to the maximum width in dorsal aspect. The length of body setae is given (in square brackets) according to the sequence genu-tibia-tarsus. General terminology used in this paper follows that summarized by Coetzer (1967-1968), and Norton and Behan-Pelletier (2009).

**DESCRIPTIONS OF NEW SPECIES**

*Perscheloribates paratzitzikamaensis* n. sp. (Figure 1)


Description — Measurements. Body length: 315 (holotype), 298 – 315 (four paratypes); notogaster width: 199 (holotype), 182 – 199 (four paratypes).


Prodorsum — Rostrum rounded. Lamellae located dorso-laterally, as long as half of prodorsum (in lateral view), without cusps. Translamellar line absent. Prolamellar lines represented only by short basal part. Sublamellar lines distinct, long. Sublamellar porose areas (Al) small, oval (6 × 4). Rostral (ro, 41 – 49), lamellar (le, 53 – 61) and interlamellar (in, 65 – 73) setae setiform, barbed. Sensilli (ss, 61 – 65) spindle-form (with well dilated head and long, thin apex), with short cilia. Exobothridial setae and their alveoli absent. A pair of elongate, narrow porose areas present (visible in dissected specimens) latero-posterior to interlamellar setae.

Notogaster — Anterior notogastral margin convex medially. Dorsophragmata (D) of medium size, widely rounded. Nine pairs of notogastral setae represented by alveoli; one pair of thin, smooth setae present (p1, 24-32). Four pairs of sacculi (Sa, S1, S2, S3) oval, with small openings.

Epimeral and lateral podosomal regions — Apodemes 1, 2, 3 and sejugal apodemes distinct. Epimeral setal formula: 3-1-2-2 (3c, 4c absent). Setae setiform, thin, smooth; medial setae 1a, 2a, 3a (6

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FIGURE 1: Perscheloribates paratzitzikamaensis n. sp.: A – body dorsally; B – body ventrally (gnathosoma and legs not illustrated); C – prodorsum and anterior part of notogaster laterally (gnathosoma and legs not illustrated); D – rostral seta; E – sensillus; F – pedotectum II and discidium in dissected specimen; G – left genital plate and epimeral seta 3a; H – left anal plate and adanal seta ad 3; I – claw on leg I. Scale bars (A-C) 100 µm, scale bar (D-F, I) 10 µm, scale bar (G, H) 20 µm.
Tarsus sp. Perscheloribates paratzitzikamaensis form sensilli, \( \text{Pletzen}, 1965 \).

Species and the species \( \text{Perscheloribates tzitzikamaensis} \) "near" and refers to the similarity between the new distally. Circumpedal carinae (cp) poorly developed, rounded anteriorly. Discidia (I) large, concave, pedotecta II (Pd II) rounded anteriorly. Pedotecta I (Pd I) shorter than others (16 – 24). Pedotecta I (Pd I) large, concave, pedotecta II (Pd II) rounded anteriorly. Discidia (dis) poorly developed, rounded distally. Circumpedal carinae (cp) distinct.

Anogenital region — Four pairs of genital (q1, 12 – 20, q2-q3, 6 – 12), one pair of aggenital (ag, 6 – 12), two pairs of anal (an1, an2, 6 – 12) and three pairs of adanal (ad1-ad3, 6 – 12) setae thin, smooth. Lyrifissures ad in paraanal position.

Legs — Claw of each leg with several minute barbs on dorsally side. Formulea of leg setation and solenidia indicated in Table 1.


Type deposition — The holotype is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; two paratypes are deposited in the collection of the Siberian Zoological Museum, Novosibirsk, Russia; two paratypes are in the personal collection of the first author.

Etymology — The prefix para is Latin meaning "near" and refers to the similarity between the new species and the species \( \text{Perscheloribates tzitzikamaensis} \) (Pletzen, 1965).

Remarks — In having the long notogastral setae \( s_1 \) (other setae represented by alveoli) and spindle-form sensilli, \( \text{Perscheloribates paratzitzikamaensis n. sp.} \) is similar to \( \text{Perscheloribates tzitzikamaensis} \) (Pletzen, 1965) from South Africa (see Pletzen 1965), however, it differs from the latter by smaller body size (298 – 315 × 182 – 199 versus 405 – 423 × 279 – 293 in \( \text{P. tzitzikamaensis} \)), longer setae \( s_1 \) (considerably longer than adanal setae versus not longer in \( \text{P. tzitzikamaensis} \)), the absence of a translammellar line (rudimentary parts of lines present in \( \text{P. tzitzikamaensis} \)) and prolammellar lines represented only by short basal part (versus present in \( \text{P. tzitzikamaensis} \)).

Also, in having the long notogastral setae \( s_1 \) (other setae represented by alveoli), \( \text{Perscheloribates paratzitzikamaensis n. sp.} \) is similar to \( \text{Perscheloribates aculeatus} \) (Hammer, 1961) from Peru (see Hammer 1961), however, it differs from the latter by the spindle-form sensilli (versus fusiform in \( \text{P. aculeatus} \)) and the rounded rostrum (versus pointed in \( \text{P. aculeatus} \)).

**SUPPLEMENTARY DESCRIPTIONS OF SPECIES (ON THE BASIS OF ECUADORIAN SPECIMENS)**

**Scheloribates elegans** Hammer, 1958

(Figure 2)


FIGURE 2: Scheloribates elegans Hammer, 1958: A – body dorsally; B – body ventrally (gnathosoma and legs not illustrated); C – prodorsum and anterior part of notogaster laterally (gnathosoma and legs not illustrated); D – rostral seta; E – medio-distal part of sensillus; F – pedotectum II, discidium and epimeral setae 3c, 4c in dissected specimen; G – left genital plate and epimeral seta 3a; H – left anal plate and anal setae ad1-ad3; I – claws on leg I. Scale bars (A-C) 200 µm, scale bar (D, I) 10 µm, scale bar (E-H) 20 µm.

Prodorsum — Rostrum narrowly rounded. Lamellae located dorso-laterally, as long as half of prodorsum (in lateral view), without cusps. Translamellar line represented by rudimentary parts near to lamellae. Prolamellar and sublamellar lines distinct. Sublamellar porose areas (Al) oval (10 – 12 × 8). Rostral (69 – 77), lamellar (102 – 114) and interlamellar (139 – 151) setae setiform, barbed. Sensilli (98-110) spindle-form (with well-dilated head and distinct, thin apex), with short cilia. Exobothridial setae (ex, 16 – 20) thin, smooth. A pair of elongate, narrow porose areas present (visible in dissected specimens) latero-posterior to interlamellar setae.

Notogaster — Anterior notogastral margin convex medially. Dorsophragmata small. Ten pairs of notogastral setae present; setae c, la, lm, lp (4 – 8) short (visible under high magnification), smooth, others longer (16 – 20), indistinctly barbed. Four pairs of sacculi (Sa, S1, S2, S3) oval, with small openings.

Epimeral and lateral podosomal regions — Apodemes 1, 2, 3 and sejugal apodemes distinct. Epimeral setal formula: 3-1-3-3. Setae setiform, slightly barbed; 3a, 4a (28 – 32) longer than others (16 – 20). Pedotecta I large, convex, pedotecta II rounded anteriorly, with small tooth. Discidia rounded distally. Circumpedal carinae distinct.

Anogenital region — Four pairs of genital (g1, 16 – 20, g2-g4, 6 – 8), one pair of aggenital (6 – 8), two pairs of anal (16 – 20) and three pairs of anal (16 – 20) setae setiform, slightly barbed. Lyrifissures iad in paraanal position.

Legs — Leg tarsi with one strong claw and two thinner claws; all with several minute barbs on dorsal side. Formulae of leg setation and solenidia: I (1-5-3-4-19) [1-2-2], II (1-5-2-4-15) [1-1-2], III (2-3-1-3-15) [1-1-0], IV (1-2-2-3-12) [0-1-0]; homology of setae and solenidia indicated in Table 1.

Legs — Leg tarsi with one strong claw and two thinner claws; all with several minute barbs on dorsal side. Formulae of leg setation and solenidia: I (1-5-3-4-19) [1-2-2], II (1-5-2-4-15) [1-1-2], III (2-3-1-3-15) [1-1-0], IV (1-2-2-3-12) [0-1-0]; homology of setae and solenidia indicated in Table 1.


Remarks — Ecuadorian specimens of Scheloribates elegans are similar in general appearance to specimens from Bolivia (see Hammer 1958) and Philippines (Corpus-Raros 1980), but there is a clear morphometrical difference: body length larger (581 – 630) than in Bolivian (460) and Philippine (303-500) specimens. We assume this difference to represent intraspecific (perhaps geographical) variability.

Monoschelobates parvus Balogh and Mahunka, 1969
(Figure 3)


Description — Measurements. Body length: 282-315 (six specimens); notogaster width: 166-199 (six specimens).


Prodorsum — Rostrum rounded. Lamellae located dorso-laterally, as long as half of prodorsum (in lateral view), without cusps. Translamellar line represented by rudimentary parts near to lamellae. Prolamellar and sublamellar lines distinct. Sublamellar porose areas (Al) very small (2 – 4 × 1 – 2), oval. Rostral (28-32), lamellar (36-45) and interlamellar (61 – 65) setae setiform, barbed. Sensilli (53 – 65) clavate, with well-dilated head, having small barbs. Exobothridial setae (2) minute. A pair of elongate, narrow porose areas present (visible in dissected specimens) latero-posterior to interlamellar setae.

Notogaster — Anterior notogastral margin convex medially. Dorsophragmata small. Ten pairs of thin, smooth notogastral setae present; setae c and la (8) slightly longer than others (4 – 6). Four pairs of sacculi (Sa, S1, S2, S3) oval, with small openings.

Epimeral and lateral podosomal regions — Apodemes 1, 2, 3 and sejugal apodemes distinct. Epimeral setal formula: 3-1-3-3. Setae setiform, thin, smooth; medial setae 1a, 2a, 3a (4) shorter than
FIGURE 3: *Monoschelobates parvus* Balogh and Mahunka, 1969: A – body dorsally; B – body ventrally (gnathosoma and legs not illustrated); C – prodorsum and anterior part of notogaster laterally (gnathosoma and legs not illustrated); D – lamellar seta; E – sensillus; F – pedotectum II, discidium and epimeral setae 3c, 4c in dissected specimen; G – left genital plate and epimeral setae 3a, 4b; H – left anal plate and adanal setae ad1-ad5; I – claw on leg I. Scale bars (A-C) 50 µm, scale bar (D-F, I) 10 µm, scale bar (G, H) 10 µm.

Anogenital region — Four pairs of genital (4), two pairs of anal (4) and three pairs of adanal (8 – 12) setae setiform, thin, smooth. Aggenital setae absent. Lyrifissures iad in paraanal position.

Legs — Each claw with several minute barbs on dorsal side. Formulae of leg setation and solenidia: I (1-5-3-4-19) [1-2-2], II (1-5-2-4-15) [1-1-2], III (2-3-1-3-15) [1-1-0], IV (1-2-2-3-12) [0-1-0]; homology of setae and solenidia indicated in Table 1.


Remarks — Ecuadorian specimens of Monosche-lobates parvus are similar in general appearance to Brazilian specimens (Balogh and Mahunka 1969; Balogh and Balogh 1990), but there is a clear difference: prolamellar lines present versus absent in Brazilian specimens. Sometimes presence or absence of prolamellar lines or their partial development can vary in specimens of one species in Scheloribatidae: for example, prolamellar lines in Scheloribates fimbriatus Thor, 1930 - present (see Subbotina 1978), developed partially (Mahunka 1987), indistinctly visible or absent (data of first author, based on specimens from Western Europe); similar situation is known for Scheloribates (Bischeloribates) mahunkai Subías, 2010 (Ermilov 2013). Hence, we assume this difference to represent intraspecific variability in the case of M. parvus.

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