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Additions to the oribatid mite fauna (Acari, Oribatida) of Ethiopia: results of the Joint Russian-Ethiopian Biological Expedition (2014) to the vicinity of Lake Tana

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ABSTRACT — The present study is based on oribatid mite material (Acari, Oribatida) collected in October–December 2014 from the vicinity of Lake Tana, Northwest Ethiopia. A list of identified taxa, including 34 species from 29 genera and 25 families, is provided; of these, ten species, seven genera and three families are recorded in Ethiopia for the first time. A new species of the genus Haplozetes (Haplozetidae) is described from the leaf litter of forests with Coffea arabica and Podacarpus gracilior. Haplozetes valbehanae n. sp. is morphologically most similar to H. triangulatus Beck, 1964, but differs by the tridentate rostrum and presence of four pairs of genital setae and dense cerotegumental tubercles in the anterior part of the ventral plate.

KEYWORDS — mites; fauna; new species; Haplozetes; morphology; systematics; record; Africa

INTRODUCTION

In recent years the Ethiopian oribatid mite fauna has been actively studied (for example, Ermilov et al. 2012a; Ermilov and Rybalov 2012b, 2013; Ermilov et al. 2014; Miko et al. 2014; Niedbała and Ermilov 2014). The present study is based on the material collected during the Russian-Ethiopian expedition in October–December 2014 to the vicinity of Lake Tana (Northwest Ethiopia). The primary goal of the paper is to present a list and new records of the identified taxa.

In the course of taxonomic identification, I found one new species, belonging to the genus Haplozetes Willmann, 1935. The secondary goal of the paper is to describe and illustrate this species under the name Haplozetes valbehanae n. sp.

The genus Haplozetes was proposed by Willmann (1935) with Peloribates vindobonensis Willmann, 1935 as type species. I support Bayartogtokh’s (2000, 2010) and Weigmann’s (2006) classification and diagnosis of this genus. At present, Haplozetes s. str. comprises more than 60 species, which have a cosmopolitan distribution. Identification keys for some species of the genus were presented by Balogh and Balogh (2002), Weigmann (2006), and Bayartogtokh (2010).

MATERIALS AND METHODS

Material — Oribatid mites were collected from four sites of the vicinity of Lake Tana (Northwest Ethiopia):
- Et-2014–20: 11°41’36”N, 37°20’49”E, near Lake
LIST OF ORIBATID TAXA COLLECTED FROM THE VICINITY OF LAKE TANA

This list indicates the specific localities where oribatid mites were collected, and notes new records and general known distribution.

**Sphaerochthoniidae**

*Sphaerochthonius splendidus* (Berlese, 1904) (see Berlese 1904b). Localities: Et-2014–20, Et-2014–21. Distribution: Tropics and Subtropics.

**Epilohmanniidae**

*Epilohmannia minuta* Berlese, 1920. Locality: Et-2014–20. Distribution: Tropics and Subtropics.

**Malaconothridae**

*Tyrphonothrus ensifer* (Mahunka, 1982). Localities: Et-2014–20, Et-2014–21. Distribution: Ethiopia and Congo.

**Nothridae**

*Nothrus crassisetus* Mahunka, 1982. Locality: Et-2014–20. Distribution: Ethiopia.

**Hermanniellidae**

*Hermanniella congoensis* Balogh, 1958. Localities: Et-2014–20, Et-2014–21, Et-2014–22. Distribution: Ethiopian region.

**Nanhermanniidae**

*Masthermannia mammillaris* (Berlese, 1904) (see Berlese 1904a). Locality: Et-2014–20. Distribution: Tropics and Subtropics.

**Plasmobatidae**

*Plasmobates foveolatus* Ermilov, Sidorchuk and Rybalov, 2011. Locality: Et-2014–20. Distribution: Ethiopia.

**Licnodamaeidae**

*Pedrocortesella africana* Pletzen, 1963. Localities: Et-2014–20, Et-2014–21. Distribution: Ethiopian region.

**Gymnodamaeidae**

*Arthrodamaeus johnni* Hugo, 2010. Locality: Et-2014–21. Distribution: South Africa and Zambia.

**Aleurodamaeidae**

*Aleurodamaeus recensesepto* Ermilov and Rybalov,
2012a. Localities: Et-2014–20, Et-2014–21, Et-2014–22. Distribution: Ethiopia.

Damaeidae
Metabelba (Pateribelba) glabriseta Mahunka, 1982. Localities: Et-2014–20, Et-2014–21, Et-2014–22. Distribution: Ethiopia and Angola.

Astegistidae
Cultorribula bicuspidata Mahunka, 1978. Localities: Et-2014–20, Et-2014–21. Distribution: Ethiopian, Neotropical and Oriental regions.

Microzetidae
Berleszetetes glaber Mahunka, 1982. Localities: Et-2014–20, Et-2014–21. Distribution: Ethiopia.

Oppiidae
Arcoppia rugosa (Mahunka, 1973). Localities: Et-2014–20, Et-2014–21. Distribution: Zimbabwe and Ethiopia.

Caloppiidae
Zetorchella vargai (Balogh, 1959). Localities: Et-2014–20, Et-2014–21, Et-2014–22. Distribution: Tanzania and South Africa*. Zetorchella pedestris Berlese, 1916 (see Berlese 1916a). Locality: Et-2014–21. Distribution: Ethiopian region.

Scheloribatidae
Scheloribates (Scheloribates) aethiopicus Mahunka, 1982. Localities: Et-2014–20, Et-2014–21, Et-2014–22. Distribution: Ethiopian region and Canary Islands.

Haplozetidae
Haplozetes valbehanae n. sp. Localities: Et-2014–20, Et-2014–22.

Zetomotrichidae
Zetomotrichus lacrimans Grandjean, 1934. Localities: Et-2014–20, Et-2014–21. Distribution: Tropics and Subtropics.

Mochlozetidae
Unguizetes atypicus (Mahunka, 1982). Localities: Et-2014–20, Et-2014–21, Et-2014–22. Distribution: Ethiopian region.

Puncoribatidae
Allozetes africanus Balogh, 1958. Locality: Et-2014–20. Distribution: Tropics.

Galumnidae
Galumna incisa Mahunka, 1982. Localities: Et-2014–20, Et-2014–21, Et-2014–22. Distribution: Ethiopia. Galumna nuda Engelbrecht, 1972. Localities: Et-2014–20, Et-2014–22. Distribution: South Africa.

Thus, in the course of taxonomic identification I found 34 species from 29 genera and 25 families; of these, one species is new for science, and ten species (Sphaerochthonius splendidus, Epilohmannia minuta, Masthermannia mammillaris, Arthrodamaeus johanni, Condylrippa pilosella, Lasioelba (Antennoppia) capilligera, Ramuloppia ramiweta, Zetorchella vargai, Hydrozetes gueyeae and Galumna nuda), seven gen-
era (Sphaerochthonius, Epilohmannia, Masthermania, Condyloppia, Ramuloppia, Hydrozetes and Haplozetes) and three families (Sphaerochthoniiidae, Epilohmanniidae and Hydrozetidae) are recorded in Ethiopia for the first time.

**DESCRIPTION**

**Haplozetes valbehanae n. sp.**

(Figures 1–5)

Diagnosis — Body size: 282 – 348 × 166 – 190. Body surface mostly foveolate. Anterior part of ventral plate with cerotegumental tubercles. Rostrum tridentate. Tutoria with one distal tooth. Rostral setae slightly dilated basally, ciliate unilaterally, inserted under tutorial teeth. Lamellar setae setiform, barbed, inserted on lamellar ends. Interlamellar setae short, erect, barbed. Bothridial setae fusiform, barbed. Notogastr with 10 pairs of short, thin setae. Notogastral saccules with elongated channels basally swollen. Subcapitular setae setiform, barbed. Epimeral setae short, barbed. Circumpedal carinae long, directed to anterior margin of ventral plate. Anogenital setae short, indistinctly barbed. Genital plates with four pairs of setae. Tridactyloous. Ventro-posterior parts of femora I and antiaxial parts of genua I with one trapezoid apophysis. Tarsi I with 19 setae.

Description — Measurements – Small species. Body length: 315 (holotype: female), 282 – 348 (14 paratypes: five females and nine males); notogaster width 166 (holotype), 166 – 190 (14 paratypes). No differences between females and males in the body sizes.

Integument (Figs 1A, 1B, 2A, 4C, 4I, 5C) — Body color yellow brownish. Body surface punctate. Notogastr, subcapitular mentum, anogenital region, genital and anal plates, medio-dorsal part of prodorsum and antero-lateral parts of epimeral region sparsely foveolate (diameter of foveolae up to 4). Pteromorphs, subcapitular mentum, pedotecta I, discidia, epimeral region, anal plates, posterior part of anogenital region, leg femora and tibiae III and IV slightly striate. Anterior part of ventral plate, which covers base of subcapitcular mentum, with dense cerotegumental tubercles (their diameter up to 4).

Prodorsum (Figs 1A, 1B, 2A, 4A–D) — Rostrum tridentate. Lamellae (lam) two thirds as long as prodorsum (measured in lateral view), with one very small outer tooth, located dorso-laterally. Prolamellae absent. Sublamellae (slam) about one third the length of lamellae, lineate. Sublamellar porose areas (Al, 10 – 12 × 6 – 8) oval, located near to sublamellae. Tutoria (tu) similar to lamellae in length, with one strong distal tooth. Parietal carinae (car) present, parallel to tutoria. Rostral setae (ro, 28) setiform, slightly dilated basally, ciliate unilaterally, inserted laterally on prodorsum under tutorial teeth. Lamellar setae (le, 36 – 41) setiform, barbed, inserted on lamellar ends. Interlamellar setae (in, 16–18) setiform, erect, barbed. Bothridial setae (bs, 49 – 57) fusiform, with long, smooth stalks and heads shorter, barbed. Exobothridial setae (ex, 8–10) thin, indistinctly barbed. Sejugal porose areas (Ad) diffuse, located posterior to interlamellar setae, transversely elongated.

Notogastr (Figs 1A–C, 2A, 4E–H) — Anterior notogastral margin convex medially. Dorsophragmata (D) elongated, longitudinally oriented. Pteromorphs triangular, with distinct hinges. Ten pairs of notogastral setae short (8 – 10), thin, smooth to indistinctly barbed. Four pairs of saccules (Sa, S1, S2 and S3) with elongated channels basally swollen. Opisthontal gland openings (gla) and lyrifissures (ia, im, ip, ih and ips) clearly visible.

Gnathosoma (Figs 2B–D) — Subcapitulum longer than wide (77 – 82 × 57 – 61). Subcapitular setae similar in length (14 – 18) and thickness, setiform, barbed. Two pairs of adoral setae (or1, or2, 6 – 8) setiform, barbed. Palps (length 49 – 53) with setation 0–2–1–3–9(+)ω. Solenidia of palptarsi attached to eupathidia (acman). Postpalpal setae (ep, 8) spiniform. Chelicerae (length 86 – 90) with two barbed setae, cha (28 – 30) longer than chb (16 – 20). Trägårdh’s (Tg) organ narrowly triangular, smooth.

Epimeral and lateral podosomal regions (Figs 1B, 2A, 4I, 5A, 5B) — Sejugal apodemes (apos) long, almost reaching genital aperture, longer than apodemes 2 (apo2) and 3 (apo3). Epimeral setal formula: 3–1–3–2; setae (8–10) setiform, thin, slightly
Figure 1: Haplozetes valbehanae n. sp.: A – dorsal view (legs not illustrated); B – ventral view (gnathosoma and legs not illustrated); C – posterior view. Scale bar 100 µm.
FIGURE 2: Haplozetes valbehanae n. sp.: A – lateral view (gnathosoma and legs not illustrated); B – subcapitulum, ventral view; C – palp, right, antiauxial view; D – chelicera, left, paraxial view. Scale bar (A) 100 µm, scale bar (B, D; C) 16 µm.
FIGURE 3: *Haplozetes valbehanae* n. sp.: A – leg I, right, antiaxial view; B – leg II, except trochanter and tarsus, right, antiaxial view; C – leg III, except tarsus, right, paraxial view; D – leg IV, except tarsus, right, paraxial view. Scale bar 20 µm.
Figure 4: Haplozetes valbehanae n. sp., dissected adult, microscope images: A – rostrum, ventral view; B – rostral seta and medio-distal part of tutorium, right, antiaxial view; C – lamellar seta and medio-distal part of lamella, left, dorsal view; D – medio-distal part of bothridial seta, right, paraxial view; E–H – notogastral saccules Sa, S1, S2 and S3, respectively; I – cerotegumental tubercles on anterior part of ventral plate; J – distal part of leg I, left, paraxial view. Scale bar 20 µm.
Figure 5: *Haplozetes valbehanae* n. sp., dissected adult, microscope images: A – part of left podosomal region with pedotectum II, discidium and trochanter III, ventral view; B – left genital plate and part of left epimeral region, ventral view; C – part of left ano-adanal region, ventral view; D – antero-dorsal tooth on leg tibia I; E – ventro-posterior apophysis on leg femur I; F – ventro-anterior tooth on leg femur II. Scale bar 20 µm.
Table 1: Leg setation and solenidia of adult Haplozetes valbehanae n. sp.

| Leg | Tr | Fe | Ge | Ti | Ta |
|-----|----|----|----|----|----|
| I   | v’ | d, (l), bv’’, v’’ | (l), v’, σ | (l), (v), φ₁, φ₂ | (ft), (tc), (it), (p), (u), (a), s, (pv), v’, (pl), ε, ω₁, ω₂ |
| II  | v’ | d, (l), bv’’, v’’ | (l), v’, σ | (l), (v), q | (ft), (tc), (it), (p), (u), (a), s, (pv), ω₁, ω₂ |
| III | l’, v’ | d, l’, ev’ | l’, σ | l’, (v), q | (ft), (tc), (it), (p), (u), (a), s, (pv) |
| IV  | v’ | d, ev’ | d, l’ | l’, (v), q | ft’’, (tc), (p), (u), (a), s, (pv) |

Note: Roman letters refer to normal setae, Greek letters to solenidia (except ε = famulus). Single prime (’) marks setae on the anterior and double prime (”) setae on the posterior side of a given leg segment. Parentheses refer to a pair of setae. Tr – trochanter, Fe – femur, Ge – genu, Ti – Tibia, Ta – tarsus.

Material examined — Holotype (male) and nine paratypes (three females and six males): Et-2014–20; five paratypes (two females and three males): Et-2014–22.

Type deposition — The holotype is deposited in the collection of the Senckenberg Museum, Görlitz, Germany; 14 paratypes are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

Etymology — This species is named in honour of Dr. Valerie Behan-Pelletier (Agriculture and Agri-Food Canada, Ottawa, Canada), to acknowledge her extensive contributions to our knowledge of oribatid mites.

Remarks — The new species is morphologically most similar to Haplozetes triangulatus Beck, 1964 from El Salvador in having long, fusiform bothridial setae, small body size, foveolate surface, short interlamellar setae, localization of rostral setae (under tutorial teeth) and tridactylous legs. However, it differs from the latter by the tridentate rostrum (vs. rounded) and presence of four pairs of genital setae (vs. five pairs) and dense cerotegumental tubercles in anterior part of ventral plate (vs. absent).

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