A NEW SPECIES OF THE GENUS ORTHOZETES FROM ECUADOR (ACARI: ORIBATIDA: MICROZETIDAE)

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ABSTRACT: A new microzetid mite species of the genus Orthozetes, O. bidentatus sp. n., from the upper organic soil layer of mostly undisturbed rain forest of Ecuador is described. The new species differs from all species of the genus by the presence of interlamellar setae. The genus Orthozetes is recorded in Ecuador for the first time.

KEY WORDS: oribatid mites, Microzetidae, Orthozetes, new species, Ecuador

INTRODUCTION

The oribatid mite genus Orthozetes (Acari: Oribatida: Microzetidae) was proposed by Balogh (1962a) with Orthozetes dispar Balogh, 1962 as the type species. Currently, this genus comprises three species, which are distributed in the tropics (Balogh 1962a, 1968): O. depilatus Balogh, 1968 (New Guinea), O. dispar Balogh, 1962 (Peru), O. papuanus Balogh, 1968 (New Guinea). The main diagnostic characters of the genus Orthozetes were summarized by Balogh (1962a, 1962b) and Balogh and Balogh (1988, 1992).

During taxonomic identification of microzetid mites from Ecuador we discovered a new species of the genus Orthozetes, which is described and illustrated below under the name Orthozetes bidentatus sp. n. This genus is recorded in Ecuador for the first time.

MATERIAL AND METHODS

The Orthozetes specimens (holotype and nine paratypes, all males) were collected by D. Sandmann in Southern Ecuador: 4°70’ S, 78°58’ W, Bombuscaro, Podocarpus National Park, 1050 m a.s.l., upper organic soil layer in mostly undisturbed rain forest, 01.04.2008.

Specimens were mounted in lactic acid on temporary cavity slides for measurement and illustration. All body measurements are presented in micrometers. The 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. Lengths of body setae were measured in lateral aspect. Formule for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (famulus included). Formule for leg solenidia are given in square brackets according to the sequence genu–tibia–tarsus. General terminology used in this paper follows that of Grandjean (1936a, 1936b), Engelbrecht (1972a, 1972b), and Norton and Behan-Pelletier (2009).

Description of Orthozetes bidentatus sp. n.

Figs 1–6

Diagnosis. Body size 200–221 × 151–164. Surface of prodorsum and notogaster smooth, surface of epimera I and narrow area next to the circumpedal carinae and next to the genital and anal plates striate. Rostrum protruding, truncated or with indistinct median cave. Distal-outer part of lamellae with two teeth. Rostral and lamellar setae with flagellate tip. Interlamellar setae long, setiform. Sensilli setiform, ciliate. Pteromorphs with tooth on anterior margin. Notogastral and anogenital (except longer g¹ and a¹) setae short.

Description. Measurements. Body length 205 (holotype), 200–221 (nine paratypes); notogastral width (without pteromorphs) 159 (holotype), 151–164 (nine paratypes).

Integument (Figs 1–3). Body color yellow-brownish. Surface of prodorsum and notogaster smooth. Interbothridial region with filamentous cerotegument. Posterior part of pteromorphs, lateral parts of lamella, epimera I, narrow area next to the circumpedal carinae and next to the genital and anal plates striate. Lateral sides of body microgranulate up to acetabula III and IV.

Prodorsum (Figs 1, 3, 4). Rostrum (visible in anterior or dorso-anterior view) protruding, thin, truncated or with indistinct median cave. Two lobed structures (s¹) present in anterior part of prodorsum. These are similar morphologically, finger-like, directed upwards, located dorso-laterally. Lamellae...
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wide, separated medially, but fused in basal part; their distal-outer part with one strong and one small
tooth, and their distal-inner part widely rounded.
Rostral setae (*ro*, 53–61) setiform, with flagellate
tip, barbed, inserted dorso-laterally on prodorsum.
Lamellar setae (*le*, 77–90) setiform, with flagellate
tip, indistinctly barbed, inserted on ventral side of
lamellae. Interlamellar setae (*in*, 61–65) present, seti-
form, thickened, barbed, inserted on lamellae.
Sensilli (*ss*, 90–98) setiform, thickened, with cilia
in dorsal side. Exobothridial setae (*ex*, 28–32) seti-
form, thin, slightly barbed. Tutoria (*tu*) with long
cusp, which is directed ventral.

Notogaster (Figs 1–3). Anterior margin distinct,
weakly convex. Pteromorphs pointed distally,
with tooth (*tp*) on anterior margin. Nine pairs of
short (4), setiform, smooth notogastral setae present.
All lyrifissures (*ia, im, ip, ih, ips*) positioned
in the typical arrangement for Microzetidae. Setae
*h*, inserted anteriorly to lyrifissures *im*. Opisthono-
tal gland openings (*gla*) located posteriorly to lyrifi-
sures *im*.

Gnathosoma. Typical for Microzetidae
(Grandjean 1936a; Engelbrecht 1972a, 1972b; Er-
milov, Anichkin 2011). Subcapitulum slightly lon-
ger than wide (53–57 × 49–53). Subcapitular setae

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Figs 1–4. *Orthozetes bidentatus* sp. n., adult: 1 — dorsal view; 2 — ventral view (subcapitular and palpal setae, and legs not shown); 3 — prodorsum, lateral view (gnathosoma and legs not shown); 4 — rostrum, dorso-anterior view.
Scale bars 50 μm (1–3); 20 μm (4).
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setiform, barbed: \( h \) and \( m \) (both 16) longer than \( a \) (12). Adoral setae \( (or_1, or_2) \) short (4–6), setiform, thin, smooth. Palps (41) with setation 0–2–1–3–9(+\( \omega \)). Solenidion setiform, not attached with eupathidium. Chelicerae (53) with two setiform, barbed setae: \( cha \) (28) longer than \( chb \) (16). Cheliceral tubercle (8) straight, blunt-ended.

Epimeral and lateral podosomal regions (Figs 2, 3). Epimeral setae setiform, smooth (1a, 1b, 1c, 2a) or barbed (all other). Lengths of setae: 1a, 1b, 1c, 2a, 4–8; 3a, 3b, 4a, 4b, 12–16; 3c, 4c, 24–28). Setae 3c inserted on pedotecta II; setae 4c inserted on discidia. Epimeral border IV well developed. Pedotecta I (Pd I) convex, covering acetabula I. Pedotecta II (Pd II) broad, rounded distally, partly covering acetabula II. Discidia (\( dl \)) large, triangular, blunt-ended. Circumpedal carina (\( cp \)) distinct.

Anogenital region (Fig. 2). Six pairs of genital setae setiform: \( g \) longest (10–16), slightly barbed; other short (10–12), thin, smooth. One pair of aggenital setae (ag, 12–16) setiform, slightly barbed. Two pairs of anal (\( an_1, an_2 \)) and three pairs of adanal (\( ad_1–ad_3, 4 \)) setae setiform, thin, smooth. Lyrifissures \( iad \) located in paraanal position.

Legs (Figs 5, 6). Typical for Microzetidae (Engelbrecht 1972b; Ermilov, Anichkin 2011). Formulae of leg setation and solenidia: I (1–5–3–4–19) [1–2–2], II (1–5–3–4–15) [1–1–2], III (2–3–1–3–15) [1–0–0], IV (1–2–2–3–12) [0–1–0]; homology of setae and solenidia indicated in Table. Setae barbed or with ventral spines (except smooth \( p, s \) on tarsus I). Setae \( p \) setiform on tarsus I, thorn-like on tarsi II–IV. Famulus short, setiform, straight. Solenidia \( \omega_1 \) on tarsus I, \( \omega_1, \omega_2 \) on tarsus II long, thickened, blunt-ended; other solenidia setiform, thin.

Type deposition. The holotype (ethanol) is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; six paratypes (ethanol) are deposited in the collection of the Siberian Zoological Museum, Novosibirsk, Russia; three paratypes (ethanol) are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

Etymology. The specific name “\( bidentatus \)” refers to two external teeth on the lamellae.

Comparison. The new species clearly differs from all known species of the genus Orthozetes by the presence of interlamellar setae (versus interlamellar setae absent in the other Orthozetes species) and the presence of two lateral lamellar teeth (versus with one tooth in the other Orthozetes species).

Remarks. The classification of genera in the family Microzetoidae is difficult because many characters used in diagnostics of genera are not apomorphic (for example, morphology and localization of prodorsal setae; direction and morphology of sensilli; presence or absence of some prodorsal setae; notogastral ornamentation). Due to the combination of generic characters, the new species is similar to the other species of the genus Orthozetes, however all Orthozetes species are
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Despite the lack interlamellar setae we tentatively include Orthozetes bidentatus sp. n. in Orthozetes because other morphological characters are similar (especially between the new species and two known species from New Guinea).

Also, due to the combination of generic characters, the new species is similar to the species of the genus Rugozetes Balogh, 1960 (Balogh 1960, 1962b; Balogh and Balogh 1988); however, known Rugozetes species possess phylliform interlamellar setae (it is a generic character of the genus).

The presence or absence of interlamellar setae as well as their morphologies are not apomorphic characters in Microzetoidea, therefore representatives of Orthozetes (including the new species) could possibly be included in the genus Rugozetes. Hence, further research on the taxonomic status of Orthozetes is needed.

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**REFERENCES**


**Table.**

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<td>(l), (v), φ₁, φ₂</td>
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Roman letters refer to normal setae (e to famulus), Greek letters to solenidia. Single prime (') marks setae on anterior and double prime (") setae on posterior side of the given leg segment. Parentheses refer to a pair of setae.