To the knowledge of the genus *Gephyrazetes* (Acari, Oribatida, Mochlozetidae)

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Abstract

The oribatid mite genus *Gephyrazetes* (Oribatida, Mochlozetidae) is recorded for the first time in the Ethiopian region; one new species is described from soil and litter of Korup National Park in Cameroon. *Gephyrazetes umukusumae sp. nov.* differs from *G. fasciatus* Hirauchi, 1999 by the larger body size, truncate lamellar cusps, setiform bothridial setae, very small notogastral porose areas, paraanal position of adanal lyrifissures, presence of four pairs of genital setae and tuberculate lateral parts of prodorsum, and absence of dorsosejugal and sublamellar porose areas. Revised generic diagnosis and the data on distribution and ecology of *Gephyrazetes* species are presented.

Key words: mochlozetid mites, systematics, generic diagnosis, morphology, new species, distribution, Ethiopian region.

Introduction

The oribatid mite genus *Gephyrazetes* (Acari, Oribatida, Mochlozetidae) is monotypic, the single known species, *Gephyrazetes fasciatus* was proposed by Hirauchi (1999) as a representative of the family Ceratozetidae, known only from Japan (Hirauchi 1999).

Among the material collected from Korup National Park of Cameroon, we found one new species of *Gephyrazetes*; hence, the genus is registered in the Ethiopian region for the first time. The main goal of this paper is to describe and illustrate a new species, revise generic diagnosis and give information on distribution and ecology of *Gephyrazetes*. This work is part of our study on the oribatid fauna of Cameroon (e.g. Ermilov & Koehler 2017).

Material and Methods

Material examined: *Gephyrazetes umukusumae sp. nov.* (holotype, female; one paratype, female): Cameroon, South-West Province, Korup National Park, Rengo Camp, about 8 km NW of Mundemba, latitude 05°02′11.64″N, longitude 08°49′45.96″E, altitude 300 m, litter and soil sifting sample, 12–16.V.2006 (V.V. Grebennikov).
Methods: Specimens were mounted in lactic acid on temporary cavity slides for measurement and illustration. 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 in dorsal aspect. Lengths of body setae were measured in lateral aspect. All body measurements are presented in micrometers. Formulas for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (famulus included). Formulas for leg solenidia are given in square brackets according to the sequence genu–tibia–tarsus. Morphological terminology used in this paper follows that of F. Grandjean: see Travé & Vachon (1975) for references, Norton (1977) for leg setal nomenclature, and Norton & Behan–Pelletier (2009), for overview. Drawings were made with a camera lucida using a Leica transmission light microscope “Leica DM 2500”.

The following abbreviations were used on the figures: ro, le, in, bs, ex – rostral, lamellar, interlamellar, bothridial and exobothridial setae, respectively; Al – sublamellar porose area; Am+Ah – humeral porose areas; D – dorsophragma; P – pleurophragma; c, la, lm, lp, h, p – notogastral setae; Aa, A1, A2, A3 – notogastral porose areas; ia, im, ip, ih, ips – notogastral lyrifissures; gla – opisthontal gland opening; h, m, a – subcapitular setae; or – adoral seta; v, l, d, cm, acm, ul, sul, vt, lt – pulp setae; cha, chb – cheliceral setae; Tg – Trägårdh’s organ; Pd I, Pd II – pedotecta I, II, respectively; 1a, 1b, 1c, 2a, 3a, 3b, 3c, 4a, 4b, 4c – epimeral setae; cus – custodium; dis – discidium; cp – circumpedal carina; g, ag, an, ad – genital, aggenital, anal and adanal setae, respectively; iad – adanal lyrifissure; p.o. – preanal organ; Tr, Fe, Ge, Ti, Ta – trochanter, femur, genu, tibia, tarsus, respectively; p.a. – leg porose area; ω, σ, φ – solenidia; ε – leg famulus; v, ev, bv, l, d, ft, tc, it, p, u, a, s, pv, pl – leg setae.

The following abbreviations of collections were used: SMNH – Senckenberg Museum of Natural History, Görlitz, Germany; TSUMZ – Tyumen State University Museum of Zoology, Tyumen, Russia.

Revised generic diagnosis

Genus Gephyrazetes Hirauchi, 1999
Type species: Gephyrazetes fasciatus Hirauchi, 1999


Juvenile instars. Not known.

Description of new species

Gephyrazetes umukusuma sp. nov. (Figs 1–11)
https://zoobank.org/urn:lsid:zoobank.org:act:540B3192-017E-408D-879A-F0546DC6BFFF


Figure 1. Gephyrazetes umukusumae sp. nov., adult: Dorsal view (legs not illustrated). Scale bar 100 μm

Description. Measurements. Body length: 1045 (holotype, female), 1095 (paratype, female); notogaster width: 863 (holotype), 830 (paratype).

Integument (Fig. 3). Body color brown. Surface microporose, lateral sides of prodorsum close to lamellae densely tuberculate (diameter of tubercles up to 8).


Notogaster (Figs 1–4). Pteromorphs well developed, broadly rounded laterally. Four pairs of porose areas very small, rounded, similar in diameter (8), with distinct borders. Fourteen pairs of notogastral setae \((c_2, la, 118–127; \text{others, } 77–86)\) setiform, thin, smooth. All lyrifissures and opisthonthal gland opening clearly visible, \(ips\) and \(lh\) slightly distanced from each other.
**Figure 2.** Gephyrazetes umukusumae sp. nov., adult: Ventral view (gnathosoma and legs not illustrated). Scale bar 100 μm


**Epimeral and lateral podosomal regions** (Figs 2, 3). Humeral porose areas Am and Ah fused, diffuse, poorly visible, elongate oval. Custodia present, strong, elongate and narrowly triangular. Discidia triangular. Circumpedal carinae connected to custodia. Epimeral setae setiform, slightly barbed, 3b, 3c, 4c (102–110) longer than 1b, 1c, 4a, 4b (61–65) and 1a, 2a, 3a (36–41).

**Anogenital region** (Figs 2–4). Four pairs of genital (36–41), one pair of aggenital (36–41), two pairs of anal (57–61) and three pairs of adanal (57–65) setae setiform, thin, slightly barbed. Adanal lyrifissure locate close and parallel to anal plates. Setae ad3 inserted anterior to iad. Marginoventral porose area complete, band-like.
Figures 3–7. Gephyrazetes umukusumae sp. nov., adult: 3 – anterior part of body, lateral view (gnathosoma and legs not illustrated); 4 – posterior part of body, lateral view; 5 – subcapitulum, ventral view; 6 – palp, right, antiaxial view; 7 – anterior part of chelicera, right, antiaxial view. Scale bars 100 μm (3, 4), 40 μm (5), 20 μm (6), 30 μm (7).
Figures 8–11. Gephyrazetes umukusumae sp. nov., adult: 8 – leg I, without trochanter and basal part of femur, right, antiaxial view 9 – femur (without basal part) and genu of leg II, right, antiaxial view; 10 – trochanter, femur and genu of leg III, left, antiaxial view; 11 – leg IV (tibial solenidion broken), left, antiaxial view. Scale bar 50 μm.
Table 1. Leg setation and solenidia of Gephyrazetes umukusumae sp. nov.

<table>
<thead>
<tr>
<th>Leg</th>
<th>Tr</th>
<th>Fe</th>
<th>Ge</th>
<th>Ti</th>
<th>Ta</th>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>v’</td>
<td>d, (l), bv”, v”</td>
<td>(l), v’, σ</td>
<td>(l), (v), φ₁, φ₂</td>
<td>(ft), (tc), (it), (p), (u), (a), s, (pv), v’, (pl), l”, ε, ω₁, ω₂</td>
</tr>
<tr>
<td>II</td>
<td>v’</td>
<td>d, l’, bv”; v”</td>
<td>(l), v’, σ</td>
<td>(l), (v), φ</td>
<td>(ft), (tc), (it), (p), (u), (a), s, (pv), ω₁, ω₂</td>
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<tr>
<td>III</td>
<td>l’, v’</td>
<td>d, l’, ev’</td>
<td>l’, σ</td>
<td>l’, (v), φ</td>
<td>(ft), (tc), (it), (p), (u), (a), s, (pv)</td>
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<tr>
<td>IV</td>
<td>v’</td>
<td>d, ev’</td>
<td>d, l’</td>
<td>l’, (v), φ</td>
<td>ft”, (tc), (u), (a), s, (pv)</td>
</tr>
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</table>

Roman letters refer to normal setae, Greek letters refer to solenidia (except ε – famulus). One apostrophe (’) marks setae on anterior and double apostrophe (”’) setae on posterior side of the given leg segment. Parentheses refer to a pair of setae.

Legs (Figs 8–11). Median claw thicker than laterals, all barbed on dorsal side; lateral claws each with small tooth ventrodistally. Trochanters III and IV without teeth anterodorsally. Formulas of leg setation and solenidia: I (1–5–3–4–20) [1–2–2], II (1–5–3–4–15) [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. Solenidia ω₁ on tarsi I, ω₀ on tarsi II and σ on genua III bacilliform, other solenidia setiform. Famulus of tarsi I short, erect, dilated distally, inserted posterior to solenidion ω₂.

Type deposition. The holotype (in ethanol with drop of glycerol) is deposited in SMNH. The paratype (in ethanol with drop of glycerol) is deposited in TSUMZ.

Etymology. The species name is dedicated to the well-known acarologist Dr. Umukusum Ya. Shtanchaeva (Universidad Complutense de Madrid, Madrid, Spain), to acknowledge her extensive contributions to our knowledge of oribatid mites.

Remarks. The known species of Gephyrazetes–G. umukusumae sp. nov. and G. fasciatus Hirauchi, 1999–can be distinguished by morphological traits listed in Table 2.

Table 2. Morphological differences between Gephyrazetes umukusumae sp. nov. and G. fasciatus Hirauchi, 1999.

<table>
<thead>
<tr>
<th>Character</th>
<th>G. umukusumae sp. nov.</th>
<th>G. fasciatus Hirauchi, 1999</th>
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<tbody>
<tr>
<td>Body size</td>
<td>1045–1095 × 830–863</td>
<td>440–490 × 300–333</td>
</tr>
<tr>
<td>Lamellar cusps</td>
<td>Truncate</td>
<td>With lateral tooth</td>
</tr>
<tr>
<td>Bothridial setae</td>
<td>Setiform</td>
<td>Fusiform</td>
</tr>
<tr>
<td>Notogastral porose areas</td>
<td>Very small</td>
<td>Normal in size</td>
</tr>
<tr>
<td>Number of genital setae</td>
<td>Four pairs</td>
<td>Five pairs</td>
</tr>
<tr>
<td>Position of adanal lyrifissures</td>
<td>Paraanal</td>
<td>Preanal</td>
</tr>
<tr>
<td>Dorsosejugal porose areas</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Sublamellar porose areas</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Tubercles lateral to lamellae</td>
<td>Present</td>
<td>Absent</td>
</tr>
</tbody>
</table>

Distribution and ecology of Gephyrazetes

At present, both species of Gephyrazetes have restricted distributions and are known only from their type localities. Gephyrazetes fasciatus was recorded from litter and soil of Betula ermanii forest in the Tanbo-daira, Tyoama Prefecture in Japan. Gephyrazetes umukusumae sp. nov. is found from litter and soil of Korup National Park in Cameroon.

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References


