A new species of the subgenus *Scheloribates* (*Topobates*) (Acari: Oribatida: Scheloribatidae) from Panama  

Новый вид подрода *Scheloribates* (*Topobates*) (Acari: Oribatida: Scheloribatidae) из Панамы

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**Abstract.** The oribatid mite subgenus *Scheloribates* (*Topobates*) Grandjean, 1958, is recorded from the Neotropical region for the first time. A new species of this subgenus is described from the leaf litter collected in Cayo Agua Island, Panama. *Scheloribates* (*Topobates*) *panamaensis* sp. nov. differs from its related species by the very large body size and presence of a strong ventrodistal process on the leg femora II–IV.

**Резюме.** Подрод панцирных клещей *Scheloribates* (*Topobates*) Grandjean, 1958, впервые зарегистрирован в Неотропической области. Новый вид этого подрода описан из лесной подстилки острова Кайо-Агуа (Панама). *Scheloribates* (*Topobates*) *panamaensis* sp. nov. отличается от похожих видов очень большим размером тела и наличием сильного вентродистального выступа на бедрах ног II–IV.

**Key words:** oribatid mites, taxonomy, morphology, Neotropical region, *Scheloribates*, *Topobates*, Scheloribatidae, new species

**Ключевые слова:** панцирные клещи, таксономия, морфология, Неотропическая область, *Scheloribates*, *Topobates*, Scheloribatidae, новый вид

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**Introduction**

*Topobates* (Oribatida: Scheloribatidae) was proposed by Grandjean (1958) with *Topobates granifer* Grandjean, 1958 as type species. Later, Weigmann & Miko (1998) proposed a subgeneric status for this genus, however, some acarologists continue to maintain the independence of the generic status (Subías, 2004, updated 2020; Mahunka & Mahunka-Papp, 2009). The subgenus comprises 25 species, which are distributed in the Palaearctic, Ethiopian, Oriental and Australian regions (Subías, updated 2020). The main subgeneric traits were summarised by Grandjean (1958) and Weigmann & Miko (1998). Identification keys for some species of *Scheloribates* (*Topobates*) were presented by Weigmann & Miko (1998), Mahunka & Mahunka-Papp (2009) and Balogh & Balogh (2002).

Saporito et al. (2007) presented several unidentifed oribatid mite taxa from Panama and Costa Rica. During taxonomic study of these species, I found a new species belonging to *Scheloribates* (*Topobates*) (designated as “genus near *Megasheloribates* sp.” in Saporito et al., 2007). It is the first record of the subgenus in the Neotropical region. The main goal of my paper is to describe and illustrate this new species.

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Material and methods

Specimens. The specimens of the new species were received from the personal collection of Prof. Dr. Roy A. Norton (State University of New York, Syracuse, U.S.A.). They are deposited in two institutions, the National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A. (currently housed with the U.S. Department of Agriculture collections in Beltsville, Maryland) (USNM), and the Tyumen State University Museum of Zoology, Tyumen, Russia (TSUMZ). The collection locality and habitat information are given in the Material examined section.

Observation and documentation. Specimens were mounted in lactic acid on temporary cavity slides for measurement and illustration. Body length was measured in dorsal view, from the tip of the rostrum to the posterior edge of the notogaster. Notogastral width refers to the maximum width of the notogaster in dorsal view. 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.

Drawings were made with a camera lucida using a transmitted light microscope Leica DM 2500.

Terminology. Morphological terminology used in this paper follows that of Grandjean: see Travé & Vachon (1975) for references; Norton (1977) for leg setal nomenclature; and Norton & Behan-Pelletier (2009) for overview.

Abbreviations. Prodorsum: lam = lamella; plam = prolamella; slam = sublamella; Al = sublamellar porose area; kf = keel-shaped ridge; ro, le, in, bs, ex = rostral, lamellar, interlamellar, bothridial, and exobothridial setae, respectively; bo = bothridium; Ad = dorsosejugal porose area; D = dorsosejugal; P = pleurophragma. Notogaster: c, da, dm, dp, la, lm, lp, h, p = notogastral setae; Sa, S1, S2, S3 = sacculi; ia, im, ip, ih, ips = lyrifissures; gla = opisthontal gland opening. Gnathosoma: a, m, h = subcapitular setae; or = adoral setae; d, l, cm, acm, ul, su, lt, vt = palp setae; ω = palp solenidion; cha, chb = cheliceral setae; Tg = Trágárdh’s organ. Epimeral and lateral podosomal regions: 1a, 1b, 1c, 2a, 3a, 3b, 3c, 4a, 4b, 4c = epimeral setae; Am, Ah = humeral porose areas; Pdl, PdII = pedotecta I and II, respectively; dis = discidium; cpc = circumpedal carina. Anogenital region: g, ag, an, ad = genital, aggenital, anal, and adanal setae, respectively; iad = adanal lyrifissure; Amar = marginal porose area; po = preanal organ. Legs: Tr, Fe, Ge, Ti, Ta = leg trochanter, femur, genu, tibia, and tarsus, respectively; trp = trochanteral process; fep = femoral process; pa = leg porose area; φ, σ, ω = leg solenidia; c = leg famulus; d, l, v, ev, bv, ft, tc, it, p, u, a, s, pv, pl = leg setae.

Taxonomy

Suborder Oribatida Duges, 1834
Superfamily Oripodoidea Jacot, 1925
Family Scheloribatidae Grandjean, 1933
Genus Scheloribates Berlese, 1908
Subgenus Scheloribates (Topobates) Grandjean, 1958

Scheloribates (Topobates) panamaensis sp. nov.
(Figs 1–10)


Paratypes. Two females (in ethanol with a drop of glycerol), same data as for holotype (TSUMZ).


Description. Measurements. Body length: 929 (holotype, male), 1045, 1062 (two paratypes, two females); notogaster width: 763 (holotype), 879, 898 (two paratypes).

Figs 1–3. Scheloribates (Topobates) panamaensis sp. nov., adult. 1, dorsal view; 2, ventral view (gnathosoma and legs not shown); 3, lateral view (gnathosoma and legs not shown). Scale bar: 200 μm.
Figs 4–10. Scheloribates (Topobates) panamaensis sp. nov., adult. 4, subcapitulum, ventral view; 5, palp, left, paraxial view; 6, chelicera, right, antiaxial view; 7, leg I, right, antiaxial view; 8, leg II, without tarsus, right, antiaxial view; 9, leg III, without tarsus, left, antiaxial view; 10, leg IV, left, antiaxial view. Scale bars: 50 μm (4, 6–10), 20 μm (3).
Table 1. Scheloribates (Topobates) panamaensis sp. nov., leg setation and solenidia of adult mite.

<table>
<thead>
<tr>
<th>Leg</th>
<th>$Tr$</th>
<th>$Fe$</th>
<th>$Ge$</th>
<th>$Ti$</th>
<th>$Tu$</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>$v'$</td>
<td>$(l, b v''$, $v''$)</td>
<td>$(l), (v), \varphi_1, \varphi_2$</td>
<td>$(f t, (c), (i t), (p), (u), (a), s, (p v), v', (p l), \psi, \omega_1, \omega_2$</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>$v'$</td>
<td>$(l, (l), \varphi$</td>
<td>$(l), (v), \varphi$</td>
<td>$(f t, (c), (i t), (p), (u), (a), s, (p v), \omega_1, \omega_2$</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>$v', l'$</td>
<td>$d, l', (e v'$</td>
<td>$l', (v), \varphi$</td>
<td>$(f t, (c), (i t), (p), (u), (a), s, (p v)$</td>
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<tr>
<td>IV</td>
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<td>$d, l'$</td>
<td>$l', (v), \varphi$</td>
<td>$(f t'', (c), (p), (u), (a), s, (p v)$</td>
</tr>
</tbody>
</table>

Note. Roman letters refer to normal setae, Greek letters to solenidia (except $\varepsilon = \text{famulus}$). Single quotation mark (’) designates setae on the anterior and double quotation mark (””) setae on the posterior side of a given leg segment. Parentheses refer to a pair of setae.


Gnathosoma. Subcapitulum longer than wide (188–205 × 155–164). All subcapitular setae setiform, slightly barbed; $h$ (57–61) longer than $m$ (20) and $a$ (36–41); $m$ thinnest. Adoral seta (20) setiform, barbed. Palp (114–123) with typical setation 0-2-1-3-9 (+$\omega$). Postpalpal seta (8) spiniform, smooth. Chelicera (205–225) with two setiform, barbed setae (cha: 57–65; chb: 36–45). Trægårdh’s organ elongate triangular.

Epimeral and lateral podosomal regions. With typical epimeral formula (3-1-3-3). All epimeral setae (1a, 2a, 3a, 4b: 32–41; 1c, 3b, 4a: 45–53; 1h, 3c, 4c: 61–69) setiform, thin, roughened. Humeral porose areas $Am$ and $Ah$ elongate oval, poorly visible. Pedotecta I and II represented by small lamina. Discidium broadly rounded. Circumpedal carina comparatively very short.

Anogenital region. Four pairs of genital ($g_1$: 41–53; others: 32–41), one pair of aggenital (32–41), two pairs of anal (45–53) and three pairs of adanal (45–53) setae setiform, thin, roughened. Adanal lyrifissure distinct. Marginal porose area band-like, complete. Preanal organ goblet-like. Ovipositor elongate (323 × 94), blade (118) shorter than length of distal section (beyond middle fold; 205). Each of the three blades with four smooth setae, $\psi_1 \approx \tau_1$ (69) setiform, $\psi_2 \approx \tau_2 \approx \tau_b \approx \tau_c$ (32) narrowly thorn-like. Six coronal setae (4) spiniform.

Leg. Median claw distinctly thicker than lateral claws, all barbed on dorsal side. Lateral claw with minute tubercle ventrodistally. Tibiae I and II with slightly developed tubercle ventroproximally. Femora II–IV with triangular process ventrodistally. Trochanter III with triangular process posteriorly. Typical ventroproximal and ventrodistal porose area well visible on each tarsus and each tibia, respectively. All femora with dorso-paraxial porose area. Formulas 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. Famulus of tarsus I short, erect, slightly dilated and blunt distally, inserted posterior to solenidion $\omega_1$. Solenidion $\omega_1$ on tarsus I, $\omega_1$ and $\omega_2$ on tarsus II and $\sigma$ on genu III slightly bacilliform, other solenidia setiform.

Comparison. Scheloribates (Topobates) panamaensis sp. nov. is morphologically most similar to S. (T) tanzanicus (Mahunka, 1993) from Tanzania (see Mahunka, 1993) and S. (T) ultraforaminosus (Lee & Pajak, 1988) from Australia (see Lee & Pajak, 1988) in having spindle-form bothridial seta and 14 pairs of short notogastral...
sae. However, the new species differs from its related species by the presence of very large body length (929–1062 versus 452–512 in \( S. (T) \) \textit{tanzanicus} and 515–586 in \( S. (T) \) \textit{ultraforaminosus}) and strong ventrodistal process on leg femora II–IV (versus femoral process absent in \( S. (T) \) \textit{tanzanicus} and \( S. (T) \) \textit{ultraforaminosus}).

**Etymology.** The species name \textit{panamaensis} refers to the country, Panama, where the new species was collected.

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**References**


