INTRODUCTION

As part of scientific expeditions performed in natural and disturbed ecosystems in surroundings of manganese tailing sites in Chiatura region of western Georgia and natural open arid woodlands in Mtskheta surroundings, Eastern Georgia, two new species of oribatid mites were found. They belong to genera Scutovertex Michael, 1879 and Haplozetes Willmann, 1935.

The family Scutoverticidae Grandjean, 1954 envelops nine genera with 72 species (Schatz et al. 2011), while Scutovertex comprises 30 species worldwide (Subías 2004, with electronic update 2011). They are known to inhabit different types of habitats from marine littoral to alpine zone (Willmann 1953; Pfingstl et al. 2009; Pfingstl et al. 2010). In Georgia three species of this genus are registered (Shtanchaeva and Subías 2010); they are found frequently, but in low densities in various types of ecosystems including wetlands and arid habitats (unpublished data).

In the family Haplozetidae Grandjean, 1931, 57 genera are registered with 368 species (Schatz et al. 2011). Haplozetes longisacculus Murvanidze et Weigmann, sp. n. is discussed and the main characters of similar Scutovertex species are compared.

MATERIAL AND METHODS

Material of Haplozetes longisacculus sp.n. was collected in January and July 2011 in manganese mine tailing sites of the Chiatura region. Scutovertex armazi sp.n. was collected in June 2010 in open arid woodland with Carpinus orientalis and Paliurus spina-christi on the Armazi Mountain in Mtskheta region. Specimens were extracted from substrates by modified Berlese-Tullgren apparatus, then stored in alcohol and studied in lactic acid in an open hollow-ground microscope slide. The terminology of morphological structures and construction of setal formulae follow Weigmann (2006).

SYSTEMATICS

Family Haplozetidae Grandjean, 1931

Genus Haplozetes Willmann, 1935

Haplozetes longisacculus Murvanidze et Weigmann, sp. n.

Figs 1–2

Description. Diagnosis. Body length 405–460 µm. Four pairs of genital setae; legs with three claws. Sensillus head longish fusiform, barbed; tutorium with small distal tooth, reaching insertion of rostral seta. Notogastral setae fine, smooth, length up to 38 µm; sacculi tube-shaped, without bifurcation, Sa very long (~20 µm); other pairs of sacculi shorter (10–15 µm). Lyrifissures well developed (Fig. 1A).

Prodorsum. Lamella without distal dens. Prodorsal setae slightly barbed, Interlamellar and lamellar setae of 60 µm, rostral seta of about 50 µm long (Fig. 1A). Sensillus moderately long (about 60 µm), stalk short, head longish fusiform, barbed (Fig. 1B). Tutorium narrow, with small distal tooth, reaching insertion of rostral seta (Fig. 2A).

Notogaster. Pteromorph large, triangular, bent ventrally. Ten pairs of notogastral setae, fine and smooth, 10 to 38 µm long, c₁ longest, p-setae shortest. All sacculi tube-shaped without distal bifurcation or widening, Sa very long (~20 µm); other pairs of sacculi shorter (10–15 µm). Lyrifissures well developed (Fig. 1A).
Ventral region. Epimeral formula: 3–1–3–3, epimeral setae slightly barbed. Discidium rounded. Four pairs of short, smooth genital setae (maximal 10 µm). Anogenital formula: 4g–1ag–2an–3ad (Fig. 2B).

Legs. All legs with three claws.

Type material. One holotype and five paraatypes were collected in January 2011 and July 2011 from the soil of post-industrial dumps at the sand tailing sites in the village of Darkvety (western Georgia), which lies in the manganese mining area of the Chiatura region (Western Georgia). At sampling site no vegetation is developed. 42.32662°N, 43.32298°E, 625 m altitude. The holotype and two paratypes in 70% alcohol are deposited in the personal collection of M. Murvanidze (No: VIII-55 and VIII-56 respectively); three paratypes in 70% alcohol are deposited in the collection of Free University (Berlin).

Etymology. The species name longisacculus refers to the very long sacculi Sa.

Discussion. There is some small possibility that the Caucasian species Scheloribates longiporosa Kuljiev from litter and humus of Hyrcan forests of Talysh, Azerbaijan is the same as ours. The description (Kuljiev 1968) is incomplete, without ventral and lateral characters; but the presence of long, tube-shaped sacculi is mentioned and illustrated. Scheloribates longiporosa obviously does not belong to Scheloribates, and in the checklist of oribatid mites of the Caucasus (Shtanchaeva and Subías 2010), it is considered a junior synonym of Haplozetes elegans Kunst, 1977. We consider this synonymy very implausible because of different shapes of sacculi and sensillus. We cannot preclude the identity of Haplozetes longisacculus n. sp. with S. longiporosa but as far we know, no type material is available for the latter and it has been regarded as a species dubia or inquirenda (Subías
Diagnostic characters of *Haplozetes* species with character combination: four pairs of genital setae; tridactylous legs; tube-shaped notogastral sacculi (measures in µm)

<table>
<thead>
<tr>
<th></th>
<th>longisacculus</th>
<th>atlanticus</th>
<th>brevisetosus</th>
<th>canariensis</th>
<th>depilis</th>
<th>elegans</th>
<th>tenuifusus*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body width</td>
<td>215–255 (slender)</td>
<td>~390 (broad)</td>
<td>262–281 (broad)</td>
<td>143–160 (slender)</td>
<td>200–210 (slender)</td>
<td>245–295 (broad)</td>
<td>310–360 (broad)</td>
</tr>
<tr>
<td>Sensillus shape</td>
<td>± long, head fusiform</td>
<td>long stalk, head fusiform</td>
<td>± long, head elongateoval</td>
<td>± long, head fusiform</td>
<td>± long, head fusiform</td>
<td>very long stalk, head lanceolate</td>
<td>very long stalk, head slender fusiform</td>
</tr>
<tr>
<td>Notogastral sacculi</td>
<td>Tube-shaped, Sa, S3 tube-shaped; S1, S2 sack-like</td>
<td>long tube-shaped, distally widened or bifurcate</td>
<td>tube-shaped, long stalk, head fusiform</td>
<td>tube-shaped, very long stalk, head fusiform</td>
<td>tube-shaped, large distal widening</td>
<td>tube-shaped, distally widened, S2 bifurcate</td>
<td>tube-shaped, very long</td>
</tr>
</tbody>
</table>


*Haplozetes longisacculus* sp. n. belongs to *Lauritzenia (Incabates)* in the sense of Gil and Subías (1993) and Subías (2004) characterized by four pairs of genital setae and legs with three claws. We prefer the conservative taxonomy discussed in Weigmann (2010), leaving such species in the genus *Haplozetes*. 18 species of *Haplozetes* belonging to the species group "*Lauritzenia (Incabates)*" are listed by Subías (2004) described worldwide; four of these species are reported for the Caucasus region by Shtanchaeva and Subías (2010): *Haplozetes elegans* Kunst, 1977(a questionable Caucasian report, refering to *S. longiporusa* Kuliev, see above); *H. nudus* (Hammer, 1961); *H. pallidus* (Mihelcic, 1956); *H. tenuifusus* (Berlese, 1916).

*Haplozetes nudus*, originally described from Peru as *Incabates n.*, differs from *H. longisacculus* sp. n. by a short globular sensillus head (Hammer 1961); *H. pallidus*, originally described from Spain, differs by a short club-shaped sensillus, sack-like sacculi and smaller body size (Mihelcic 1956; Pérez-Iñigo 1993); *H. tenuifusus* (re-described by Kunst 1977; Mahunka and Mahunka-Papp 1995), originally described from Italy, differs by a long-stalked sensillus with slender fusiform head.

Further Palaearctic species of this *Haplozetes* group exhibit various differences with *H. longisacculus* n. sp. Table 1 presents diagnostic characters of only those species with tube-shaped notogastric sacculi: *Haplozetes atlanticus* Pérez-Iñigo et Peña, 1996(a) (Canary Islands); *H. brevisetosus* Bayartogtokh, 2010 (Mongolia); *H. canariensis* Pérez-Iñigo et Peña, 1997 (Canary Islands); *H. depilis* Pérez-Iñigo et Peña, 1996(b) (Canary Islands); *H. elegans* Kunst, 1977 (Czech Republic; Holarctic); *H. tenuifusus* (Berlese, 1916) (Italy, Europe). For further details see Berlese 1916; Kunst 1977; Pérez-Iñigo and Peña 1996a, 1996b, 1997; Bayartogtokh 2010.

**Family Scutoverticidae Grandjean, 1954**

*Genus Scutovertex* Michael, 1879

*Scutovertex armazi* Murvanidze et Weigmann

*Sp. n.*

*Figs 3–4*

**Description.** Body length 515 µm. Cuticle light yellowish brown. Notogastral sculpture with scattered nodules, covered by granular cuticle. Lamellar cusp longer than broad, with well developed translamellar line; lamellar and rostral setae moderately long (about 30 µm). Tutorium in form of V-shaped ridges; distinct transverse ridge on rostrum anterior to translamella. Nine pairs of short, pointed notogastral setae, inserted on small tubercles. **Mentum with transverse ridge.**

**General characters.** Length 515 µm, width 360 µm (one male). Light yellowish brown, weakly sclerotized.

**Prodorsum.** Rostrum rounded, anterior edge thickened, transverse ridge below translamella.
distinctly protruding (Fig. 4A). Cusp of lamella moderately developed, slightly longer than wide, with translamella; Lamellar and rostral setae moderately long (about 30 µm), bent mediad, finely barbed; interlamellar seta absent. Median interlamellar ridge Y-shaped, formed by nodules; transverse ridge anterior to lenticulus weakly developed (Fig. 3). Sensillus slender clavate, barbed. Tutorium V-shaped, formed by two ridges at acute-angle to each other (Fig. 4A).

**Notogaster.** Humeral (pteromorphal) process formed as very slender blade. Lenticulus large, oval, surrounded by nodules. Notogastral sculpture with scattered nodules, covered by granular cerotegument. **Nine pairs of short pointed notogastral setae** inserted on obvious small tubercles, seta la largest (about 13 µm), p2 and p3 smallest. All five normal pairs of lyrifissures present: small ia on nodule below humeral process (seen in lateral view); lyrifissures im, ip visible in dorsal aspect, large and on longitudinal tubercles. Sacculi S1 and S2 small, S3 not found (Fig. 3A).

**Ventral region.** Transverse ridge of mentum distinct (Fig. 4C). Epimeral formula 3–1–2–2. Anogenital formula 5g–1ag–2an–3ad; two anterior genital setae side-by-side (Fig 4B); aggenital seta minute, spiniform; adanal setae short, about 5–7 µm.

**Type material.** A single male specimen (the holotype) was collected from Armazi Mountain in the Mtskheta region (Eastern Georgia). 41.830°N, 44.700°E, 530 m altitude. It was found in soil of xerophilous open arid forest with predominance of *Carpinus orientalis* Mill. and *Paliurus spinachristi* Mill. It was collected in June 2010 by Prof. Arni. Gegechkori and PhD student Nana Mosia. The holotype is preserved in alcohol in the personal collection of M. Murvanidze.

**Etymology.** The species name *armazi* refers to Armazi Mountain, where the holotype was found.

**Discussion.** Currently there are 30 species of *Scutovertex* described worldwide (Subías 2004, with electronic update 2011). Seven species have been registered in the Caucasus region (Shtanchaeva and Subías 2010). Shtanchaeva and Netuzhilin (2003) presented a list with 33 known species of *Scutovertex*, but currently 12 of them have been assigned to other genera (Subías 2004, with electronic update 2011).

Four species of *Scutovertex* – *S. alpinus*, Willmann, 1953; *S. mikoi*, Weigmann, 2009; *S. pileatus*, Schäffer, Krisper, Pfingstl et Sturmbauer, 2008; *S. punctatus*, Sitnikova, 1975 — are similar to *S. armazi* n.sp. by having the following characters: (1) small body length (<520 µm); (2) Y-shaped interlamellar ridge and (3) weakly developed translamella. These species differ from *S. armazi* n.sp. by other relevant characters, as discussed below and summarized in Table 2.

According to the redescription by Pfingstl et al. (2010), the body length of the studied specimens of *S. alpinus* varies between 477 and 527 µm; a specimen deposited in the collection of Schweizer is 558 µm long (Pfingstl et al 2010). Weigmann (2006) indicated a body length of 550–630 µm, including the length of a studied specimen with 555 µm from North-East Germany and the original description of Willmann (1953) indicating the body length as 630 µm. The notogastral cuticula sculpture consists of foveae, whereas that of *S. armazi* is formed by scattered nodules and is covered by granular cerotegument. *Scutovertex*
Two new species of oribatid mites from Georgia

**Scutovertex armazi** has five pairs of genital setae, whereas *S. alpinus* has six pairs.

**Scutovertex mikoi** is most similar to *S. armazi* n.sp. with regard to the light body colour, presence of nine pairs of notogastral setae and the type of notogastral sculpture (Weigmann 2009), but it is smaller (body length 387–445 µm), has short lamellar cusps and the tutorium is arched, rather than V-shaped as in *S. armazi* n.sp. Notogastral seta *h₁* of *S. mikoi* is slightly widened, whereas all nine pairs of *S. armazi* are of similar pointed shape.

In contrast to *S. armazi* n.sp., **Scutovertex pileatus** is dark brown, with strongly developed cerotegument and thick nodes around the lenticulus. The number of notogastral setae varies between 10–11 pairs and the number of genital setae pairs is six (Schäffer et al. 2008).

**Scutovertex punctatus** is different from *S. armazi* n.sp. in several characters (Sitnikova 1980):

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**Table 2. Characters of selected Scutovertex species**

<table>
<thead>
<tr>
<th></th>
<th>armazi sp. n.</th>
<th>alpinus</th>
<th>mikoi</th>
<th>pileatus</th>
<th>punctatus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body color</td>
<td>light brown</td>
<td>dark brown</td>
<td>light brown</td>
<td>dark brown</td>
<td>dark brown</td>
</tr>
<tr>
<td>Tutorium</td>
<td>V-shaped</td>
<td>V-shaped</td>
<td>arched ridge</td>
<td>V-shaped</td>
<td>?</td>
</tr>
<tr>
<td>Notogastral</td>
<td>scattered</td>
<td>covered by granular</td>
<td>small nodule,</td>
<td>strong cerotegument and thick</td>
<td>roughly granulated,</td>
</tr>
<tr>
<td>sculpture</td>
<td>nodules,</td>
<td>cerotegument</td>
<td>covered by granular</td>
<td>nodes around the</td>
<td>forming dark spots</td>
</tr>
<tr>
<td></td>
<td>covered by</td>
<td>cerotegument</td>
<td>cerotegument</td>
<td>lenticulus</td>
<td></td>
</tr>
<tr>
<td>Pairs of ng setae</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Shape of ng setae</td>
<td>smooth, erect</td>
<td>smooth, erect</td>
<td>smooth, <em>h₁</em> slightly widened</td>
<td>smooth, erect</td>
<td>partly broadened,</td>
</tr>
<tr>
<td>Pairs of genital setae</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

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Fig. 4. Scutovertex armazi sp. n. A — prodorsum, lateral aspect; B — genital plate; C — mentum of subcapitulum. Abbreviation: tut — tutorium. Scale bar 100 µm.
with thick cuticle and “well developed tut- torium” (with no distinct tuttorium characters described); with 10 pairs of notogastral setae, three posterior pairs broadened and barbed; with six pairs of genital setae.

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