

**TWO NEW SPECIES OF ORIBATID MITES (ACARI, ORIBATIDA)  
HAPLOZETES LONGISACCULUS AND SCUTOVERTEX ARMAZI  
FROM GEORGIA (CAUCASUS)**

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**ABSTRACT.** Two new species of oribatid mite, one each from the genera *Haplozetes* and *Scutovertex*, are described based on adult specimens. The *H. longisacculus* n. sp. specimens were found in manganese mining areas of Chiatura region (Western Georgia) and one individual of *S. armazi* n. sp. was found in open arid woodlands in Mtskheta surroundings (Eastern Georgia). Systematic placement of *H. longisacculus* n. sp. is discussed and the main characters of similar *Scutovertex* species are compared.

**KEY WORDS:** Acari, Oribatida, new species, mining sites, open arid woodland, Armazi

### 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; Pfungstl et al. 2009; Pfungstl 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they are found frequently, but in low densities in various types of ecosystems including wetlands and arid habitats (unpublished data).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). For the four species of *Haplozetes* known from Georgia (Shtanchaeva and Subías 2010), findings are rare and the species show no particular habitat preferences.

### 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. Discidium rounded.

*General characters.* Body length 405–460 µm, width 215–255 µm (behind pteromorphs). Cuticle smooth, yellowish brown.

*Prodorsum.* Lamella without distal dens. Prodorsal setae slightly barbed, Interlamellar and lamellar setae about 60 µm, rostral seta 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, *c*<sub>2</sub> 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).

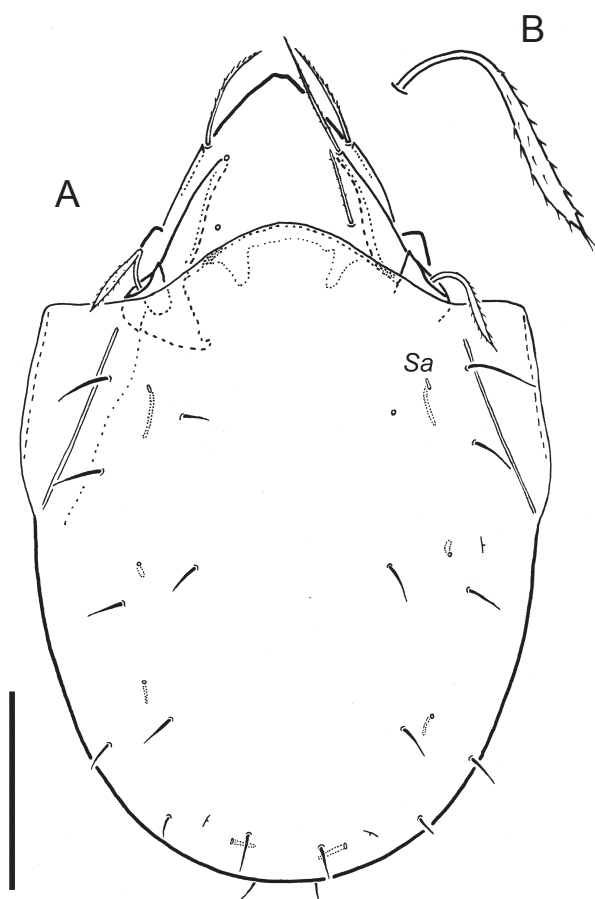


Fig. 1. *Haplozetes longisacculus* sp. n. A — dorsal aspect (legs omitted); B — sensillus. Abbreviation: Sa — anterior sacculus. Scale bar 100  $\mu$ m.

**Ventral region.** Epimeral formula: 3–1–3–3, epimeral setae slightly barbed. Discidium rounded. Four pairs of short, smooth genital setae (maximal 10  $\mu$ m). Anogenital formula: 4g–1ag–2an–3–ad (Fig. 2B).

**Legs.** All legs with three claws.

**Type material.** One holotype and five paratypes 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 longipo-*

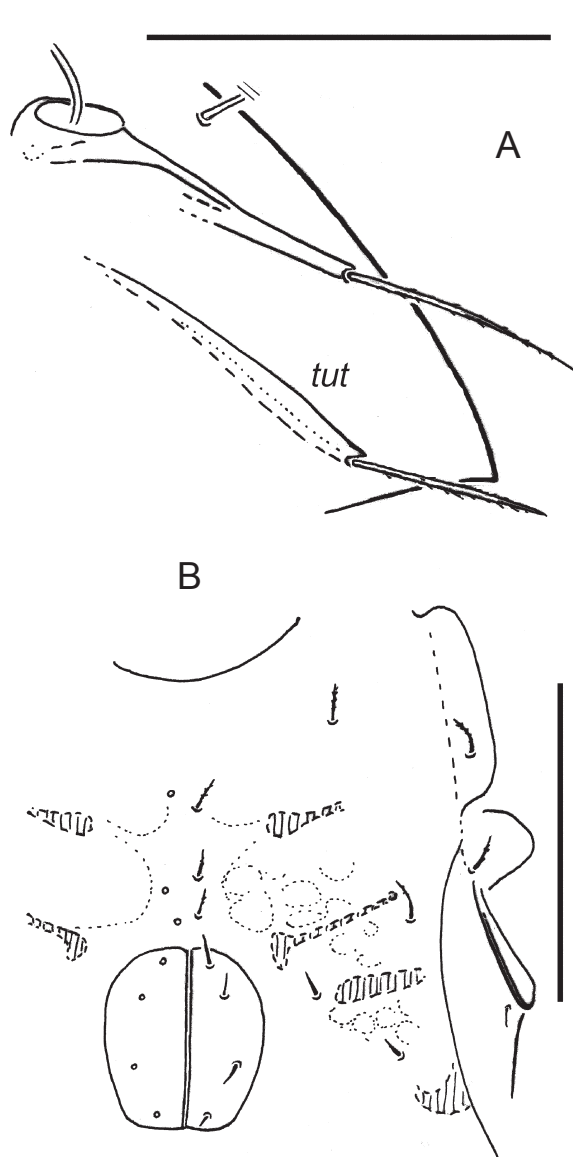


Fig. 2. *Haplozetes longisacculus* sp. n. A — prodorsum, lateral aspect; B — ventral aspect, anterior part. Abbreviation: tut — tutorium. Scale bars 100  $\mu$ m.

*rosa* Kulijev from litter and humus of Hyrcan forests of Talysh, Azerbaijan is the same as ours. The description (Kulijev 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

Table 1.

Diagnostic characters of *Haplozetes* species with character combination: four pairs of genital setae; tridactylous legs; tube-shaped notogastral sacculi (measures in  $\mu\text{m}$ )

	<i>longisacculus</i>	<i>atlanticus</i>	<i>brevisetosus</i>	<i>canariensis</i>	<i>depilis</i>	<i>elegans</i>	<i>tenuifusus</i> *
Body length	405–460	534–578	405–428	267–293	320–330	370–405	460–490
Body width	215–255 (slender)	~390 (broad)	262–281 (broad)	143–160 (slender)	200–210 (slender)	245–295 (broad)	310–360 (broad)
Sensillus shape	± long, head fusiform	long stalk, head fusiform	± long, head elongate-oval	± long, head fusiform	± long, head fusiform	very long stalk, head lanceolate	very long stalk, head slender fusiform
Notogaster setae	10–38 ( $c_2$ longest)	long >60	short ~15	short <5	only alveoles	medium >20	medium >30
Sacculi	tube-shaped, $Sa$ very long, $S1$ – $S3$ medium	$Sa$ , $S3$ tube-shaped; $S1$ , $S2$ sack-like	long tube-shaped, distally widened or bifurcate	tube-shaped, distally widened	tube-shaped with large distal widening	tube-shaped, distally widened, $S2$ bifurcate	tube-shaped, very long

\* Body measures after Berlese (1916), details after Mahunka and Mahunka-Papp, 1995 — sacculi shape in Weigmann (2006) different.

2004, electronic update 2011). We prefer to propose a new species name instead of a doubtful synonym.

*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, referring to *S. longiporosa* 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 charac-

ters of only those species with tube-shaped notogastral 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.** *Diagnosis.* Body length 515  $\mu\text{m}$ . Cuticle light yellowish brown. Notogastral sculpture with scattered nodules, covered by granular cerotegument. Lamellar cusp longer than broad, with well developed translamellar line; lamellar and rostral setae moderately long (about 30  $\mu\text{m}$ ). 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  $\mu\text{m}$ , width 360  $\mu\text{m}$  (one male). Light yellowish brown, weakly sclerotized.

*Prodorsum.* Rostrum rounded, anterior edge thickened, transverse ridge below translamella

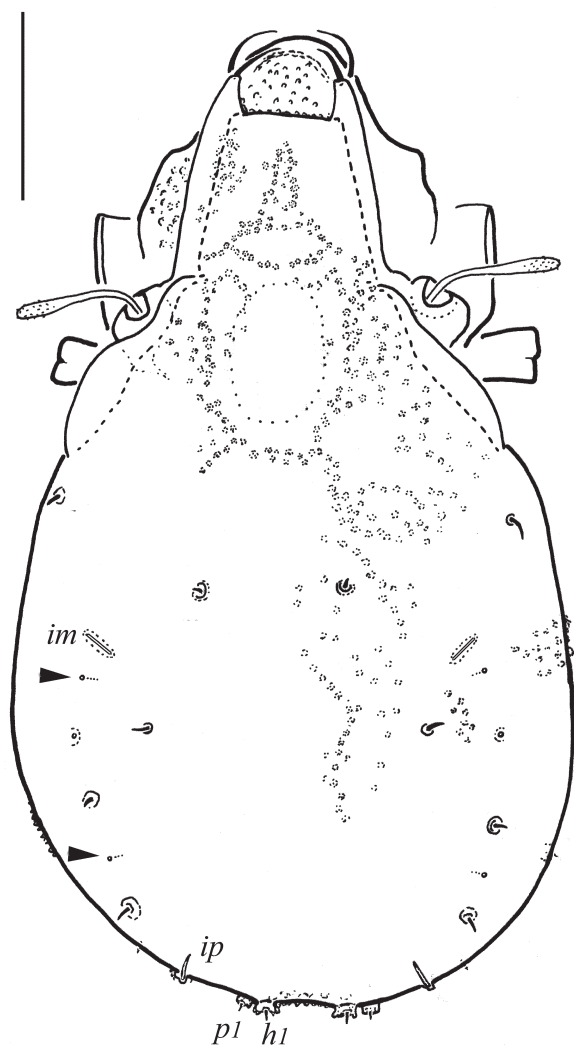


Fig. 3. *Scutovertex armazi* sp. n. Dorsal aspect (legs omitted). Abbreviations: *im*, *ip* — lyrifissures; *p*<sub>1</sub>, *h*<sub>1</sub> — notogastral setae; arrow heads — sacculi. Scale bar 100  $\mu$ m.

distinctly protruding (Fig. 4A). Cusp of lamella moderately developed, slightly longer than wide, with translamella. Lamellar and rostral setae moderately long (about 30  $\mu$ m), 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 (pteromorph) 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  $\mu$ m), *p*<sub>2</sub> and *p*<sub>3</sub> 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 as-

pect, 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  $\mu$ m.

**Legs.** Hetero-tridactylous.

**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. Arn. 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, Pfungstl et Sturmhuber, 2008; *S. punctatus*, Sitnikova, 1975 — are similar to *S. armazi* n.sp. by having the following characters: (1) small body length (<520  $\mu$ m); (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 Pfungstl et al. (2010), the body length of the studied specimens of *S. alpinus* varies between 477 and 527  $\mu$ m; a specimen deposited in the collection of Schweizer is 558  $\mu$ m long (Pfungstl et al 2010). Weigmann (2006) indicated a body length of 550–630  $\mu$ m, including the length of a studied specimen with 555  $\mu$ m from North-East Germany and the original description of Willmann (1953) indicating the body length as 630  $\mu$ m. The notogastral cuticula sculpture consists of foveae, whereas that of *S. armazi* is formed by scattered nodules and is covered by granular cerotegument. *Scutovertex*

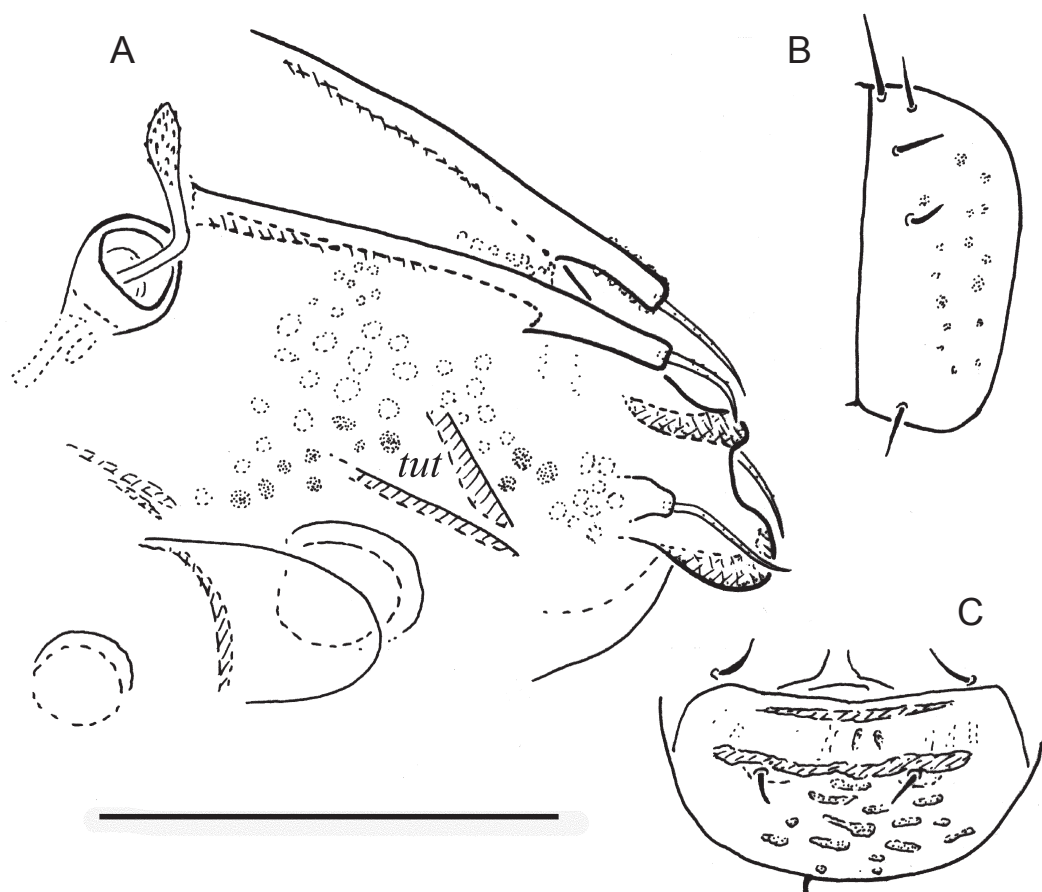


Fig. 4. *Scutovertex armazi* sp. n. A — prodorsum, lateral aspect; B — genital plate; C — mentum of subcapitulum. Abbreviation: *tut* — tutorium. Scale bar 100  $\mu$ m.

Table 2.  
Characters of selected *Scutovertex* species

	<i>armazi</i> sp. n.	<i>alpinus</i>	<i>mikoi</i>	<i>pileatus</i>	<i>punctatus</i>
Body length ( $\mu$ m)	515	477–630	387–445	481–575	433–599
Body color	light brown	dark brown	light brown	dark brown	dark brown
Tutorium	V-shaped	V-shaped	arched ridge	V-shaped	?
Notogastral sculpture	scattered nodules, covered by granular cerotegument	cuticular foveae	small nodules, covered by granular cerotegument	strong cerotegument and thick nodes around the lenticulus	roughly granulated, forming dark spots
Pairs of ng setae	9	10	9	10	10
Shape of ng setae	smooth, erect	smooth, erect	smooth, $h_1$ slightly widened	smooth, erect	partly broadened, barbed
Pairs of genital setae	5	6	6	6	6

*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  $\mu$ m), has short lamellar cusps and the tutorium is arched, rather than V-shaped as in *S. armazi* n. sp. Notogastral seta  $h_1$  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):

with thick cerotegument and “well developed tutorium” (with no distinct tutorium characters described); with 10 pairs of notogastral setae, three posterior pairs broadened and barbed; with six pairs of genital setae.

#### ACKNOWLEDGEMENTS

M. Murvanidze thanks Prof. Arn. Gegechkori and the PhD student N. Mosia for collecting soil samples in arid woodland of Armazi Mountain. The research was financed by grant of Shota Rustaveli National Scientific Foundation (SRNSF) No. 371 “*The invertebrate animals of Kolkheti National Park (coastal part), their biodiversity and population of the main habitats and ecosystems*” and by a grant from the Science and Technology Centre of Ukraine No. 4327 “*Monitoring of the settlement of dump and recultivated soils on manganese queries by invertebrate animals*”.

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