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NEW SPECIES OF THE GENUS *OLIGAPHORURA* (COLLEMBOLA, ONYCHIURIDAE) FROM THE FORESTED STEPPE ZONE OF RUSSIA

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Four new species of the genus *Oligaphorura*, *viz. O. mazeii* sp. n., *O. jiguliensis* sp. n., *O. imosolica* sp. n. and *O. psammophila* sp. n., from the forested steppe zone of European Russia are described. Two former species are characterized by the full number of distal setae on the tibiotarsi, and the furcal remnant with a cuticular furrow and 1 + 1 posterior setae. *Oligaphorura mazeii* sp. n. is formally the most similar to *O. shifangensis* Liu et al. 2019, the latter species being known from China. These species differ in the type of the labium and the number of sensilla on the thoracic terga (labium of *ABC*-type and 022 sensilla on *Th*.1–3 in *O. mazeii* sp. n., *vs AC*-type and 011 sensilla in *O. shifangensis*). *Oligaphorura jiguliensis* sp. n., can easily be distinguished from other similar species with *ms* on *Th*.3, namely *O. changbaiensis* Sun et Wu 2012, *O. shifangensis*, *O. uralica* (Khanislamova 1986) and *O. mazeii* sp. n., by the absence of *pso* on *Th*.1. *Oligaphorura imosolica* sp. n., which prefers lower soil horizons, has only 9 distal setae on the tibiotarsi, the furcal remnant is a finely granulated area without cuticular furrow, and with 1 + 1 posterior setae. It is readily comparable with *O. differens* (Bagnall 1949), but is characterized by a different pattern of dorsal sensilla (poorly-developed sensilla expressed as 10/011/0001(0)1(0)0 in the new species, *vs* 2/011/22211 well-marked sensilla in *O. differens*). *Oligaphorura psammophila* sp. n. has 11 distal setae on the tibiotarsi, and the furcal remnant with a cuticular furrow and 2 + 2 posterior setae. It is very similar to *O. tuvinica* Potapov et Stebaeva 1997, but shows a different number of subcoxal *pso* (111 *pso* in the new species, *vs* 333 in *O. tuvinica*). A division of the genus into seven groups that combine species with higher rates of morphological similarity is proposed. A key to all 14 congeners known from the region under study is given.

Keywords: Taxonomy, *Oligaphorurini*, European part of Russia, forested steppe zone, key

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The fauna of the genus *Oligaphorura* of the forested steppe zone of Eurasia has been most fully studied in Ukraine (Weiner, Kaprus', 2014) and the Asian part of Russia (Khanislamova, 1986, Potapov, Stebaeva, 1997; Weiner, Kaprus', 2014). Our long-term environmental studies on monitoring the soil animal communities in the forested steppe zone have been carried out in two regions of the European part of Russia, namely the Penza and Samara regions. Previously (Shveenkova, 2010, 2010a), only two *Oligaphorura* species were known for that area, i.e. the widespread *O. absoloni* (Börner 1901) and *O. uralica* (Khanislamova 1986), the latter species described from the southern Urals (Bashkiria). Recently, two more species of the genus, *O. humicola* Shvejonkova et Potapov 2012 and *O. stojkoae* (Shvejonkova et Potapov 2012), have been discovered in the chernozem soils of the same regions. This paper provides descriptions of further four new congeners, namely *O. jiguliensis* sp. n., *O. imosolica* sp. n., *O. psammophila* sp. n. and *O. mazeii* sp. n.

Abbreviations. *Abd*.1–6, abdominal segments; *A–E*, labial papillae; *A*-, *T*-, *B*-, *C*-setae and seta *M*, tibiotarsal setae according to Deharveng (1983); *a*-, *b*-, *c*-setae, setae on anal valves (Yoshii, 1996); *ABC*-, *ABD*-, *AC*-type, types of labium (Fjellberg, 1999); *A*-, *D*-, *H*-, *S*-type, types of furcal remnant (see below); *a*-, *m*-, *p*-setae, setae of anterior, medial, and posterior rows on terga; *Ant*.1–4, antennal segments; *AO*, antennal organ on *Ant*.3; *ms*, microsensillum(a); *or*, organite on antennal tip; *PAO*, postantennal organ; *pso*, pseudocellus(i); *psx*, parapseudocellus(i); *S*, lanceolate sensorial seta; *Sc*, subcoxa; *Th*.1–3, thoracic segments; *Ti*, tibiotarsus(i); *VT*, ventral tube. MSPU, Zoology and Ecology Department of Moscow State Pedagogical University.

MORPHOLOGICAL REMARKS

Two main types of furcal remnant can be distinguished within the genus *Oligaphorura* Bagnall 1949.

Table 1. Main diagnostic characters of the species-groups within the genus *Oligaphorura*

Species-group	Number of *pso* at antennal base	Anal spines	Number of distal setae on tibiotarsi	Type of furcal area
"absoloni"	3 + 3	+	11	*A*
"alnus"	3 + 3	+	11	*D*
"groenlandica"	3 + 3	+	11	*S* or *H*
"differens"	3 + 3	+	9	*D*
"daii"	3 + 3	+/–	5–8	*D*
"montana"	4 + 4	+	11	*S*
"marcuzzii"	4 + 4	–	6–11	*S* or *H*

The first consists of a cuticular fold of various sizes, located ventrally in the central part of *Abd*.4. In the second, more reduced type, the furca is completely absent and only a field with fine integument granulations remains in its place. Apart from this, there are also two types of chaetotaxy in the so-called manubrial region, i.e. the area located between the furcal remnant and the medial pore on the *Abd*.4 sternum. The former, more complete variant can be interpreted either as the presence of 2 + 2 axial (dental) setae in two rows together with two posterior rows of manubrial setae (Weiner, 1996) or as 1 + 1 dental setae and three posterior rows of manubrial setae (Paśnik, Weiner, 2017). In the second type, one of these setal rows was aborted, this to be interpreted either as the conservation of 1 + 1 axial (dental) setae with two manubrial posterior rows of setae (Weiner, 1996) or as the complete absence of dental setae while maintaining three rows of manubrial setae (Paśnik, Weiner, 2017). These two chaetotaxic patterns and two types of furcal remnants appear to be independent in their evolution and their combinations lead to the existence of four types of furcal areas within the genus:

• type-*S*, or "schoetti"-type: a combination of the first type of furcal remnant and the first type of chaetotaxic pattern;

• type-*A*, or "absoloni"-type: a combination of the first type of furcal remnant together with the second type of chaetotaxic pattern;

• type-*H*, or "humicola"-type: a combination of the second type of furcal remnant and the first chaetotaxic pattern;

• type-*D*, or "differens"-type: a combination of the second type of furcal remnant and the second chaetotaxic pattern.

SUBDIVISION OF THE GENUS

Recently (Weiner, 1996; Weiner, Kaprus', 2014), five different genera have been identified within the tribe Oligaphorurini: *Archaphorura* Bagnall 1949, *Oligaphorura* Bagnall 1949, *Micraphorura* Bagnall 1949, *Dimorphaphorura* Bagnall 1949, and *Chribellphorura* Weiner 1996. This division was proposed by Bagnall (1949) and over recent decades has been mainly based on such a non-adaptive character as the degree of furca reduction, which is non-functional even in its maximum development in the subfamily, while the independence of some of these genera has repeatedly been doubted (Christiansen, Bellinger, 1980; Fjellberg, 1987; Shvejonkova, Potapov, 2012; Babenko, Fjellberg, 2015). Recently a formal phylogenetic analysis of the tribe Oligaphorurini was performed and all genera of the tribe except *Chribellphorura* have been merged (Paśnik, Weiner, 2017) into one genus *Oligaphorura*, which includes at least 60 known species (Bellinger et al., 1996–2020), with this number constantly increasing (Liu et al., 2019; Sun et al., 2019). The taxonomy of Oligaphorurini is based on a combination of a limited number of morphological characters; with neither key nor unique features (autapomorphies) known which would allow us to reliably distinguish closely related lineages within the genus. There are several general or regional identification keys (e.g., Fjellberg, 1987; Babenko, Fjellberg, 2015; Paśnik, Weiner, 2017; Sun et al., 2019), all greatly facilitating an assessment of this diversity. For the same purpose, we propose a division of the genus into a number of groups that combine species with higher rates of morphological similarity. The main diagnostic characters of these species-groups are given in the Table 1.

• The "absoloni"-group (Holarctic): *O. absoloni* (Börner 1901), *O. kurtshevae* Martynova 1981[1], *O. pieninensis* (Weiner 1988), *O. uralica* (Khanislamova 1986), *O. changbaiensis* Sun et Wu 2012, *O. gamae* (Buşmachiu et Weiner 2013), *O. shifangensis* Liu et al. 2019, *O. mazeii* sp. n., *O. jiguliensis* sp. n.

• The "alnus"-group (eastern Palaearctic): *O. alnus* (Fjellberg 1987), *O. jingyueensis* (Sun et Wu 2012), *O. sanjiangensis* (Sun et Wu 2012), *O. inya* (Weiner et Kaprus' 2014), *O. sibirica* (Weiner et Kaprus' 2014), *O. pseudoinya* (Weiner et Kaprus' 2014), *O. wanglangensis* Sun et Xie 2019.

• The "groenlandica"-group (Holarctic): *O. groenlandica* (Tullberg 1877), *O. schoetti* (Lie-Pettersen 1896), *O. tottabetsuensis* (Yosii 1972), *O. ursi* Fjellberg 1984, *O. aborigensis* (Fjellberg 1987), *O. interrupta*

[1] The position of this species within the "absoloni"-group was confirmed by our study of the type specimens.

(Fjellberg 1987), *O. nataliae* (Fjellberg 1987), *O. nuda* (Fjellberg 1987), *O. pingicola* (Fjellberg 1987), *O. reversa* (Fjellberg 1987), *O. judithae* (Weiner 1994), *O. linderae* (Weiner 1994), *O. koreana* (Weiner 1994), *O. tuvinica* Potapov et Stebaeva 1997, *O. sabulosa* Babenko 2007, *O. judithnajtae* Weiner et Paśnik 2017, *O. psammophila* sp. n.

• The "differens"-group (mainly Europe, except for *O. sophyae*): *O. differens* (Bagnall 1949), *O. raxensis* (Gisin 1961), *O. pseudoraxensis* (Nosek et Christian 1983), *O. hackeri* (Christian 1986), *O. melittae* (Christian 1993), *O. irinae* (Thibaud et Taraschuk 1997), *O. eremia* (Kaprus' et al. 2002), *O. olenae* (Weiner et Kaprus' 2014), *O. sophyae* (Weiner et Kaprus' 2014), *O. caucasica* (Weiner et Kaprus' 2014), *O. imosolica* sp. n.

• The "daii"-group (Europe): *O. daii* (Pomorski et al. 1998), *O. chatyrdagi* (Kaprus' et al. 2002), *O. steposa* (Kaprus' et al. 2002), *O. stojkoae* (Shvejonkova et Potapov 2012).

• The "montana"-group (eastern Palaearctic): *O. montana* Weiner 1994, *O. pseudomontana* Sun et Wu 2012, *O. chankaensis* Sun et Wu 2012, *O. ussurica* Shveenkova et Babenko 2019, *O. kedroviensis* Shveenkova et Sun 2019.

• The "marcuzzii"-group (mainly Europe, except for *O. ambigua*): *O. marcuzzii* Cassagnau 1968, *O. humicola* Shvejonkova et Potapov 2012, *O. kremenitsai* Shvejonkova et Potapov 2012, *O. ambigua* Babenko et Fjellberg 2015.

Because these groups are entirely based on external morphology, naturally some species can be included into a particular group not because of true generic relations, but only because of convergent similarities. Only for some local groups, such as, for example, the "montana" and the "marcuzzii" groups, some genetic proximity may be suggested. The remaining groups are most likely artificial and include both related and nonrelated forms.

Seven known species, namely *O. multiperforata* (Gruia 1973), *O. gela* (Christiansen et Bellinger 1980), *O. palissai* (Yosii 1971), *O. quadrituberculata* (Börner 1901), *O. alavensis* (Simón-Benito et al. 1994), *O. serratotuberculata* (Stach 1933) and *O. duocellata* Babenko et Fjellberg 2015, could not be included into any group. For the first five species, we simply do not have the necessary information, since some key features are omitted from the original descriptions. *Oligaphorura serratotuberculata* is probably a group of related forms, as can be seen from differing descriptions (Stach, 1933; Pomorski, 1998; Fjellberg, 1998; Weiner, 1996; Shvejonkova, Potapov, 2012). Because *O. duocellata* occupies an isolated position, it may well be assigned in future to a separate group together with a similar, yet undescribed species from Yakutia.

SPECIES DESCRIPTIONS

Oligaphorura mazeii Shveenkova et Babenko sp. n. (Figs 1, *1–6*)

D i a g n o s i s. Body cylindrical. Dorsal sensilla on body well-marked. Anal spines relatively long (width : length as 1 : 4), set on tiny papillae. *AO* with 5 papillae, *PAO* slightly larger than nearest *pso*, with 3–4 lobes. Labium of *ABC*-type. Both *Th*.2–3 with lateral *ms*. Tibiotarsal chaetotaxy most complete of genus, distal whorls (A + T) of each *Ti* with 11 setae. Number of *pso*: 32/133/33343 (dorsal), 11/000/0000 (ventral), 111 (subcoxal). Number of ventral *psx*: 0/000/12(1)1(2)100+1^{m}. *A*-type of furcal remnant. *Abd*.5 often with unpaired seta p_0.

T y p e m a t e r i a l. Holotype, ♀ on slide, European part of Russia, Middle Volga River Basin, Penza Region, "Privolzhskaya Lesostep" State Nature Reserve, upper reaches of Sura River, *Ulmus laevis* riparian deciduous forest [53.3169° N, 46.8866° E], soil (0–10 cm), 30.09.2014, leg. Yu. Shveenkova.

Paratypes: 1 ♂, 1 ♀, 6.08.2014, ibid., 2 ♀♀, 1 ♂, 29.05.2006, same Nature Reserve, middle reaches of Kadada River, near settl. Shatkino, oak (*Quercus robur*) forest [52.9229° N, 46.2752° E], soil (0–10 cm), 2 ♂♂, 23.05.2006, same Nature Reserve, middle reaches of Kadada River, near settl. Krasnoe Pole, oak (*Quercus robur*) forest [52.8169° N, 46.3929° E], soil (0–10 cm), 1 ♀, 4.10.2016, ibid., but pine (*Pinus sylvestris*) forest [52.8240° N, 46.3519° E], soil (0–10 cm), 5 ♀♀, 7 ♂♂, 2.06.2016, ibid., but meadow with *Calamagrostis epigejos* [52.8130° N, 46.3527° E], soil (40–50 cm). The types are kept in the collection of MSPU.

D e s c r i p t i o n. Size 0.52–0.62 mm, holotype 0.615 mm. Colour white in alcohol. Body cylindrical. Granulation regular, slightly coarser around dorsal *pso* (10–12 granules) located both on head and *Abd*.4–5 (Fig. 1, *1*).

Number of *pso*: 32/133/33343 (dorsal) and 11/000/0000 (ventral) (Fig. 1, *1*, *4*, *5*). Ventral *psx* poorly expressed, sometimes not visible, its number as 0/000/12(1)1(2)100+1^{m} (Fig. 1, *5*). Each upper *Sc* of legs 1–3 with 1 *pso* and 1 *psx*.

Antennae slightly shorter than head. *Ant*.4 with three slightly thickened *S*-setae, subapical organite present, microsensillum located in proximal row of setae (Fig. 1, *2*). *AO* on *Ant*.3 consisting of 5 papillae, 5 guard setae, 2 sensory rods, 2 granulated clubs (external one larger) and lateral *ms*. Antennal area not marked. *Ant*.1–2 with 8 and 14 setae, respectively. *PAO* located laterally in cuticular furrow, with 4(3) lobes, slightly larger than nearest *pso*. Maxilla unmodified. Maxillary palp simple with 1 basal seta and 2 sublobals. Labrum with 4/342 setae. Labium with 10 guards (6 long and 4 spiniform), 6 proximal, 4 basomedian and 5 basolateral setae, terminal sensilla of papillae *A*, *B* and *C* thickened, sensillum on papilla *C* slightly thinner than others (labium of *ABC* type) (Fig. 1, *3*).

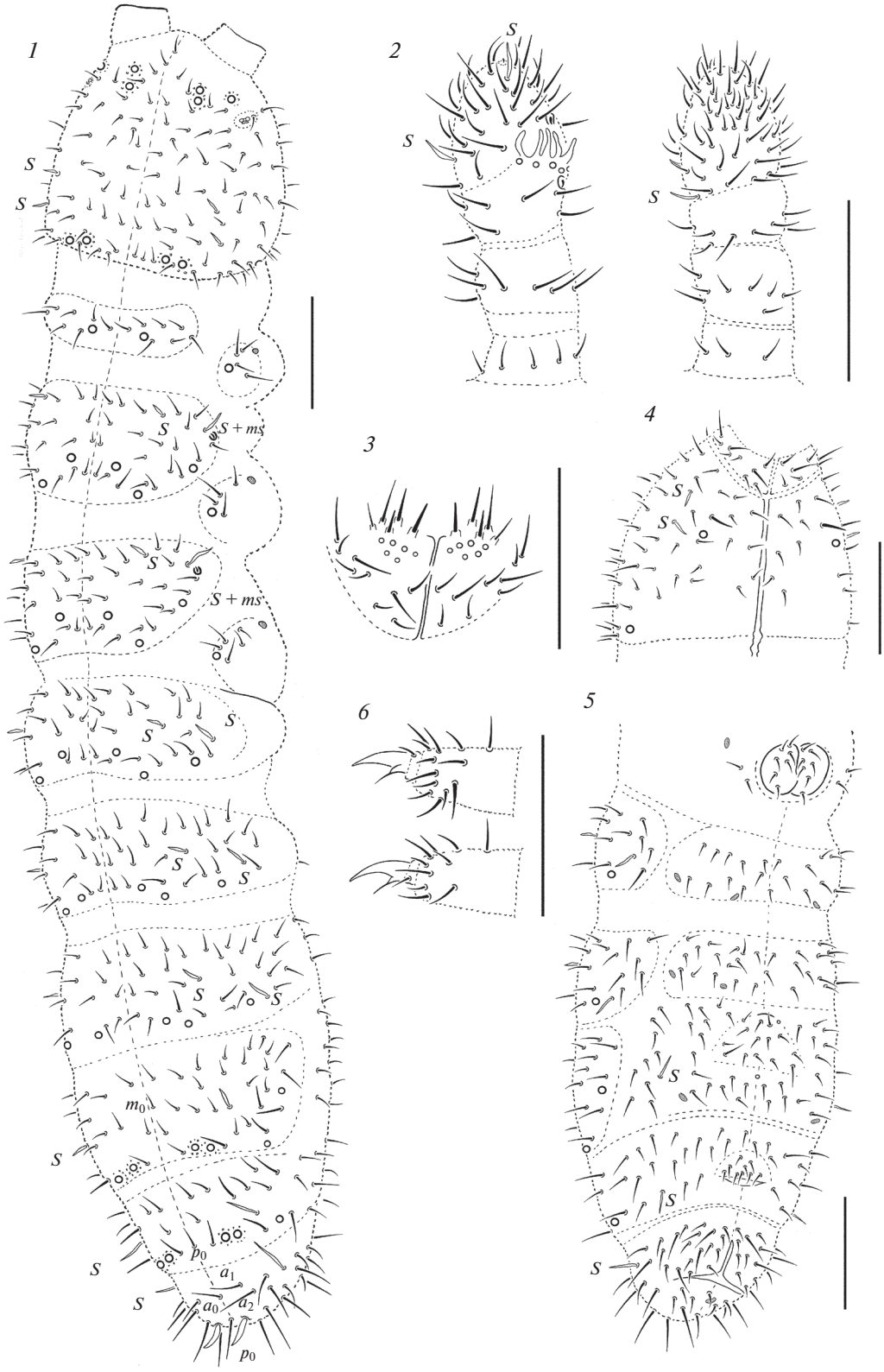

Fig. 1. *Oligaphorura mazeii* sp. n.: *1* – dorsal chaetotaxy; *2* – antenna, different views; *3* – labial palp (guards not shown); *4* – ventral chaetotaxy of head; *5* – ventral chaetotaxy of abdomen; *6* – tip of leg 3. Scales (mm): *1–6* – 0.05.

Dorsal setae poorly differentiated into macro- and microsetae, symmetrical in general (Fig. 1, *1*). *S*-setae well marked and distributed as follows: 2/022/222111 (dorsally), 2/000/0001(0)1(0)0 (ventrally) and 0, 1, 1 on lower *Sc* of legs 1–3. Head with axial unpaired seta a_0 and without $a_{0'}$, d_0 absent as usual for genus. Setae p_1 on head usually at level with p_2. *Th*.1 with 7 + 7 dorsal setae. Lateral *ms* present on both *Th*.2–3. Terga of *Th*.2–*Abd*.3 with 3–4 pairs of axial setae. *Abd*.4 with unpaired seta m_0. *Abd*.5 with unpaired seta p_0 often present. On *Abd*.6 setae a_0 and a_1 approximately the same size, setae a_2 and p_0 slightly longer than a_0. Thoracic sterna with 0-1-1 setae on each side of ventral line. Ventral chaetotaxy of abdomen as in Fig. 1, *4–5*.

Upper subcoxae of legs 1–3 with 4(3), 5(4), 5(4) setae, respectively. Tibiotarsal chaetotaxy most complete of genus with 20–20–19 setae, respectively: distal whorls (*T* + *A*) with 11 setae, 7 *B*-setae (B_7 absent only on *Ti* 3), one seta of *C*-whorl and unpaired seta *M*. Unguis without inner or lateral teeth, unguiculus narrow with narrow basal lamella, about 0.7 times as long as inner edge of unguis (Fig. 1, *6*). *VT* with 7 + 7 proximal and 2+2 setae at base. Furcal remnant of *A*-type. Each of lateral anal valves with a_0, $2a_1$ setae, unpaired valve with a_0, $2b_1$, $2b_2$ and 5 setae in *c*-row (b_0 and a_1 absent). Anal spines relatively long (width: length as 1:4), set on tiny papillae.

A f f i n i t i e s. *Oligaphorura mazeii* sp. n. belongs to the "absoloni"-group, being characterized by the presence of 11 distal setae on the tibiotarsi and the furcal remnant being of *A*-type. Three species of the group, *viz. O. absoloni*, *O. gamae* and *O. pieninensis*, differ clearly from *O. mazeii* sp. n. by such a sound character as the absence of *ms* from *Th*.3. Two other congeners of the same species-group, *O. uralica* and *O. changbaiensis*, have more *pso* on *Abd*.1–5 (44454). *Oligaphorura kurtshevae* can be distinguished by an uncommon (triangular) arrangement of *pso* on the posterior part of the head.

Formally, *O. mazeii* sp. n. seems to be especially similar to *O. shifangensis*, the latter species from China, as both show identical pseudocellar formulae (dorsal, ventral and subcoxal), the same type of the furcal area, and *ms* present on both *Th*.2–3. However, the new species is distinctly smaller (0.52–0.62 mm, *vs* 1.1–1.6 mm in *O. shifangensis*) and has a different type of labium (*ABC*, *vs AC* in *O. shifangensis*). There are also several stable chaetotaxic differences between these species, for instance, the number of setae in the basolateral part of the labium (5 + 5 in *O. mazeii* sp. n., *vs* 6 + 6 in *O. shifangensis*) and on *Th*.1 (7 + 7 setae in *O. mazeii* sp. n., *vs* 8–9 + 8–9 in *O. shifangensis*). Apart from this, the new species differs by the number of sensilla on the thorax (022 in *O. mazeii* sp. n., *vs* 011 in *O. shifangensis*) and the usual presence of unpaired seta p_0 on *Abd*.5 (absent from *O. shifangensis*).

D i s t r i b u t i o n a n d e c o l o g y. The species was registered in three separated parts of the "Privolzhskaya Lesostep" Nature Reserve, namely, in the upper reaches of Sura River (so called "Verkhnesursky" cluster) and in two different areas of the middle reaches of Kadada River (clusters "Kuncherovsky" and "Borok"). *O. mazeii* sp. n. inhabits various types of biotopes including forests, steppes and floodplains, everywhere clearly preferring sandy soils.

E t y m o l o g y. The species is named after protozoologist Yuri Mazei, whose earlier scientific career was associated with the Penza State University. Under his initial direction, studies on soil microfauna in the "Privolzhskaya Lesostep" Nature Reserve were started.

Oligaphorura jiguliensis Shveenkova et Babenko sp. n. (Figs 2, *1–7*)

D i a g n o s i s. Body cylindrical. Dorsal sensilla on body poorly marked, long and thin. Anal spines relatively long (width : length as 1 : 5), without papillae. *AO* with 5 papillae, *PAO* about as long as nearest *pso*, with 3–4 lobes. *AC*-type of labium. Both *Th*.2–3 with lateral *ms*. Each tibiotarsi with 11 distal setae. Number of *pso:* 32/033/33343 (dorsal), 11/000/0000 (ventral), 111 (subcoxal). Ventral *psx* not visible. *A*-type of furcal remnant. *Abd*.5 often with unpaired seta p_0.

T y p e m a t e r i a l. Holotype, ♀ on slide, European part of Russia, Middle Volga River Basin, Samara Region, "Samarskaya Luka" National Park, calcareous stone-pit, maple and birch forest [53.4059° N, 50.0794° E], soil, 02.05.2011, leg. Yu. Shveenkova.

Paratypes: ♀, ♂ and 1 juv., same location as holotype. Types are kept in the collection of the MSPU.

D e s c r i p t i o n. Size 0.66–0.84 mm, holotype 0.725 mm. Colour white in alcohol. Body cylindrical. Granulation regular (Fig. 2, *1*).

Number of *pso*: 32/033/33343 (dorsally) and 11/000/0000 (ventrally) (Fig. 2, *1*, *4*, *5*). Each upper *Sc* of legs 1–3 with 1 *pso*. Ventral *psx* not visible.

Antennae slightly shorter than head. *Ant.* 4 with two poorly thickened *S*-setae, *or* present, *ms* located in proximal row of setae (Fig. 2, *2*). *AO* on *Ant*.3 consisting of 5 papillae, 5 guard setae, 2 sensory rods, 2 granulated clubs (external one larger) and lateral *ms*. Antennal area not marked. *Ant*.1–2 with 8 and 15 setae, respectively. *PAO* located laterally in cuticular furrow, with 4(3) lobes, about as long as nearest *pso*. Maxilla unmodified. Maxillary palp simple with 1 basal seta and 2 sublobals. Labrum with 4/342 setae. Labium with 10 guards (6 long, 4 spiniform), 6 proximal, 4 basomedian and 5 basolateral setae, terminal sensilla of papillae *A* and *C* thickened (labium of *AC* type) (Fig. 2, *3*).

Dorsal setae poorly differentiated into macro- and microsetae, symmetrical in general (Fig. 2, *1*). *S*-setae poorly marked, long and thin and distributed as follows: 2/011/222(1)110 (dorsally), 2/000/00000 (ven-

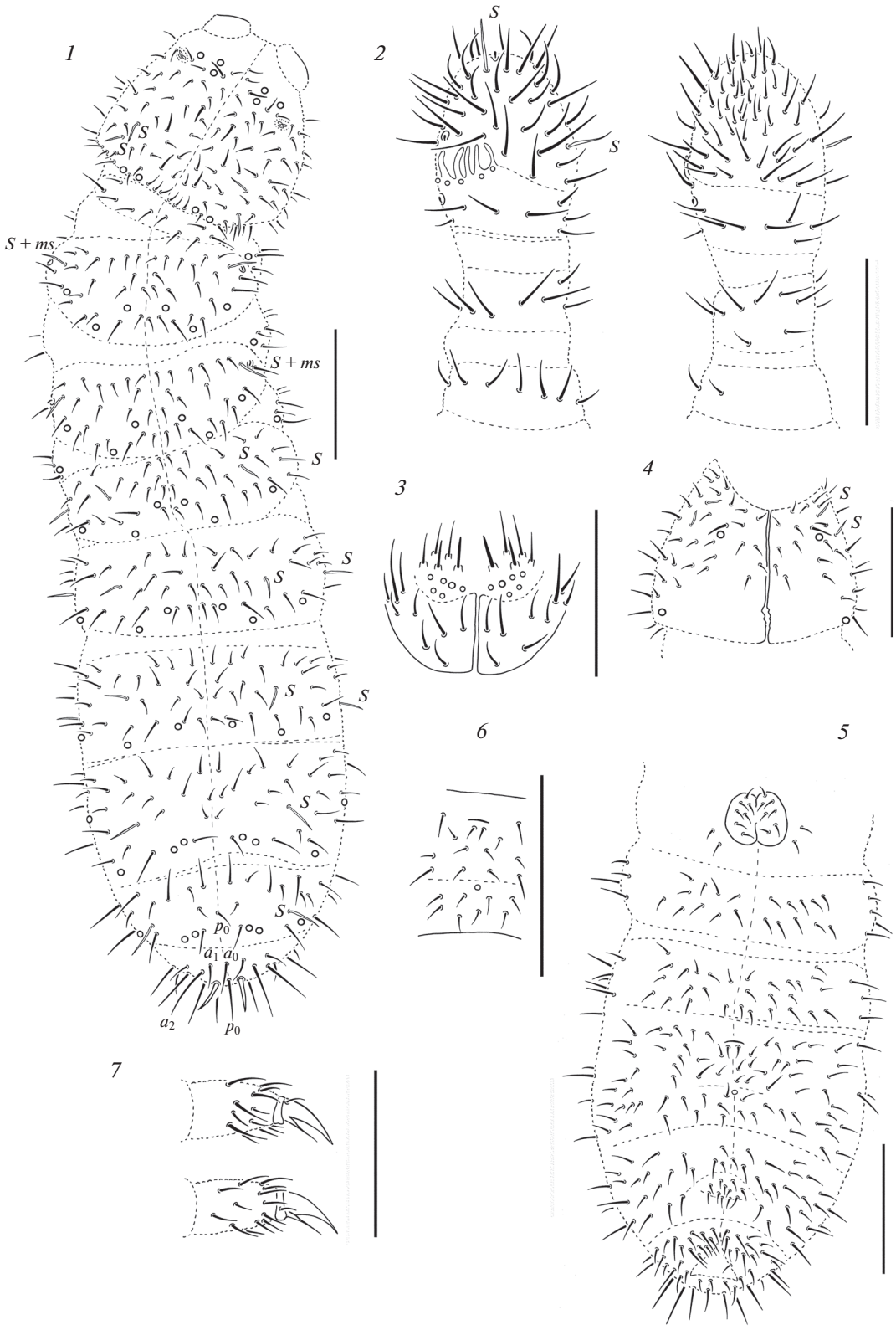

Fig. 2. *Oligaphorura jiguliensis* sp. n.: *1* – dorsal chaetotaxy; *2* – antenna, different views; *3* – labial palp; *4* – ventral chaetotaxy of head; *5* – ventral chaetotaxy of abdomen; *6* – furcal area; *7* – tip of leg 3. Scales (mm): *1*, *4*, *5* – 0.1; *2*, *3*, *6*, *7* – 0.05.

trally) and 0, 0, 1 on lower *Sc*. Head with axial unpaired setae a_0 and without $a_{0'}$, d_0 absent as usual for genus. Setae p_1 on head usually at level with p_2. *Th*.1 with only 5+5 dorsal setae. Lateral *ms* present on both *Th*.1–2. Terga of *Th*.2–*Abd*.3 with 3–4 pairs of axial setae. *Abd*.4 with paired setae m_1 or with unpaired seta m_0. Unpaired seta p_0 on *Abd*.5 often present (its localization variable – in holotype and some paratypes it moved forward to m_0-position). On *Abd*.6 seta a_0 slightly shorter than p_0 but longer than a_1, setae a_2 more than twice the length of a_1. Thoracic sterna with 0-1-1 setae on each side of ventral line. Ventral chaetotaxy of abdomen as in Fig. 2, *4, 5, 6*.

Upper subcoxae of legs 1–3 with 3, 5, 5 setae, respectively. Tibiotarsal chaetotaxy most complete of genus with 20–20–19 setae, respectively: distal whorl (*T* + *A*) with 11 setae, 7 *B*-setae (B_7 absent only on *Ti* 3), unpaired seta *M* and one seta of *C*-whorl. Unguis without inner or lateral teeth, unguiculus narrow with weak basal lamella, about 0.8 times as long as inner edge of unguis (Fig. 2, *7*). *VT* with 7 + 7 proximal setae and 2 + 2 at its base. Furcal remnant of *A*-type (Fig. 2, *5*, *6*). Each of lateral anal valves with a_0, $2a_1$ setae, upper valve with a_0, $2b_1$, $2b_2$ and 5 setae in *c*-row (b_0 and a_1 absent). Anal spines thin and long, (width: length as 1 : 5) without papillae.

Affinities. *O. jiguliensis* sp. n. belongs to the "absoloni"-group (see above), being characterized by 11 distal setae on the tibiotarsi and the furcal remnant of *A*-type. Three species of this group, i.e. *O. absoloni*, *O. gamae* and *O. pieninensis*, differ clearly by the absence of lateral *ms* on *Th*.3. *Oligaphorura kurtshevae* is characterized by an uncommon triangular arrangement of *pso* in the posterior part of the head. *Oligaphorura jiguliensis* sp. n. can easily be distinguished from others species of the "absoloni"-group, namely *O. changbaiensis*, *O. shifangensis*, *O. uralica* and *O. mazeii* sp. n., by the absence of *pso* on *Th*.1.

Distribution and ecology. The new species is only known from the type locality where it was found in a maple-birch forest at the foot of rocks.

Etymology. The species is named after the Zhiguli (Jiguli in Latin transliteration) Hills of "Samarskaya Luka" National Park.

Oligaphorura imosolica Shveenkova et Babenko sp. n. (Figs 3, *1–6*)

Diagnosis. Body cylindrical. Dorsal sensilla short, poorly marked. Anal spines relatively short (width : length as 1 : 3), set on tiny papillae. *AO* with 5 papillae, *PAO* slightly larger than nearest *pso*, with 3–4 lobes. Labium: *ABC*-type. Both *Th*.2–3 with lateral *ms*. Number of *pso:* 32/133/33343 (dorsal), 11/000/0000 (ventral). Number of ventral *psx*: 0/000/111100+1^m. Upper *Sc* of legs 1–3 with 111 *pso* and 1(?2)22 *psx*, respectively. Distal whorl of each *Ti* with 9 setae. Furcal remnant: *D*-type.

Type material. Holotype, ♀ on slide, European part of Russia, Middle Volga River Basin, Penza Region, "Privolzhskaya Lesostep" State Nature Reserve, right bank of Khoper River, *Padus avium* forest [52.8340° N, 44.4228° E], soil (50–60 cm), 24.07.2015, leg. Yu. Shveenkova.

Paratypes: 1 ♂, same data as holotype, 8 ♀♀, 2 ♂♂, 1 juv., same Nature Reserve, upper reaches of Khoper River, meadow with *Calamagrostis epigejos* [52.9967° N, 44.3295° E], soil (40–50 cm), 05.06.2009, 3 ♀♀, 6 ♂♂ and 1 juv., European part of Russia, Middle Volga River Basin, Samara Region, "Samarskaya Luka" National Park, calcareous stonepit, maple forest [53.4059° N, 50.0794° E], soil, 02.05.2011. Types are kept in the collection of the Department of Zoology & Ecology, Moscow State Pedagogical University.

Description. Size 0.58–0.73 mm, holotype 0.687 mm. Colour white in alcohol. Body cylindrical. Granulation regular, coarser on *Abd*.6 (8–10 granules) and around dorsal *pso* located on head and medial parts of terga (Fig. 3, *1*).

Number of *pso*: 32/133/33343 (dorsal) and 11/000/0000 (ventral) (Fig. 3, *1*, *4*, *5*). Number of ventral *psx*: 0/000/111100+1^m, on *Abd*.1 *psx* located in lateral position (Fig. 3, *5*). Upper *Sc* of legs 1–3 with 111 *pso* and 1(?2)22 *psx*, respectively.

Antennae slightly shorter than head. *Ant*.4 with two slightly thickened *S*-setae, *or* present, microsensillum located in proximal row of setae (Fig. 3, *2*). *AO* on *Ant*.3 consisting of 5 papillae, 5 guard setae, 2 sensory rods, 2 granulated clubs (external one larger) and lateral *ms*. Antennal area slightly marked with uniform granulation. *Ant*.1–2 with 8 and 13 setae, respectively. *PAO* located laterally in cuticular furrow, with 4(3) lobes, slightly larger than nearest *pso*. Maxilla unmodified. Maxillary palp simple with one basal seta and 2 sublobals. Labrum with 4/342 setae. Labium with 10 guards (6 long, 4 spiniform), 6 proximal, 4 basomedian and 5 basolateral setae, terminal sensilla of papillae *A*, *B* and *C* thickened, the latter slightly thinner than others (labium of *ABC* type) (Fig. 3, *3*).

Dorsal setae poorly differentiated into macro- and microsetae, symmetrical in general (Fig. 3, *1*). *S*-setae short, poorly marked and distributed as follows: 10/011/0001(0)1(0)0 (dorsally), 2/000/000000 (ventrally) and not developed on lower *Sc*. Head with axial unpaired setae a_0 and without $a_{0'}$, d_0 absent as usual for genus. Setae p_1 on head usually in front of p_2. *Th*.1 with 6–7 + 6–7 dorsal setae. Lateral *ms* present on both *Th*.2–3. Terga of *Th*.2–*Abd*.3 with 3–4 pairs of axial setae. *Abd*.4 with unpaired seta m_0. On *Abd*.6 setae a_0, a_2, p_0 of approximately equal size, setae *a*1 as long as 1/2 of p_0. Thoracic sterna with 0-1-1 setae on each side. Ventral chaetotaxy of abdomen as in Fig. 3, *4*, *5*.

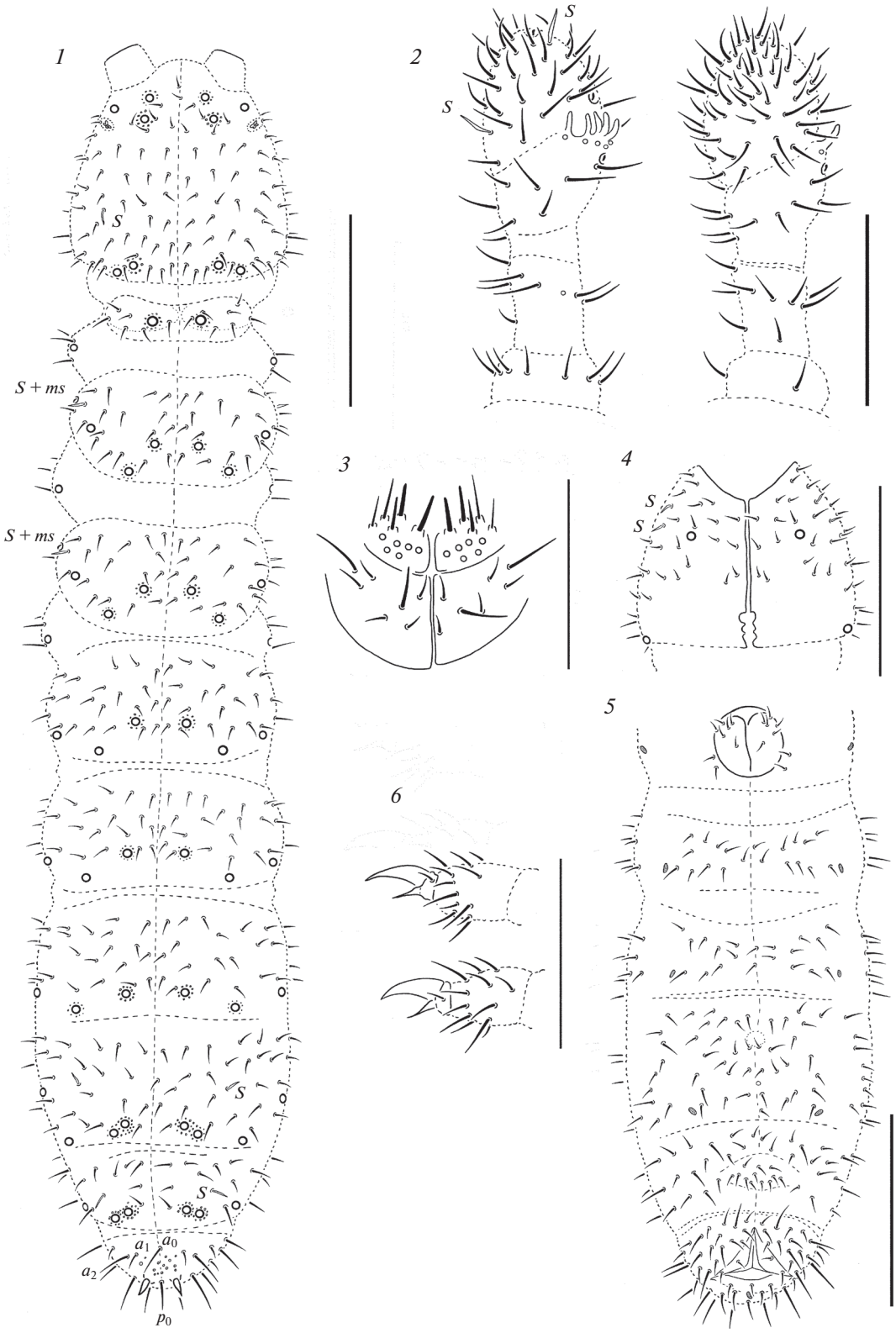

Fig. 3. *Oligaphorura imosolica* sp. n.: *1* – dorsal chaetotaxy; *2* – antenna, different views; *3* – labial palp; *4* – ventral chaetotaxy of head; *5* – ventral chaetotaxy of abdomen; *6* – tip of leg 3. Scales (mm): *1*, *4*, *5* – 0.1; *2*, *3*, *6* – 0.05.

Upper subcoxae of legs 1–3 with 3, 3(4), 3 setae, respectively. Tibiotarsal chaetotaxy with 18–18–17 setae, respectively: distal whorl ($T + A$) with 9 setae (setae T_2 and T_3 absent), 7 *B*-setae (B_7 absent only on *Ti* 3), unpaired seta *M* and one seta of *C*-whorl. Unguis without inner or lateral teeth, unguiculus narrow with weak basal lamella, about 0.6 times as long as inner edge of unguis (Fig. 3, *6*). *VT* with 6 + 6 proximal and 2 + 2 setae at its base. Furcal remnant of *D*-type. Each of lateral anal valves with a_0, $2a_1$ setae, upper valve with a_0, $2b_1$, $2b_2$ and 5 setae in *c*-row (b_0 and a_1 absent). Anal spines relatively short, (width: length as 1 : 3) set on tiny papillae.

Affinities. Due to only 9 distal setae on the tibiotarsi and the *D*-type of furcal remnant, *O. imosolica* sp. n. can be assigned to the "differens"-group. It is indeed very similar to *O. differens*, although can easily be distinguished by the different expression of dorsal sensilla, which are more numerous (2/011/22211, *vs* 10/011/0001(0)1(0)0 in *O. imosolica* sp. n.) and clearly visible only in *O. differens*. There are also a number of tiny, but rather stable characters that can be used for these species' separation. Among them, the number of ventral and subcoxal *psx* (0/000/111100+1^m and 1(?2)22 in *O. imosolica* sp. n., *vs* only 1+1 ventral *psx* on *Abd*.4 in *O. differens*) and the number of setae on the upper subcoxae (33(4)3 in *O. imosolica* sp. n., *vs* 445 in *O. differens*) and *VT* (6 + 6 in *O. imosolica* sp. n., *vs* 5 + 5 in *O. differens*). Apart from this, the new species is smaller (0.58–0.73 mm, *vs* 0.83–0.98).

Three other species of the "differens"-group, namely *O. caucasica*, *O. eremia* and *O. hackeri*, differ clearly from the new species in the absence of *ms* on *Th*.3. Both *O. raxensis* and *O. melittae* are characterized by the absence of *pso* from *Th*.1.

Further four species of the "differens"-group, *O. irinae*, *O. olenae*, *O. sophyae* and *O. pseudoraxensis*, have the same number of dorsal *pso* as *O. imosolica* sp. n. Contrary to *O. imosolica* sp. n., two former have *pso* on the abdominal sterna (0001 in *O. irinae* and 1111 in *O. olenae*), *O. sophyae* has only four papillae in *AO*, while *O. pseudoraxensis* is characterized by thin anal spines.

Distribution and ecology. *Oligaphorura imosolica* sp. n. clearly prefers lower soil horizons in both forest and steppe biotopes and, apparently, is widespread in the region under study. It was found on territories of both "Samarskaya Luka" National Park and "Privolzhskaya Lesostep" State Nature Reserve. In the latter, it was registered in two separate areas in the Khoper River basin, namely, in "Ostrovtsovsky" and "Poperechensky" clusters.

Previous records of *O. irinae* in the broadleaved forests of Russia (Chernov et al., 2010; Shveenkova, 2010a) belong to *O. imosolica* sp. n.

Etymology. The species is named after its biological preferences, "imo solo" Lat., meaning the lower, deeper soil horizons.

Oligaphorura psammophila Shveenkova et Babenko sp. n. (Figs 4, *1–6*)

Diagnosis. Body cylindrical. Dorsal sensilla short, well-marked. Anal spines relatively short (width: length as 1 : 3), set on tiny papillae. *AO* with 5 papillae, *PAO* slightly larger than nearest *pso*, with 3–4 lobes. Labium: *ABC*-type. Tibiotarsi with 11 distal setae. Lateral *ms* present only on *Th*.2. Number of *pso:* 32/133/33343 (dorsal), 11/000/0000 (ventral). Number of ventral *psx*: 0/000/111100. Upper *Sc* of legs 1–3 with 111 *pso* and 111 *psx*, respectively. Furcal remnant: *S*-type.

Type material. Holotype, ♂ on slide, European part of Russia, Middle Volga River Basin, Penza Region, "Privolzhskaya Lesostep" State Nature Reserve, middle reaches of Kadada River, pine forest on slope [52.8213° N, 46.3465° E], soil (0–10 cm), 04.10.2018, leg. Yu. Shveenkova.

Paratypes: 1 ♂, 3 ♀, same data as holotype, 2 ♂♂, 4 ♀♀, same data as holotype, but aspen forest [52.8189° N, 46.3607° E], 04.05.2009, 2 ♂♂ (premature), same locality, but 10.10.2009. Types are kept in the collection of the Department of Zoology & Ecology, Moscow State Pedagogical University.

Description. Size 0.60–0.70 mm, holotype 0.626 mm. Colour white in alcohol. Body cylindrical. Granulation regular, slightly coarser around dorsal *pso* (10–12 granules) located on head and central part of body (Fig. 4, *1*).

Number of *pso*: 32/133/33343 (dorsal) and 11/000/0000 (ventral) (Fig. 4, *1*, *4*, *5*). Ventral *psx* sometimes poorly expressed, its number as 0/000/111100, on *Abd*.1 *psx* located in lateral position (Fig. 4, *5*). Each upper *Sc* of legs 1–3 with 1 *pso* and 1 *psx*, respectively.

Antennae slightly shorter than head. *Ant*.4 with two slightly thickened *S*-setae, *or* present, microsensillum located in proximal row of setae (Fig. 4, *2*). *AO* on *Ant*.3 consisting of 5 papillae, 5 guard setae, 2 sensory rods, 2 granulated clubs (external one larger) and lateral *ms* (Fig. 4, *2*). *Ant*.1–2 with 8 and 14 setae, respectively. Antennal area not marked. *PAO* located laterally in cuticular furrow, with 4(3) lobes, slightly larger than nearest *pso*. Maxilla unmodified. Maxillary palp simple with 1 basal seta and 2 sublobals. Labrum with 4/342 setae. Labium with 10 guards (6 long, 4 spiniform), 6 proximal, 4 basomedian and 5 basolateral setae, terminal sensilla of papillae *A*, *B* and *C* thickened (labium of *ABC* type) (Fig. 4, *3*).

Dorsal setae poorly differentiated into macro- and microsetae, more or less symmetrical (Fig. 4, *1*). *S*-setae well marked and distributed as follows: 2/011/222111 (dorsally), 2/000/000000 (ventrally) and 0, 0, 1 on lower *Sc*. Head with axial unpaired setae a_0 and without $a_{0'}$, d_0 absent as usual for genus. Setae p_1 on head usually at level with p_2. *Th*.1 with 7 + 7 dorsal setae. Lateral *ms* present only on *Th*.2, absent on *Th*.3.

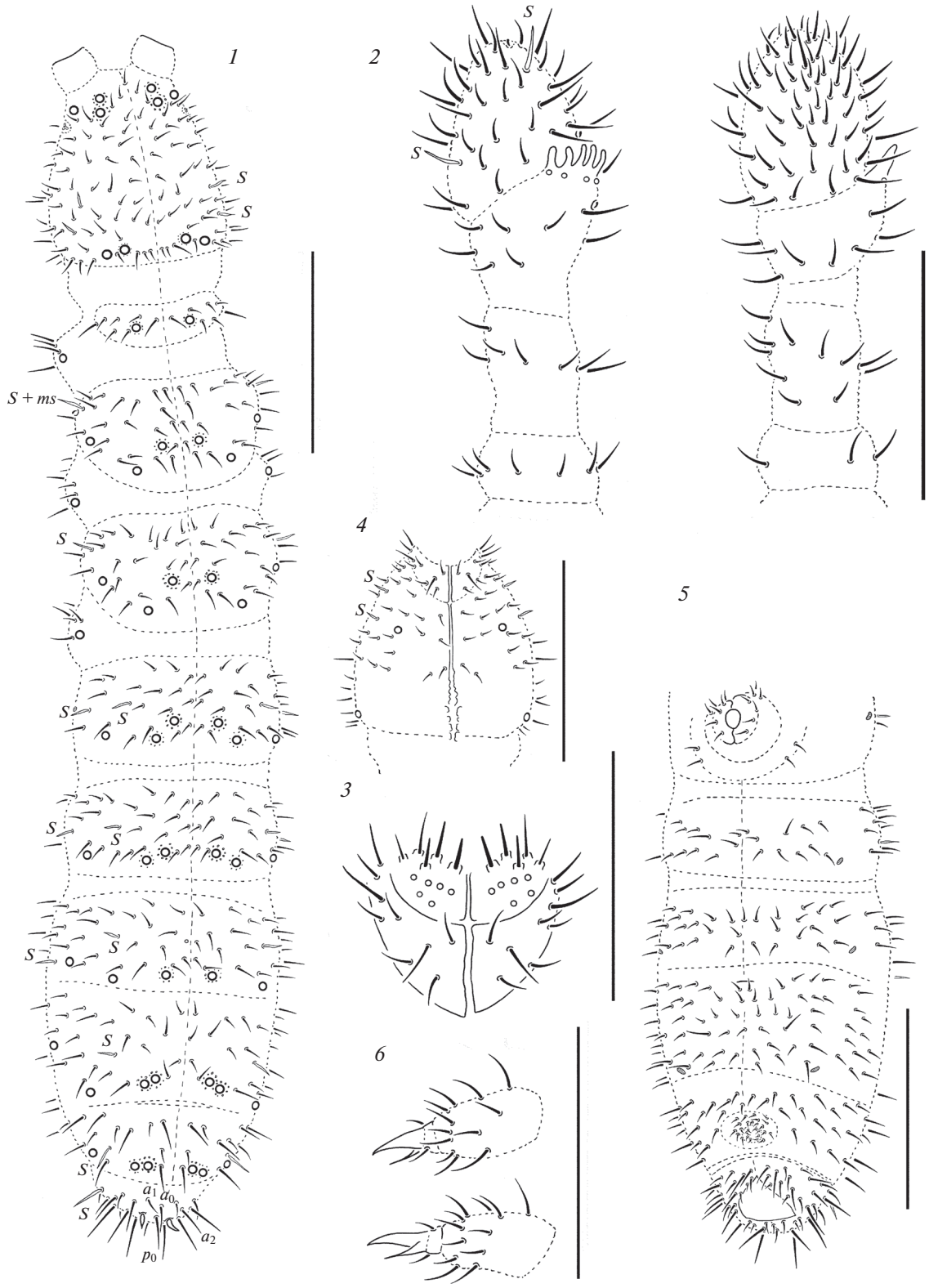

Fig. 4. *Oligaphorura psammophila* sp. n.: *1* – dorsal chaetotaxy; *2* – antenna, different views; *3* – labial palp; *4* – ventral chaetotaxy of head; *5* – ventral chaetotaxy of abdomen; *6* – tip of leg 3. Scales (mm): *1*, *4*, *5* – 0.1; *2*, *3*, *6* – 0.05.

Terga of *Th*.2–*Abd*.3 with 3–4 pairs of axial setae. *Abd*.4 usually with unpaired seta m_0. On *Abd*.6 setae a_0, a_2, p_0 of approximately equal size, and setae a_1 as long as 1/2 of p_0. Thoracic sterna with 0-1-1 setae on each side. Ventral chaetotaxy of abdomen as in Fig. 4, *4*, *5*.

Upper subcoxae of legs 1–3 with 4, 5(6), 5 setae, respectively. Tibiotarsal chaetotaxy most complete of genus with 20–20–19 setae, respectively: distal whorl (*T* + *A*) with 11 setae, 7 *B*-setae (B_7 absent on *Ti* 3), unpaired seta *M* and one seta of *C*-whorl. Unguis without inner or lateral teeth, unguiculus narrow with weak basal lamella, about 0.7 times as long as inner edge of unguis (Fig. 4, *6*). *VT* with 7 + 7 proximal and 2+2 setae at base. Furcal remnant of *S*-type. Each of lateral anal valves with a_0, $2a_1$ setae, upper valve with a_0, $2b_1$, $2b_2$ and 5 setae in *c*-row (b_0 and a_1 absent). Anal spines short (width: length as 1 : 3), set on tiny papillae.

Affinities. *O. psammophila* sp. n. is a member of the "groenlandica"-group, having 11 distal setae on the tibiotarsi and the *S*-type of furcal remnant. Among the known species of this group, it shares the absence of *ms* from *Th*.3 only with *O. ursi*, *O. nataliae*, *O. tuvinica* and *O. sabulosa*. The former species differs from *O. psammophila* sp. n. in having the *A*-type of labium (*ABC* in *O. psammophila* sp. n.). *Oligaphorura nataliae* lacks dorsal *pso* on *Th*.1. *Oligaphorura tuvinica* shows more subcoxal *pso* (333 in *O. tuvinica*, *vs* 111 in *O. psammophila* sp. n.), whereas *O. sabulosa* is characterized by a different number of *pso* on *Abd*.4.

Distribution and ecology. The species seems to have a local distribution within the "Privolzhskaya Lesostep" Nature Reserve being found only in one area, so called "Kuncherovsky" cluster. It can be treated as a psammobiont clearly preferring sandy soils in the region under study.

Etymology. The species is named after its ecological preferences, being recorded in sandy soils.

Key to the *Oligaphorura* species from the forested steppe zone of Russia

1 Anal spines absent..... 2

– Anal spines present..... 3

2 4 + 4 *pso* at antennal base, tibiotarsi with 6 distal setae..... *O. humicola*

Species of the "marcuzzii"-group: 42/133/33354 (dorsal *pso*), 11/000/1111 (ventral *pso*), 222 (subcoxal *pso*), *ABD* labium, *H*-type of furcal remnant, *ms* on *Th*.3 absent, *AS* absent

– 3 + 3 pso at antennal base, tibiotarsi with 7 distal setae .....*O. stojkoae*

Species of the "daii"-group: 32/133/33343 (dorsal *pso*), 11/000/0000 (ventral *pso*), 111 (subcoxal *pso*), *ABC* labium, *D*-type of furcal remnant, *ms* on *Th*.3 absent, *AS* absent

= 3 + 3 *pso* at antennal base, tibiotarsi with 11 distal setae..... *O. serratotuberculata*[2]

Ant.3–4 fused, 32/122/33343 (dorsal *pso*), 11/000/11111 (ventral *pso*), 111 (subcoxal *pso*), *ABC* labium, *ms* on *Th*.3 present, *S*-type of furcal remnant, *Abd*.5 and 6 fused dorsally, *AS* absent

3 Tibiotarsi with distal 9 setae..... 4

= Tibiotarsi with 11 distal setae..... 5

4 *AO* with 5 papillae..... *O. imosolica* sp. n.

Species of the "differens"-group: 32/133/33343 (dorsal *pso*), 11/000/0000 (ventral *pso*), 111 (subcoxal *pso*), *ABC* labium, *D*-type of furcal remnant, with *ms* on *Th*.3, 9 distal setae on tibiotarsi, dorsal sensilla poorly differentiated

– *AO* with 4 papillae..... *O. sophyae*

Species of the "differens"-group: 32/133/33343 (dorsal *pso*), 11/000/0000 (ventral *pso*), 111 (subcoxal *pso*), *AC* labium, *D*-type of furcal remnant, 9 distal setae on tibiotarsi, *ms* on *Th*.3 present

5 Furcal remnant of *D*-type..... 6

– Furcal remnant of *S*-type..... 7

= Furcal remnant *A*-type..... 8

6 *Abd*.4 with 4 + 4 dorsal *pso*..... *O. sibirica*

Species of the "alnus"-group: 32/133/33343 (dorsal *pso*), 11/000/0000 (ventral *pso*), 111 (subcoxal *pso*), *AC* labium, *D*-type of furcal remnant, with *ms* on *Th*.3, 11 distal setae on tibiotarsi

– *Abd*.4 with 5 + 5 dorsal and without ventral *pso*.....*O. inya*

Species of the "alnus"-group: 32/133/33353 (dorsal *pso*), 11/000/0000 (ventral *pso*), 111 (subcoxal *pso*), *AC* labium, *D*-type of furcal remnant, with *ms* on *Th*.3, 11 distal setae on tibiotarsi

= *Abd*.4 with 5 + 5 dorsal and with 1 + 1 ventral *pso*.....*O. pseudoinya*

Species of the "alnus"-group: 32/133/33353 (dorsal *pso*), 11/000/0001 (ventral *pso*), 111 (subcoxal *pso*), *AC* labium, *D*-type of furcal remnant, with *ms* on *Th*.3, 11 distal setae on tibiotarsi

7 Upper subcoxae of legs 1–3 with 3-3-3 *pso*..... .....*O. tuvinica*

Species of the "groenlandica"-group: *pso* 32/133/33343 (dorsal *pso*), 11/000/0000 (ventral *pso*), 333 (subcoxal *pso*), *ABC* labium, *S*-type of furcal remnant, *Th*.3 without *ms*, tibiotarsi with 11 distal setae

– Upper subcoxae with 1-1-1 *pso*..... .....*O. psammophila* sp. n.

Species of the "groenlandica"-group: *pso* 32/133/33343 (dorsal *pso*), 11/000/0000 (ventral *pso*), 111 (subcoxal *pso*), *ABC* labium, *S*-type of furcal remnant, *Th*.3 without *ms*, tibiotarsi with 11 distal setae

[2] This species has not yet been registered in the forested steppe zone of Russia, although it is rather common in the neighboring belt of broad-leaved forests (Chernov et al., 2010). Its morphology is given after Pomorski (1998).

8 *AO* with 4 short papillae, *Th*.3 without *ms*..... .....*O. absoloni*

Species of the "absoloni"-group: 32/133/33343 (dorsal *pso*), 11/000/0000 (ventral *pso*), 111 (subcoxal *pso*), *AC* labium, *A*-type of furcal remnant, tibiotarsi with 11 distal setae

– *AO* with 5 papillae, *ms* on *Th*.3 present..... 9

9 *Th*.1 without *pso*.....*O. jiguliensis* sp. n.

Species of the "absoloni"-group: 32/033/33343 (dorsal *pso*), 11/000/0000 (ventral *pso*), 111 (subcoxal *pso*), *AC* labium, *A*-type of furcal remnant, *Th*.3 with *ms*, tibiotarsi with 11 distal setae, *AS* thin and long, without papillae, *Abd*.5 often with unpaired seta p_0

– With 1 + 1 *pso* on *Th*.1.....10

10 Thoracic sterna without setae.....*O. uralica*

Species of the "absoloni"-group: large species with coarse granulations, especially on *Abd*.6, *AS* strong, *PAO* about twice as nearest *pso*, 32/133/44454 (dorsal *pso*), 11/000/1(2)1120 (ventral *pso*), 233 (subcoxal *pso*), *AC* labium, *A*-type of furcal remnant, *Th*.3 with *ms*, tibiotarsi with 11 distal setae

– Thoracic sterna with 0-1-1 setae..... .....*O. mazeii* sp. n.

Species of the "absoloni"-group: body small and thin, granulation uniform, *AS* thin, *PAO* about as large as nearest *pso*, 32/133/33343 (dorsal *pso*), 11/000/0000 (ventral *pso*), 111 (subcoxal *pso*), *ABC* labium, *A*-type of furcal remnant, *Th*.3 with *ms*, tibiotarsi with 11 distal setae, well-marked sensilla, *Abd*. 5 often with unpaired seta p_0

CONCLUSIONS

Together with the newly described species, the genus *Oligaphorura* presently includes about 65 species and, according to Bellinger et al. (1996–2020), it is inferior in diversity only to three genera of the family Onychiuridae: *Protaphorura* (138 species), *Deuteraphorura* (83) and *Thalassaphorura* (67). Despite this assessment of the generic diversity is conventional because of many taxonomic problems, the high species richness of the genus *Oligaphorura* is beyond doubt. Equally unequivocal is its high heterogeneity. The species groups identified above probably fail to exhaust the existing intrageneric diversity. Moreover, many of them can hardly be considered natural, since they are based solely on external morphological traits. Yet they definitely facilitate the assessment of the existing generic diversity. To establish true genetic relationships, extensive molecular studies are necessary. Unfortunately, this is a rather distant perspective, but not the nearest future for the given group.

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НОВЫЕ ВИДЫ РОДА *OLIGAPHORURA* (COLLEMBOLA, ONYCHIURIDAE) ИЗ ЛЕСОСТЕПНОЙ ЗОНЫ РОССИИ

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Описаны четыре новых вида рода *Oligaphorura* из лесостепной зоны европейской части России, а именно *O. mazeii* sp. n., *O. jiguliensis* sp. n., *O. imosolica* sp. n. и *O. psammophila* sp. n. Первые два вида характеризуются полным набором дистальных хет на тибиотарзусах и рудиментом прыгательной вилки в виде кутикулярной складки с 1 + 1 хетами позади нее. *Oligaphorura mazeii* sp. n. формально наиболее близок к китайскому виду *O. shifangensis* Liu et al. 2019. Эти виды легко различимы по строению нижней губы и количеству сенсилл на грудных сегментах (нижняя губа типа *ABC* и 022 сенсиллы на *Th*.1–3 у *O. mazeii* sp. n. *vs AC*-тип и 011 сенсиллы у *O. shifangensis*). *Oligaphorura jiguliensis* sp. n. выделяется среди близких видов, имеющих латеральные микросенсиллы на мезо- и метатораксах, а именно *O. changbaiensis* Sun et Wu 2012, *O. shifangensis*, *O. uralica* (Khanislamova 1986) и *O. mazeii* sp. n., отсутствием псевдоцелей на первом грудном сегменте. Третий новый вид *O. imosolica* sp. n. предпочитает глубокие почвенные горизонты. Он имеет только 9 дистальных хет на тибиотарзусах и рудимент прыгательной вилки в виде области с мелкой грануляцией, позади которой расположены 1 + 1 хеты. *O. imosolica* sp. n. близок к *O. differens* (Bagnall 1949), но характеризуется иным набором дорсальных сенсилл (2/011/22211 ясно выраженные сенсиллы у *O. differens vs* 10/011/0001(0)1(0)0 плохо заметные сенсиллы у нового вида). Последний описанный вид, *O. psammophila* sp. n., с 11 дистальными хетами на тибиотарзусах, рудиментом вилки в виде кутикулярной складки и 2 + 2 хетами позади нее наиболее похож на *O. tuvinica* Potapov et Stebaeva 1997, но имеет иное число субкоксальных псевдоцеллей (111 *pso* у нового вида *vs* 333 *pso* у *O. tuvinica*). Предложено деление рода на семь групп, которые объединяют виды с более высоким уровнем морфологического сходства. Дан определительный ключ для всех 14 видов рода, встречающихся в регионе.

Ключевые слова: таксономия, *Oligaphorurini*, европейская часть России, лесостепная зона, ключ