Zootaxa 4990 (1): 117–133
https://www.mapress.com/j/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.4990.1.7
http://zoobank.org/urn:lsid:zoobank.org:pub:AD076194-6D97-4559-B6C9-E81CF0774BB0

The harvestmen fauna (Arachnida: Opiliones) of the Katunsky Biosphere Reserve and adjacent territories (South Siberia, Russia), with a description of a new species of *Sabacon* (Sabaconidae) and notes on *Sabacon sergeidedicatum* Martens, 1989

LAIMONAS A. TRILIKAUSKAS[1] & GALINA N. AZARKINA[2, *]

[1]*The Laboratory of Invertebrate Ecology, The Institute of Systematics and Ecology of Animals, Siberian Branch Russian Academy of Sciences, Frunze Street 11, Novosibirsk 630091, Russia.*
laimont@mail.ru; https://orcid.org/0000-0003-4520-8529

[2]*The Laboratory of Systematics of Invertebrate Animals, The Institute of Systematics and Ecology of Animals, Siberian Branch Russian Academy of Sciences, Frunze Street 11, Novosibirsk 630091, Russia and Department of Zoology & Centre for Invasion Biology, University of Venda, Thohoyandou, 0950, South Africa.*

[*]*Corresponding author: urmakuz@gmail.com; https://orcid.org/0000-0002-9328-3913*

Abstract

An annotated list of harvestmen species (six species in two families) of the Katunsky Biosphere Reserve and adjacent territories in the Altai Republic, Russia is provided. A new species, *Sabacon zateevi* **sp. nov.** (♂ ♀ from the Altai Mountains, Russia), is described. *Liropilio stukanovi* Gritsenko, 1979 is recorded from Russia for the first time, and appearance and diagnostic features of its male are described. The appearance of a living specimen of the female of *Homolophus nordenskioeldi* (C.L. Koch, 1879) is also provided. For all the studied species, biotope preferences and distribution are discussed. Additional information on morphology and distribution of *Sabacon sergeidedicatum* Martens, 1989 is given.

Key words: Altai Mountains, *Liropilio*, *Sabacon zateevi* **sp. nov.**, State Nature Reserve

Introduction

The study of Siberian harvestmen fauna began in the 19th century (Koch 1879), but information remains insufficient and uneven. In recent decades, only a few papers have been published on the harvestmen of Southern Siberia (e.g., Martens 1989; Tchemeris *et al.* 1999; Tsurusaki *et al*. 2000; Chemeris & Logunov 2001, Trilikauskas 2013, 2016, 2017; Tchemeris 2015). To date, focused research on the harvestmen fauna of specially protected natural regions of Russia has never been studied. The papers listed above contain scattered information on harvestmen from the Altai Mountains, and only a single record of *Acanthomegabunus sibiricus* Tsurusaki, Tchemeris & Logunov, 2000 near the northern border of the Katunsky Biosphere Reserve (Tchemeris 2015).

The Katunsky Biosphere Reserve is located at the headwaters of the Katun' River, in the Ust-Koksa District of the Altai Republic. Its territory includes the northern slopes of the Katunsky and Listvyaga Mountain Ranges (Map 1).

The aims of the present paper are: (1) to provide a list of and to map all the harvestmen species recorded from the Katunsky Biosphere Reserve, (2) to illustrate *Liropilio stukanovi* Gritsenko, 1979, the first specimen found since its original description, (3) to provide photographs of living specimens of *Homolophus nordenskioeldi* (C.L. Koch, 1879) and *L. stukanovi*, (4) to illustrate and describe a new species of *Sabacon* from the Altai Republic of Russia, and (5) to provide additional information on the morphology and distribution of *Sabacon sergeidedicatum* Martens, 1989.

Accepted by J. Shultz: 25 May 2021; published: 18 Jun. 2021

MAP 1. Records of Opiliones from the Katunsky Biosphere Reserve and neighbouring territories: 1—Katunsky Biosphere Reserve, head of Ozernaya River, shore of Taimenye Lake, near the ranger station; 2—Same locality, vicinities of Taimenye Lake, middle reaches of the Kharyuzovka River; 3—Same locality, NW shore of Taimenye Lake; 4—SE shore of Taimenye Lake; 5—Katunsky Biosphere Reserve, bank of Taimenye Lake near Soloukha River mouth; 6—Upper reaches of Katun' River, Ozernaya River mouth; 7—Katunsky Biosphere Reserve, upper reaches of Katun' River, left bank of Zaichikha River near its mouth; 8—same locality, 4 km NE of the ranger station.

Material and methods

A total of 437 specimens belonging to two families have been examined; all of them were collected by the first author (LT) by means of pitfall traps, sweep nets, and hand collecting in 2019–2020 except for those where authors are mentioned. The specimens were preserved and studied in 70% ethanol, and their colouration refers to that of preserved specimens. All drawings were made with the aid of a reticular eyepiece attached to an MBS–10 stereomicroscope. Ovipositors were detached and stained with Amido Black 10B. Digital images of preserved specimens were taken with a Canon EOS 550D attached to a Zeiss Stemi 2000–C stereomicroscope. Stacked images were combined using Helicon Focus 6.3 software. SEM micrographs were taken with SEM Hitachi TM–1000 at ISEA: material was mounted using adhesive and dried for a few hours. Photos of living specimens were taken with Canon EOS 1100D and Canon EOS 6D cameras. After photos were taken and drawings had been made, harvestmen body parts were placed into microvials and are stored with the corresponding specimens. The drawings were edited in Adobe Photoshop and CorelDraw. Map 2 was produced using the online mapping software SimpleMappr (Shorthouse 2010).

The specimens studied in the present paper have been deposited in the following collections:

ISEA—Institute of Systematics and Ecology of Animals, Novosibirsk, Russia (Curator G.N. Azarkina);

MMUE—The Manchester Museum, The University of Manchester, UK (Curator D.V. Logunov);

PCLT—Personal collection of L.A. Trilikauskas.

The terminology follows Suzuki (1983) and Martens (1978, 2015). All measurements are in millimetres (mm).

Results

Family *Phalangiidae* Latreille, 1802

Only four species of harvestmen, except for the five species listed below, *Homolophus asiaticus* Gritsenko, 1979, *Opilio parietinus* (De Geer, 1778), *Homolophus pallens* (Kulczyński, 1901), and *Scleropilio insolens* (Simon, 1895), are known to date from Russian part of Altai-Sayan Mountain region (Tchemeris *et al*. 1999; 2015; Tsurusaki *et al*. 2000a).

Acanthomegabunus sibiricus Tsurusaki, Tchemeris & Logunov, 2000

Acanthomegabunus sibiricus Tsurusaki *et al*. 2000b: 74, figs 1– 4.
Acanthomegabunus sibiricus Tchemeris 2015: 568, figs 1, 5, 14–15, 17.

Comments. *Acanthomegabunus sibiricus* is the only species previously known from the Katunsky Biosphere Reserve. The species was recorded from the vicinity of Srednee Multinskoe Lake (erroneously named Srednee Kuktinskoe Lake) (Tchemeris 2015). The lake is actually located outside the reserve, close to its northern border where the reserve's ranger station is situated, although this record requires confirmation because it is based on a single female. A closely related species, *A. altaicus* Tchemeris, 2015, may also occur there—its type locality lies close to the Katunsky Reserve (East Kazakhstan Area, Katon-Karagaiskii Districts).

Habitat. Mountain moss-stony tundra, moss-pebble riverbanks, *Abies* forest, *Anemone* meadows, stony debris, dark coniferous forests, and aspen-fir forests (Tsurusaki *et al*. 2000b; Trilikauskas 2016, 2017).

Distribution. The mountains of South Siberia, Russia: the southern part of Krasnoyarsk Territory, Altai Territory, and Altai Republic, Kemerovo Area, Khakassia, and Tuva (Tchemeris 2015).

Homolophus nordenskioeldi (C.L. Koch, 1879)

Figure 1

Farzalieva & Esyunin 2000: 193, figs 67–73.
Tchemeris *et al*. 1999: 189, figs 1–7.
Snegovaya & Cokendolpher 2021: 338, figs 28–29.

Material examined. RUSSIA: Altai Republic: Ust'-Koksa District: 1 ♂ (ISEA O.001.0250), Katunsky Biosphere Reserve, upper reaches of the Katun' River, left bank of Zaichikha River, near mouth, [49°37'08.3"N, 85°43'03.8"E], 1302 m a.s.l., 15–26.VIII.2020; 1 ♀ (ISEA O.001.0251), Katunsky Biosphere Reserve, c. 4 km NE of the Zaichikha ranger station, [49°36'25.6"N, 85°44'13.4"E], 1511 m a.s.l., 16.VIII.2020.

Habitat. Dry valley meadow and synanthropic habitats (Tchemeris *et al*. 1999); scree, big stones near *Salix*, and grass thickets on small riverbanks (in Katunsky Biosphere Reserve).

Distribution. Finland to Korea (Tchemeris *et al*. 1999).

Liropilio stukanovi Gritsenko, 1979

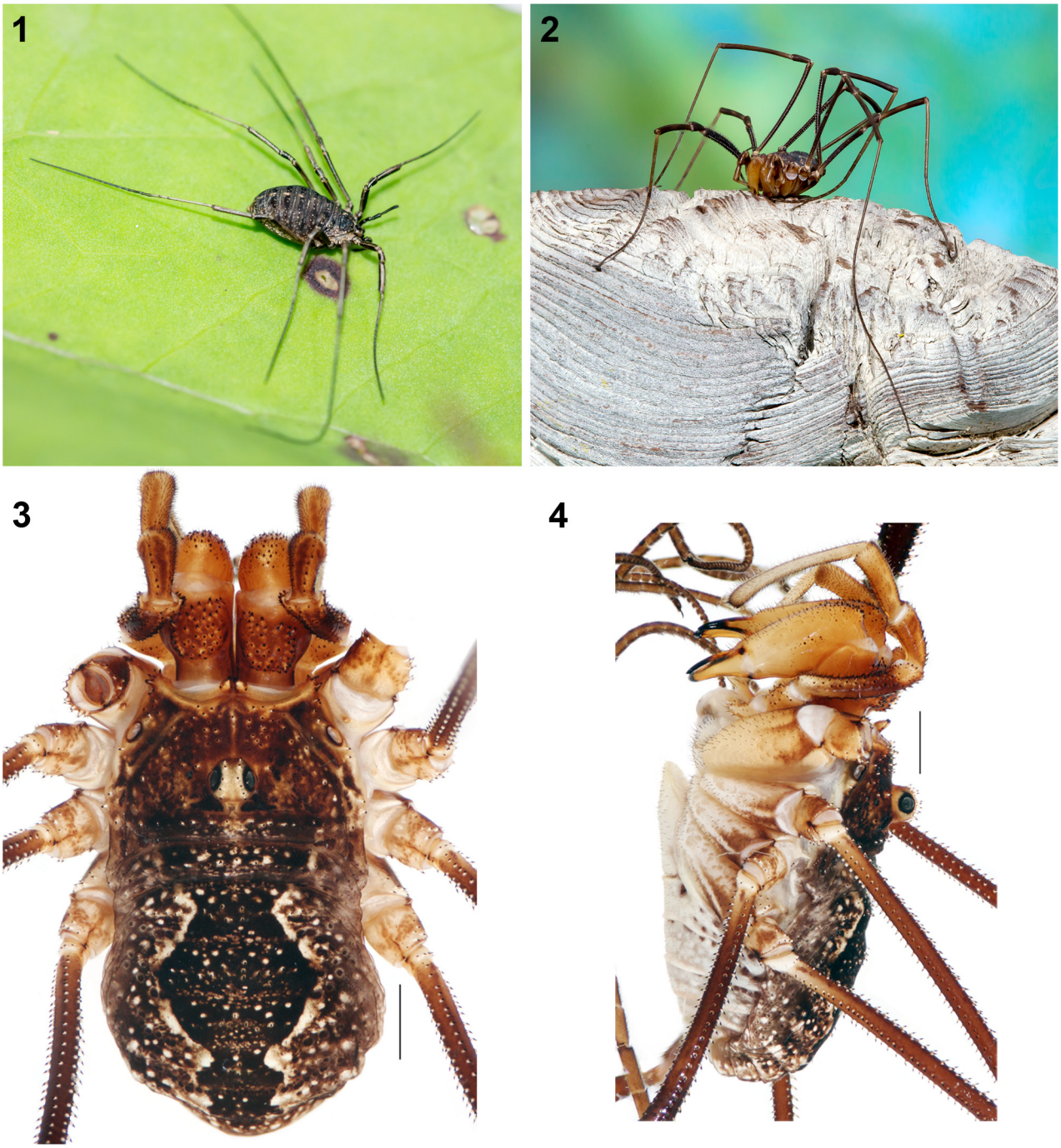
Figures 2–15

Gritsenko, 1979: 266, figs 7–13

Material examined. RUSSIA: Altai Republic: Ust'-Koksa District: 1 ♂ (ISEA O.001.0288), Katunsky Biosphere

Reserve, NW shore of Taimenye Lake, [49°49’35.9”N, 85°48’25.5”E], 1745–1760 m a.s.l., scree, 8.VIII.2019; 4 ♂, 1 ♀ (PCLT), Katunsky Biosphere Reserve, head of the Ozernaya River, shore of Taimenye Lake, near the ranger station, [49°48’40.9–42.9”N,85°47’57.2–57.6”E], 1509 m a.s.l., 10.VIII.2019; 2 ♂ (PCLT), upper reaches of the Katun’ River, mouth of Ozernaya River, [49°40’16.7”N, 85°41’49.6”E], 1268 m a.s.l., 14.VIII.2019.

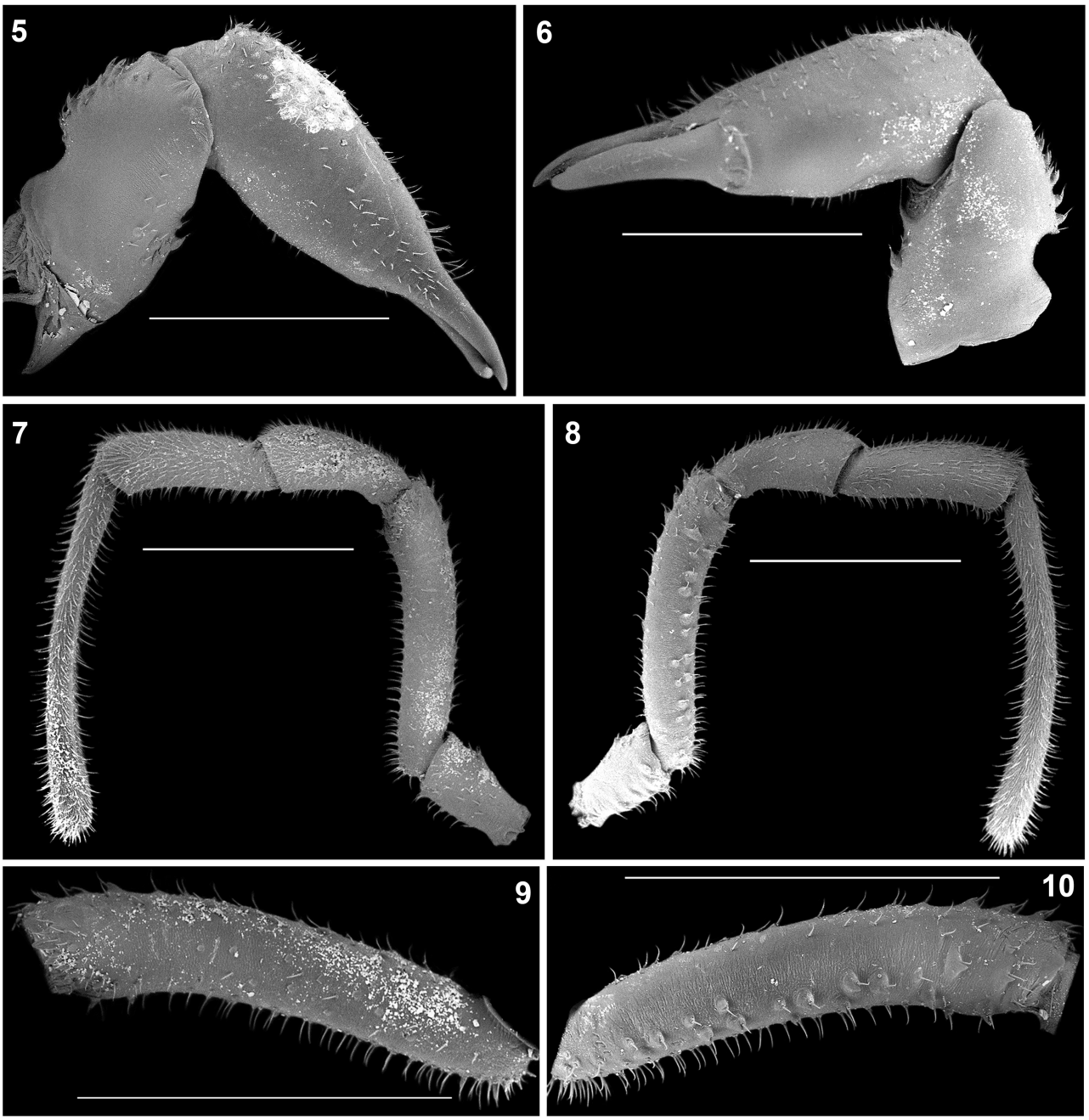
Comments. The species was described from the Ivanovsky Mountain Range in north-eastern Kazakhstan (Gritsenko 1979) and has not been found since; this is the first record for the species from Russia. The genus *Liropilio* is morphologically similar to *Zacheus* C.L. Koch but differs by the presence of a tubercle with denticles on the basal segment of the pedipalps (Figs 3–6) and an alate part on the penis, apically (Figs 11–15). Palpal femur, trochanter, and tibia of this species slightly thickened latero-apically, densely covered with short, stout setae. Palpal femur bordered dorso-apically, with two rows of teeth ventro-retrolaterally, tarsus covered with setae (Figs 3–4, 7–10).



FIGURES 1–4. General appearances of the female of *Homolophus nordenskioeldi* (C.L. Koch, 1879) (1) and the male of *Liropilio stukanovi* Gritsenko, 1979 (2–4): 1–2 Live specimens; 3–4 Ethanol-preserved specimens, 3 Dorsal view, 4 Lateral view. Scales: 1 mm (3–4).

Habitat. Scree, edges of mixed forests (*Pinus silvestris*, *Abies sibirica, Betula pendula*), stony riverbanks overgrown by moss and grass. The habitat of the type locality is unknown (Gritsenko 1979).

Distribution. Eastern Kazakhstan (Ivanovsky Mountain Range, West Altai) and Altai Republic, Russia (Katunsky Mountain Range).



FIGURES 5–10. *Liropilio stukanovi* Gritsenko, 1979, SEM micrographs: 5 Chelicera, prolateral view; 6 Same, retrolateral view; 7 Palp, prolateral view; 8 Same, retrolateral view; 9 Palpal femur, prolateral view; 10 Same, retrolateral view. Scales: 1mm.

Mitopus morio (Fabricius, 1779)

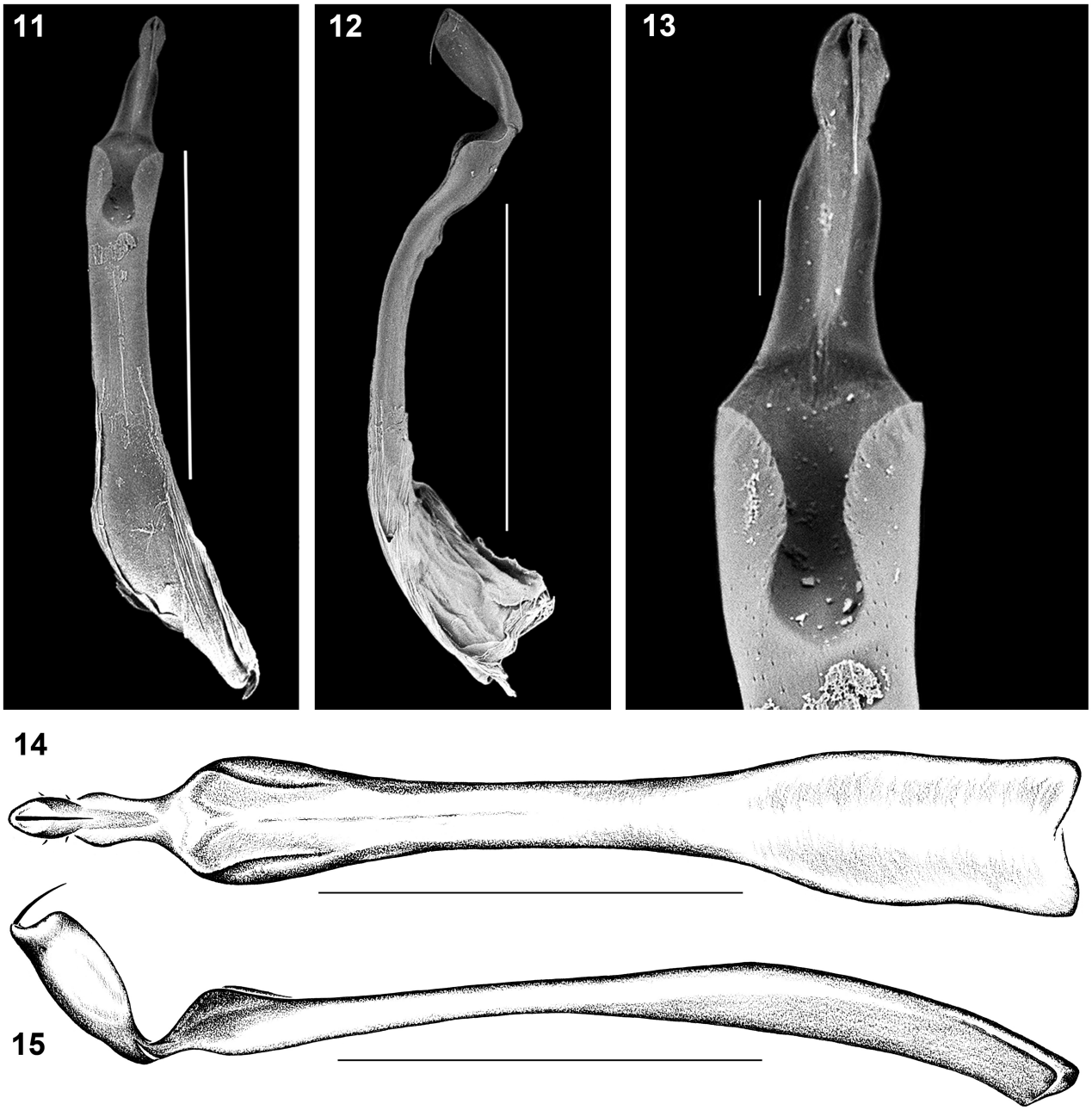
Farzalieva & Esyunin 2000: 186, figs 8–17, 87.
Tchemeris *et al*. 1999: 194, figs 15–23.

Material examined. RUSSIA: Altai Republic: Ust'-Koksa District: 4 ♂, 2 ♀ (PCLT), Katunsky Biosphere Reserve, bank of Taimenye Lake near Soloukha River mouth, [49°50'11.6"N, 85°51'07.7"E], 1534 m a.s.l., 7.VIII.2019; 1

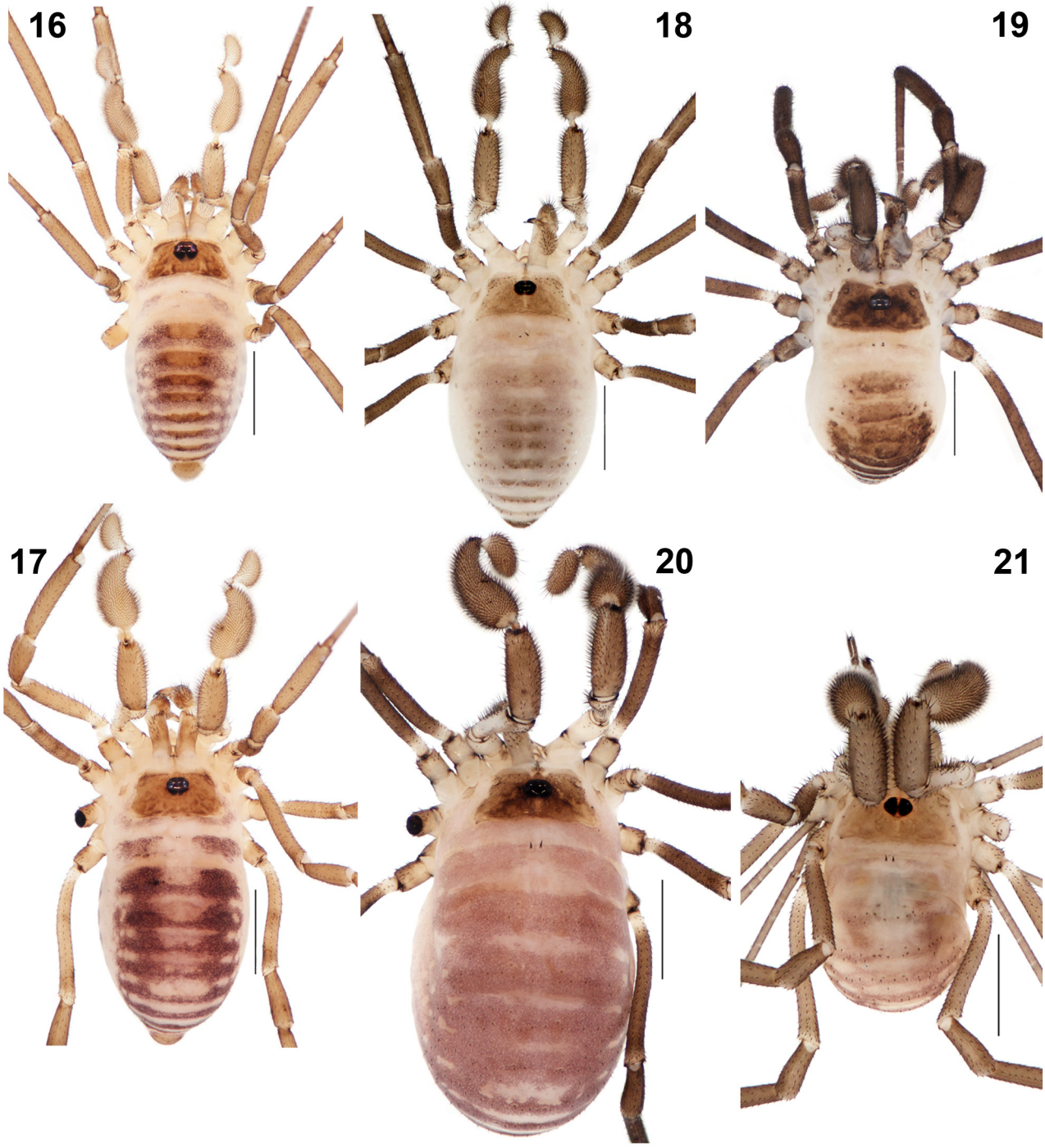
♂, 1 ♀ (PCLT), Katunsky Biosphere Reserve, head of the Ozernaya River, shore of Taimenye Lake, near the ranger station, [49°48’40.9–42.9”N,85°47’57.2–57.6”E], 1509 m a.s.l., 10.VIII.2019; 1 ♂, 3 ♀ (PCLT), Katunsky Biosphere Reserve vicinities of Taimenye Lake, middle reaches of Kharyuzovka River, [49°48’53.6”N, 85°47’42.0”E], 1652–1660 m a.s.l., 11.VIII.2019; 6 ♀ (PCLT), SE shore of Taimenye Lake, [49°48’08.2”N, 85°48’00.5”E], 1551 m a.s.l., 7–13.VIII.2019; 13 ♂, 5 ♀ (ISEA O.001.0253), 11 ♂, 11 ♀ (PCLT), Katunsky Biosphere Reserve, upper reaches of the Katun’ River, left bank of Zaichikha River, near its mouth, [49°37’08.3”N, 85°43’03.8”E] , 1302 m a.s.l., 15–26.VIII.2020; 1 ♂ (PCLT), Katunsky Biosphere Reserve, 4 km NE of the Zaichikha ranger station, [49°36’25.6”N, 85°44’13.4”E], 1511 m a.s.l., 16.08.2020.

Habitat. Mesophytic and moist meadows and clearings in birch and mixed forests, sloping mesophytic steppes, in sparse mountain larch forest, as well as agricultural areas (Tchemeris *et al.* 1999); blueberry-green moss and grass-green moss spruce forests and spruce woodland, *Abies sibirica* forest, subalpine grass meadow, thickets of sedge near lakes and streams (in Katunsky Biosphere Reserve).

Distribution. Holarctic (Tchemeris *et al.* 1999).



FIGURES 11–15. *Liropilio stukanovi* Gritsenko, 1979, SEM micrographs (11–13): 11, 14 Penis, dorsal view; 12, 15 Same, lateral view; 13 Glans and apical part, dorsal view. Scales: 1mm (11–12, 14–15), 0.1 mm (13).



FIGURES 16–21. General appearances of *Sabacon sergeidedicatum* Martens, 1989 (16–17) and *S. zateevi* **sp. nov.** (18 Holotype, 19–21 paratypes): 16, 18–19 Males; 17, 20–21 Females. Scales: 1 mm.

Oligolophus tridens (C.L. Koch, 1836)

Farzalieva & Esyunin 2000: 188, figs 27–34, 96.
Tchemeris *et al*. 1999: 196, figs 24–31.

Material examined. RUSSIA: Altai Republic: Ust'-Koksa District: 1 ♂, 4 ♀ (ISEA O.001.0254), 11 ♂, 20 ♀ (PCLT), Katunsky Biosphere Reserve, upper reaches of the Katun' River, left bank of Zaichikha River near its mouth, [49°37'08.3"N, 85°43'03.8"E], 1302 m a.s.l., 15–26.VIII.2020.

Habitats. Mesophytic meadows and clearings in birch or mixed forests (Tchemeris *et al.* 1999); grass-green moss spruce forests (in Katunsky Biosphere Reserve).

Distribution. Europe to Siberia (up to Yenisei River) (Tchemeris *et al.* 1999).

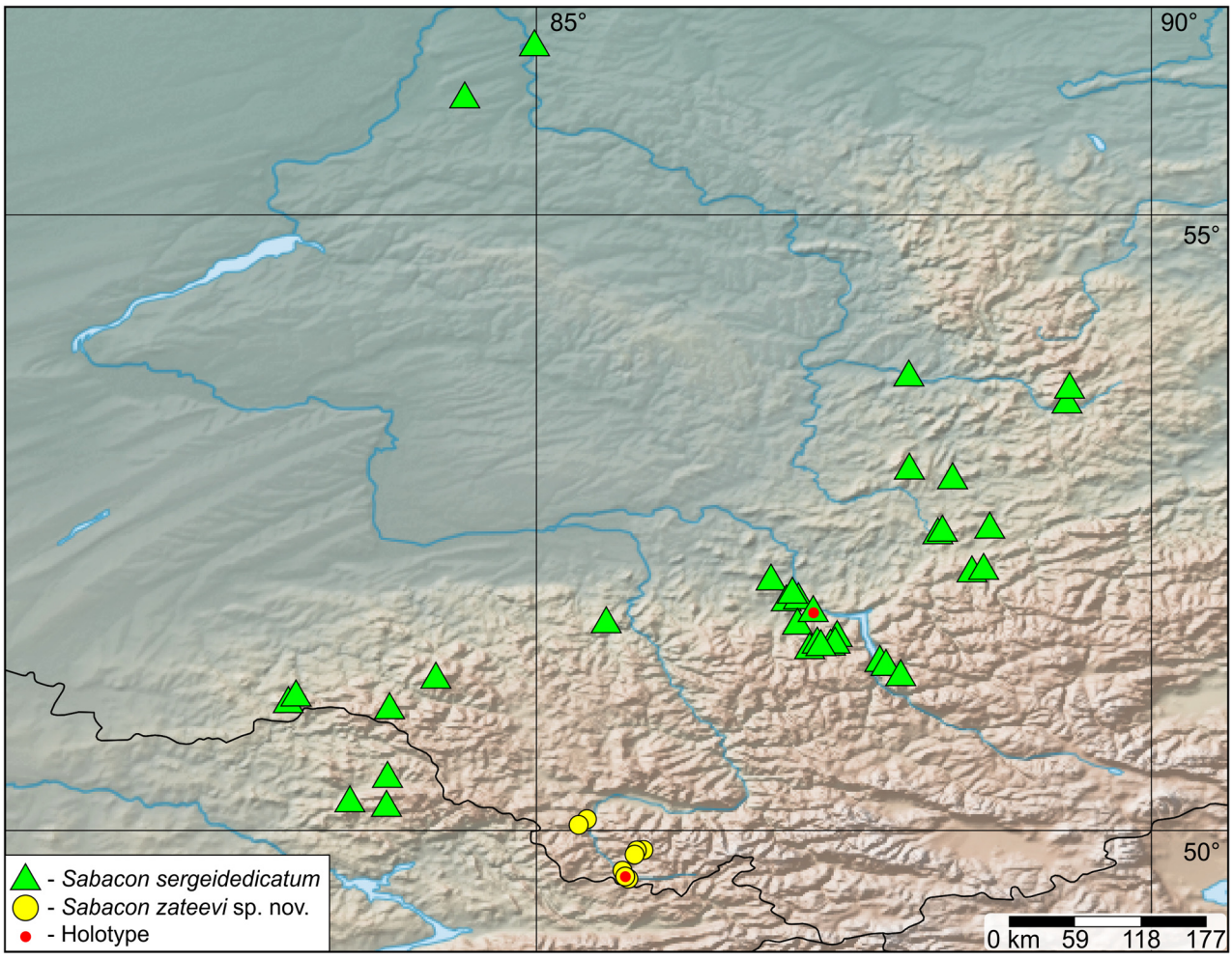
Phalangium opilio Linnaeus, 1758

Farzalieva & Esyunin 2000: 189, figs 35–46, 94.
Tchemeris *et al*. 1999: 198, figs 49–58.

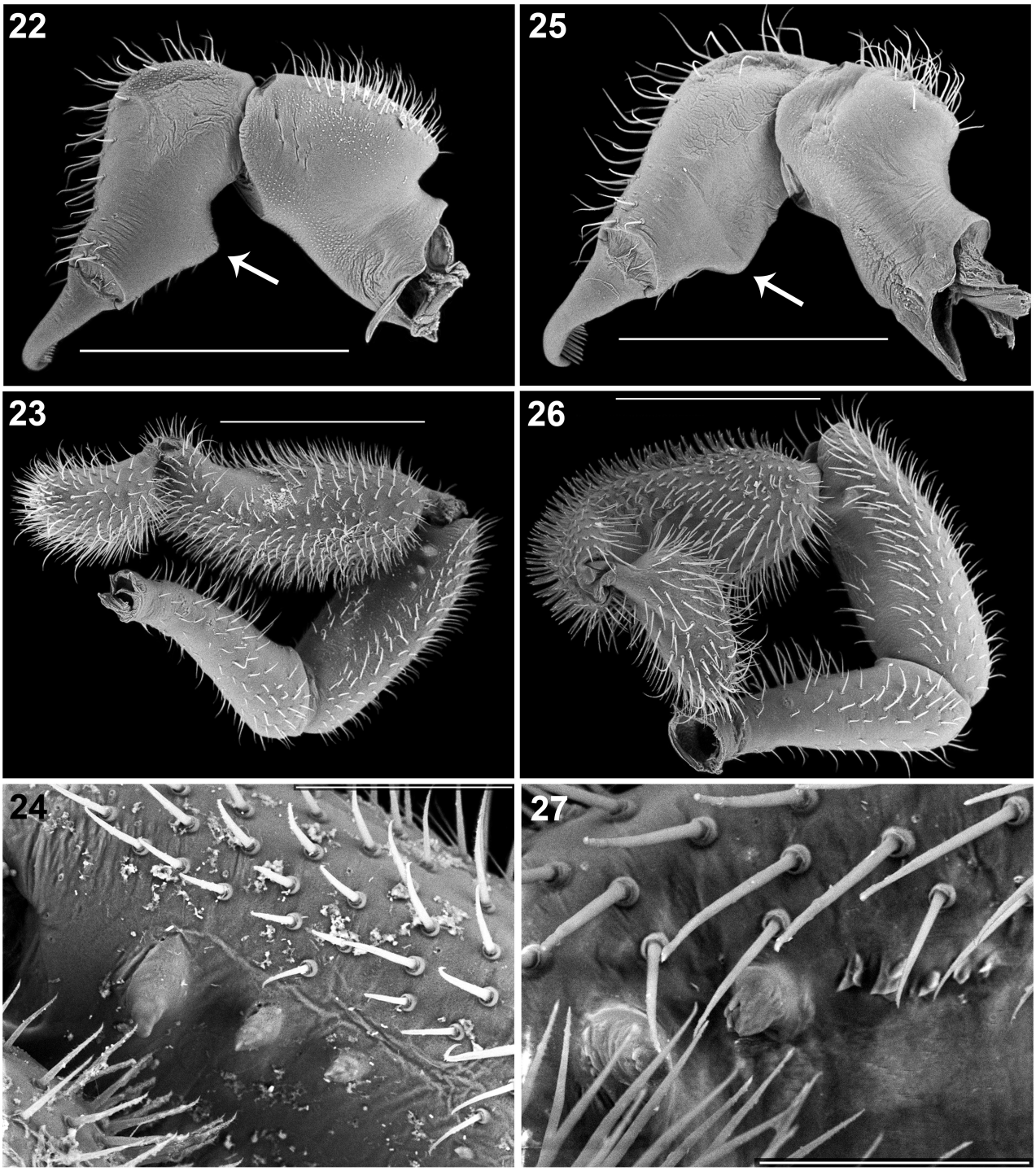
Material examined. RUSSIA: Altai Republic: Ust'-Koksa District: 3 ♀ (PCLT), Katunsky Biosphere Reserve, head of the Ozernaya River, shore of Taimenye Lake, near the ranger station, [49°48'40.9–42.9"N,85°47'57.2–57.6"E], 1509 m a.s.l., 10.VIII.2019; 1 ♀ (PCLT), Katunsky Biosphere Reserve, vicinities of the Taimenye Lake, middle reaches of Kharyuzovka River, [49°48'53.6"N, 85°47'42.0"E], 1652–1660 m a.s.l., 11.VIII.2019; 1 ♀ (PCLT), SE shore of Taimenye Lake, [49°48'08.2"N,85°48'00.5"E], 1551 m a.s.l., 7–13.VIII.2019; 2 ♀ (PCLT), Katunsky Biosphere Reserve, upper reaches of the Katun' River, left bank of Zaichikha River near its mouth, [49°37'08.3"N, 85°43'03.8"E], 1302 m a.s.l., 15–26.VIII.2020.

Habitat. Moist and mesophytic deciduous and mixed forests and anthropogenic habitats (Tchemeris *et al.* 1999); blueberry-green moss and grass-green moss spruce forests (in Katunsky Biosphere Reserve).

Distribution. Holarctic (Tchemeris *et al.* 1999).



MAP 2. Distribution of *Sabacon sergeidedicatum* and *Sabacon zateevi* **sp. nov.**



FIGURES 22–27. *Sabacon sergeidedicatum* Martens, 1989 (22–24) and *S. zateevi* **sp. nov.** (25–27, paratype from ISEA), scanning electron macrographs: 22, 25 Chelicera, retrolateral view; 23, 26 Palp, retrolateral view; 24, 27 Palpal patella, retrolatero-ventral view. Scales: 0.5 mm (22–23, 25–26), 0.1 (24, 27).

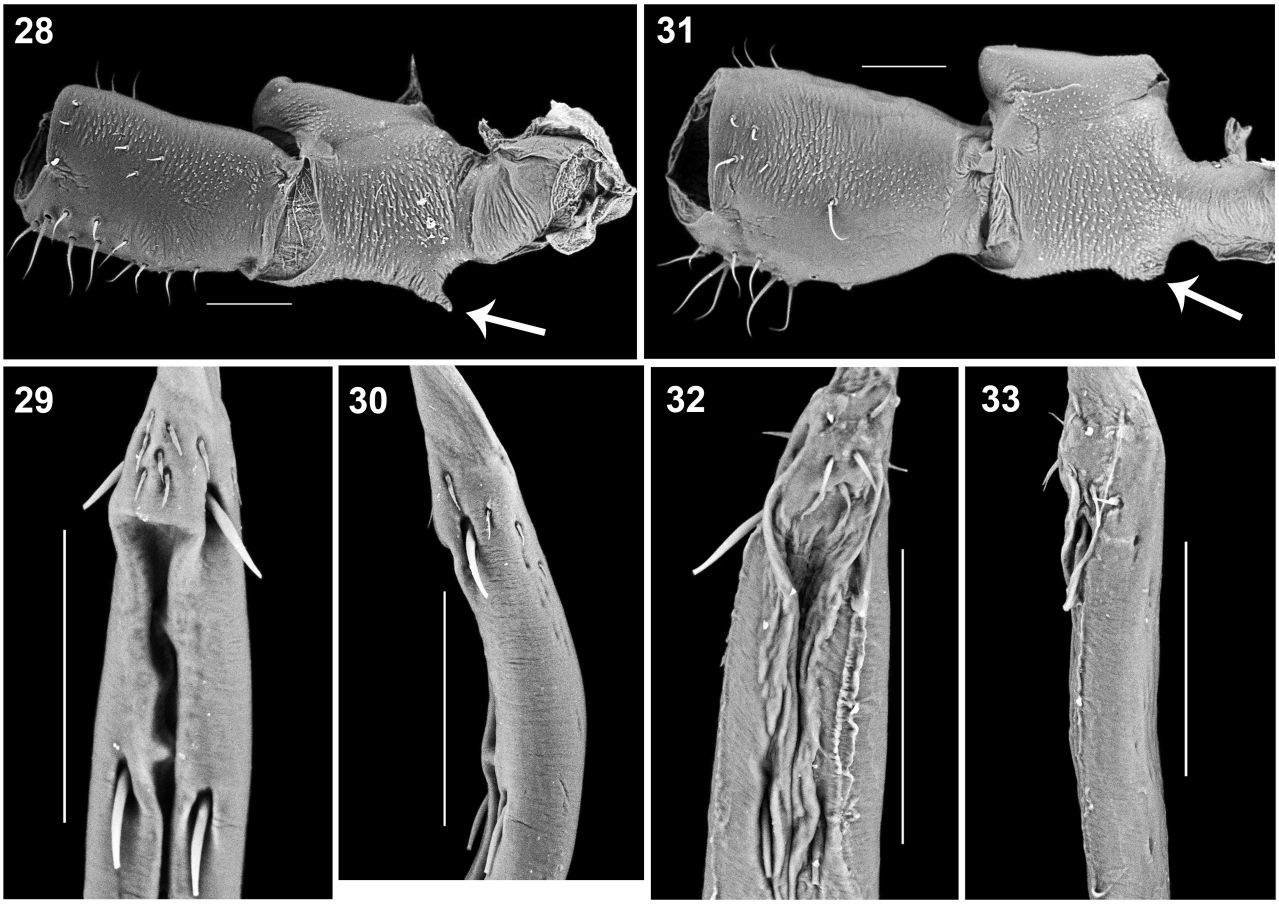
Family *Sabaconidae* Dresco, 1970

To date, only two species of Sabaconidae, *Sabacon crassipalpe* (L. Koch, 1879) and *S. sergeidedicatum* Martens, 1989, are known from the Altai-Sayan Mountain region (Chemeris & Logunov 2001).

***Sabacon zateevi* sp. nov.**
Figures 18–21, 25–27, 31–33, 41–44, 50, 56, 64–65, 69–71, Map 2

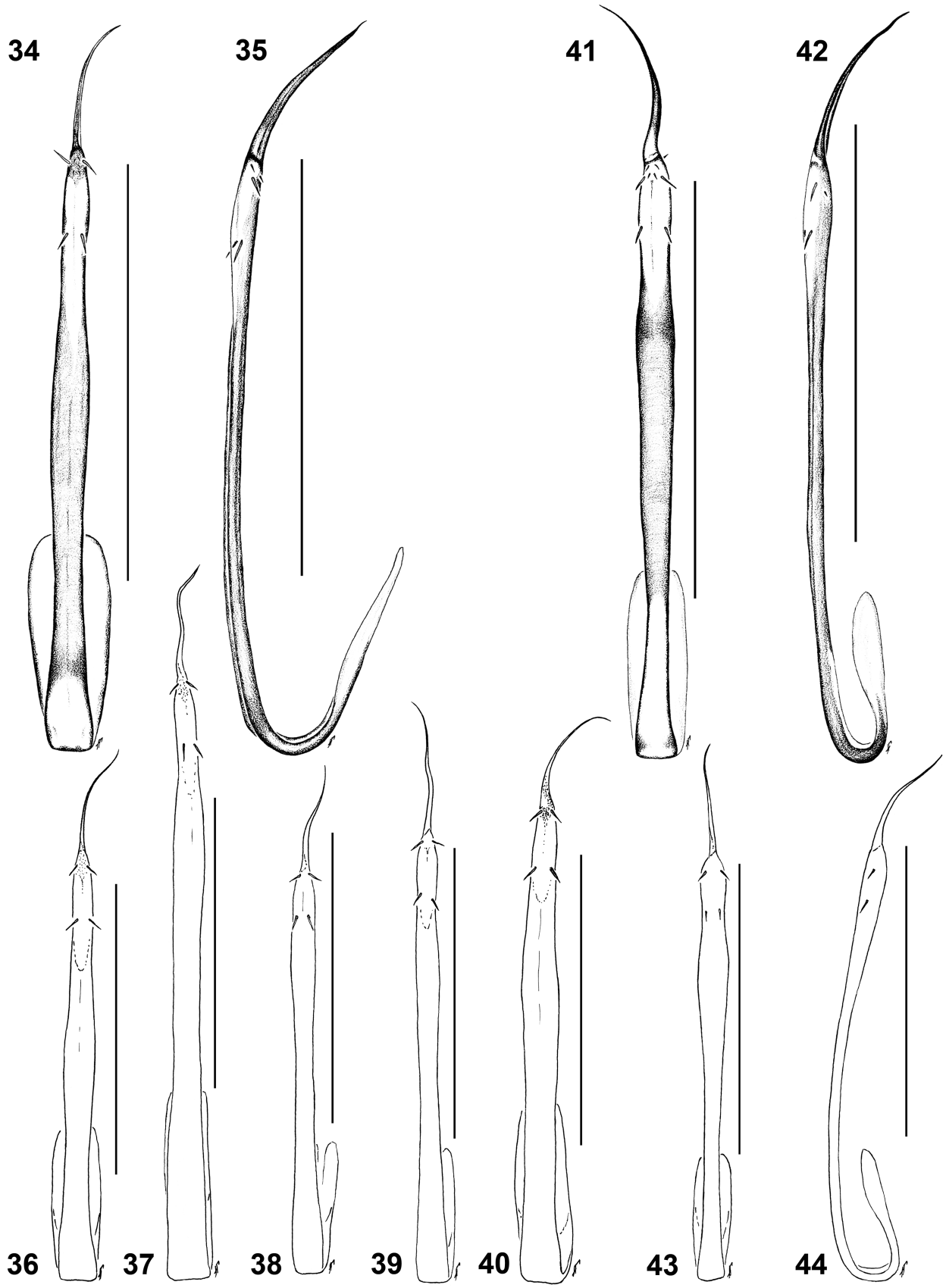
Type. Holotype ♂ (ISEA O.001.0280), Russia, Altai Republic, Ust'-Koksa District, upper reaches of Katun' River, Katunsky Biosphere Reserve, Zaichikha River mouth, [49°37'08.3"N, 85°43'03.8"E], 1302 m a.s.l.,16–26.VIII.2020, L.A. Trilikauskas.

Paratypes. **RUSSIA: Altai Republic: Ust'-Koksa District:** 1 ♀ (ISEA O.001.0281), Katunsky Biosphere Reserve, head of Ozernaya River, vicinities of Taimenye Lake, middle reaches of Kharyuzovka River, [49°48'53.6"N, 85°47'42.0"E], 1652–1660 m a.s.l., 11.VIII.2019, L.A. Trilikauskas; 1 ♂, 2 ♀ (MMUE G7650.1), 1 ♀ (ISEA O.001.0282), adjacent territory of Katunsky Biosphere Reserve, SE shore of Taimenye Lake, [49°48'08.2"N,85°48'00.5"E], 1551 m a.s.l., 7–13.VIII.2019, L.A. Trilikauskas; 1 ♂ (ISEA O.001.0283), Katunsky Biosphere Reserve, upper reaches of Katun' River, Katunsky State Nature Biosphere Reserve, Zaichikha River mouth, [49°37'08.3"N, 85°43'03.8"E], 1302 m a.s.l., 19.VIII.2020, L.A. Trilikauskas; 1 ♂ (ISEA O.001.0285), 1 ♀ (ISEA O.001.0284), same but 17.VIII.2020, L.A. Trilikauskas; 3 ♂ (ISEA O.001.0286), 32 km SSW of Ust'-Koksa, upper reaches of Petrushkina River, [50°03'N, 85°21-22'E], 1400-1500 m a.s.l., forest, 5-6.VI.2005, R.Y. Dudko; 1 ♂ (ISEA O.001.0287), 25 km SSW of Ust'-Koksa, NE slope of Kabanukha Mt., [50°05'N, 85°24'E], 1850-1950 m a.s.l., forest, 28-29.V.2005, R.Y. Dudko.

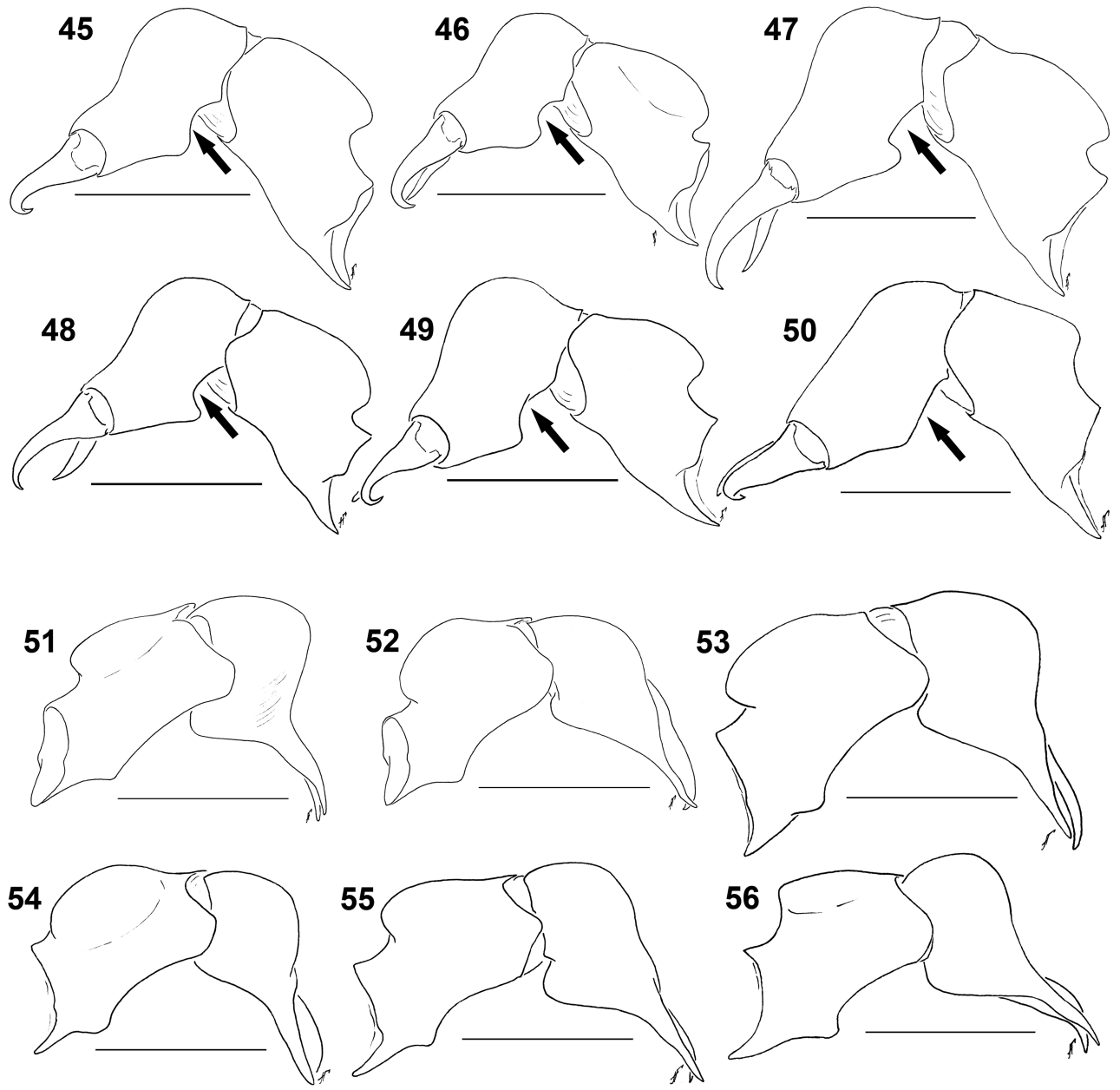


FIGURES 28–33. *Sabacon sergeidedicatum* Martens, 1989 (28–30) and *S. zateevi* **sp. nov.** (paratype from ISEA, 31–33), SEM micrographs: 28, 31 Male palpal coxae, retrolateral view; 29, 32 Glans penis, dorsal view, 30, 33 Same, lateral view. Scales: 0.1 mm.

Comparative material: *Sabacon sergeidedicatum* Martens, 1989 (Figs 16–17, 22–24, 28–30, 34–40, 45–49, 51–55, 57–63, 66–68, Map 2): **RUSSIA: Novosibirsk Area: Bolotnoye District:** 4 ♂, 2 ♀ (ISEA O.001.0258) near Bolshaya Chyornaya, [55°57'49"N, 84°25'24"E], *Pinus sibirica* forest, pitfall traps, 16–31.V.2015, L.A. Trilikauskas. **Tomsk Area**: **Tomsk District:** 9 ♂, 7 ♀ (ISEA O.001.0274), Anikino vicinities, mixed forest, near spring, 20–30.VI.2000 (A.N. Tchemeris); 4 ♂, 1 ♀ (ISEA O.001.0275), same but 25.VI.1994, S.Y. Rakov; 1 ♂



FIGURES 34–44. *Sabacon sergeidedicatum* Martens, 1989 (34–40: 34–36 Shorsky National Park; 37 Khakassia ISEA O.001.0272; 38 near Iogach ISEA O.001.0028; 39 Kazakhstan ISEA O.001.0279; 40 Tomsk ISEA O.001.0274) and *S. zateevi* **sp. nov.** (male Holotype 41–42 and male paratype ISEA O.001.0286 43–44): 34, 36–40, 41, 43 Penis, dorsal view; 35, 42, 44 Same, lateral view; Scales: 1 mm.



FIGURES 45–56. *Sabacon sergeidedicatum* Martens, 1989 (45–49, 51–55: 45, 51 Tomsk ISEA O.001.0274; 46, 52 Shorsky National Park ISEA O.001.0255; 47, 53 Khakassia ISEA O.001.0272; 48, 54 near Iogach ISEA O.001.0028; 49, 55 Kazakhstan ISEA O.001.0279) and *S. zateevi* **sp. nov.** (male paratype ISEA O.001.0286 50, 56): 45–50 Chelicera, retrolateral view; 51–56 Same, dorso-prolateral view. Scales: 0.5 mm.

(ISEA O.001.0276), same but 10.VI.1994, S.Y. Rakov; 4 ♂, 1 ♀ (ISEA O.001.0050), same but 21–23.VI.1995, S.Y. Rakov. **Altai Territory: Charyshskoe District:** 1 ♂ (ISEA O.001.0259), Bashchelak Mt. Range, ca. 30 km NWW of Sentelek, Zagrikha Mt., [51°15'N, 84°11'E], 1700 m a.s.l., sparse forest, 28.VI.2000, G.N. Azarkina; 1 ♂ (ISEA O.001.0260), 10 km S of Tigirek, upper reaches of Malyi Tigirek River, [ca. 51°03'N, 82°59'E], 1000–1400 m a.s.l., stone stream (kurum), 19–21.VI.2000, A.N. Tchemeris; 1 ♂ (ISEA O.001.0261), Malyi Tigirek River valley, [ca. 51°06'N, 83°02'E], 500–1000 m a.s.l., bank of river, on stone covered with moss, 16–18.VIII.2000, R.Y. Dudko; 1 ♂, 2 ♀ (ISEA O.001.0262), Korgon Mt. Range, Gorelyi Korgon River valley, [51°00.01'N, 83°48.49'E], 1.VII.2011, R.Y. Dudko. **Altai Republic: Choya District:** 1 ♂ (ISEA O.001.0257), near Uskuch Vil., [52°02'07"N, 86°54'30"E], detritus scree, 30.IV.–02.V.2011, L.A. Trilikauskas. **Turochak District:** 1 ♀ (ISEA O.001.0002), ca. 4 km SW of Kebezen', [51°53'11.5"N, 87°02'55.9"E], 450 m a.s.l., *Pinus-Abies*-birch forest, pitfall traps, 21.VI.–6.VII.2004, S.B. Ivanov; 3 ♂, 2 ♀ (ISEA O.001.0001), ca. 2 km SEE of Kebezen', [51°54'06.1"N, 87°07'54.0"E],

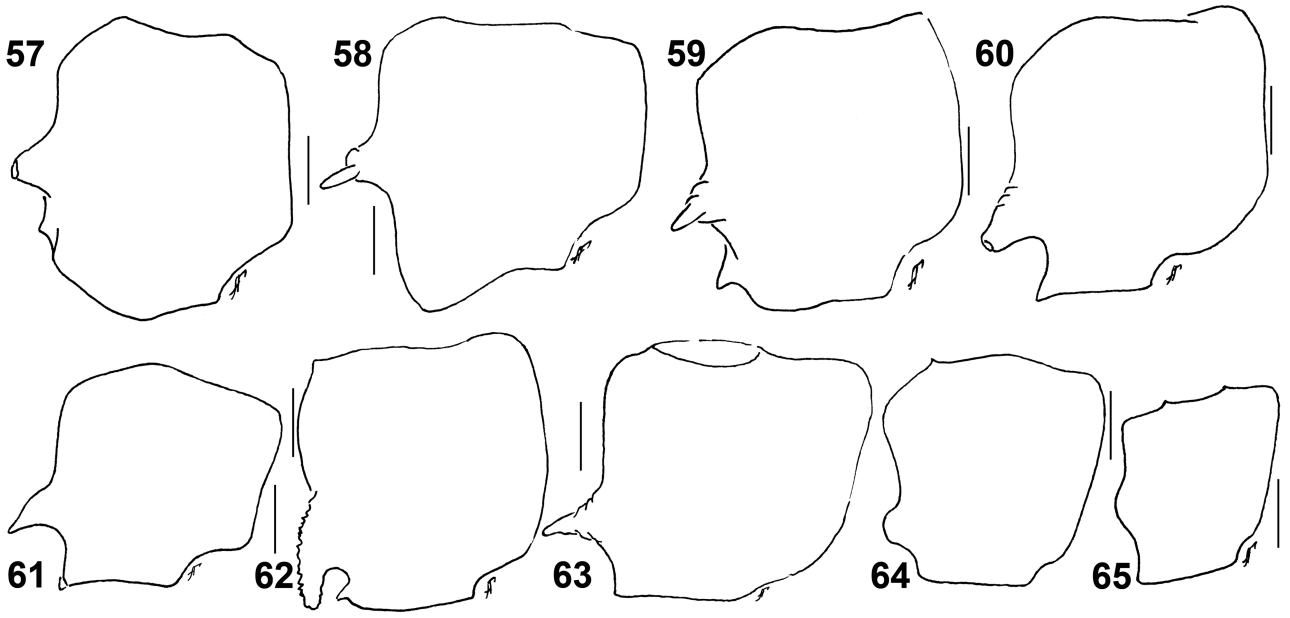
500 m a.s.l., *Pinus* forest, pitfall traps, 21.V.–6.VI.2004, S.B. Ivanov; 1 ♂ (ISEA O.001.0263), ca. 2 km SW of Kebezen', [51°53'11.5"N, 87°02'55.9"E], *Abies*-aspen forest, pitfall traps, 5–22.VIII.2004, S.B. Ivanov; 2 ♂, 1 ♀ (ISEA O.001.0026), ca. 4 km NNW of Kebezen', [51°57'00.8"N, 87°04'37.3"E], *Pinus*-birch forest, pitfall traps, 7–19.VI.2004, S.B. Ivanov; 1 ♀ (ISEA O.001.0030), 2 ♂ (ISEA O.001.0029), 4 ♂, 1 ♀ (ISEA O.001.0018), near Obogo, Valley of Pyzha River, [51°31.355'N, 87°17.737'E], 980 m a.s.l., birch-aspen valley forest, pitfall traps, 20.VI.–6.VII.2003, 6–23.VII.2003, S.B. Ivanov; 18 ♂, 9 ♀ (ISEA O.001.0264), 2 ♂, 2 ♀ (ISEA O.001.0051), same but *Picea*-birch valley forest, 17.V.–26.VII.2003, 1–20.VI.2003, S.B. Ivanov; 1 ♂ (ISEA O.001.0009), 1 ♂ (ISEA O.001.0017), ca. 1.2 km E of Obogo, [51°31.259'N, 87°18.458'E], *Abies-Pinus sibirica* forest, logging area, 950 m a.s.l., pitfall traps, 1–20.VI.2003, 6–23.VII.2003, S.B. Ivanov; 1 ♀ (ISEA O.001.0005), ca. 5.5 km SW of Obogo, [51°30.048'N, 87°13.216'E], *Abies-Pinus sibirica* forest, 860 m a.s.l., pitfall traps, 23.VI.–14.VII.2004, S.B. Ivanov; 6 ♂, 2 ♀ (ISEA O.001.0265), ca. 8.8 NEE of Obogo, [51°33.072'N, 87°24.678'E], 1270 m a.s.l., *Picea-Abies-Pinus sibirica* forest, pitfall traps, 21.VI.–7.VII.2003, S.B. Ivanov; 2 ♂, 1 ♀ (ISEA O.001.0024), ca. 15 km NE of Obogo, [51°36.61'N, 87°26.395'E], *Betula rotundifolia* tundra, 1870 m a.s.l., pitfall traps, 21.VI.–8.VII.2003, S.B. Ivanov; 1 ♂, 1 ♀ (ISEA O.001.0031), head of Archa Mt., [51°31.595'N, 87°26.316'E], 1840 m a.s.l., sparse forest with meadows and *Betula rotundifolia*, pitfall traps, 19.V.–2.VI.2003, S.B. Ivanov; 2 ♀ (ISEA O.001.0266), same but *Pinus sibirica* forest, [51°32.865'N, 87°25.742'E], 1600 m a.s.l., 16.V.–2.VI.2003, S.B. Ivanov; 3 ♂, 1 ♀ (ISEA O.001.0028), ca. 14 km SW of Iogach, near Suuchak, [51°41'21.6"N, 87°07'13.6"E], birch-aspen forest, old fire site, pitfall traps, 11–22.VI.2004, S.B. Ivanov. **Shebalino District:** 1 ♀ (ISEA O.001.0267), Seminsky Mt. Range, near Kamlak, Kamyshlinskoe Plateau, Dezertirnaya cave, [ca. 51°42'N, 85°34'E], 25.VI.2015, I.S. Turbanov. **Ulagan District:** 2 ♂, 1 ♀ (ISEA O.001.0098), Altai Nature Reserve, right bank of Bayas River, [ca. 51°20'N, 87°52'E], *Pinus sibirica* forest, 20–23.08.2011, S.M. Ponomareva; 1 ♂ (ISEA O.001.0105), Altai Nature Reserve, Kyga River basin, Malaya Kolyushta Mt., [ca. 51°16'N, 87°58'E], mountain stony tundra, 25–28.VI.2011, S.M. Ponomareva; 1♂ (ISEA O.001.0092), 2 km NW from Chiri, [ca. 51°22'N, 87°49'E], pine forest, 22.VI.–6.VII.2011, S.M. Ponomareva. **RUSSIA: Kemerovo Area:** 2 ♂, 2 ♀ (ISEA O.001.0269), Mezhdurechensk vicinity, right bank of Usa River, 3 km from mouth, [ca. 53°42'N, 88°02'E], 23.IX.1997, R.Y. Dudko, I.I. Lyubechanskii. **Tashtagol District:** 7 ♂, 9 ♀ (ISEA O.001.0255), Shorsky National Park, near Verkhniy Taimet, Biyskaya Griva Mt. Range, [52°26'18.2"N, 88°17'42.5"E], *Pinus sibirica* forest, pitfall traps, 19.IX.–11.X.2016, L.A. Trilikauskas; 1♀ (ISEA O.001.0161) same but 22.VIII.2013, L.A. Trilikauskas; 5♂ 6♀ (ISEA O.001.0152) same but 7–15.VI.2013, L.A. Trilikauskas; 79 ♂, 64 ♀ (ISEA O.001.0256), Shorsky National Park, near Verkhniy Taimet, *Populus tremula-Abies sibirica* forest (chernevaya taiga), [52°26.309'N, 88°17.695'E], 9–19.VI.2016, L.A. Trilikauskas; 3♂ 3♀ (ISEA O.001.0118) same but *Pinus sibirica* forest, 8–18.VI.2012, L.A. Trilikauskas; 5 ♂, 5 ♀ (ISEA O.001.0117), Shorsky National Park, Mrassu River valley, mouth of Kubansu River, [ca. 52°28'N, 88°41'E], dark coniferous forest, 22–26.VII.2012, L.A. Trilikauskas; 2♂ 3♀ (ISEA O.001.0052), 6 ♂, 4 ♀ (ISEA O.001.0268), near "Mednaya", [ca. 52°52'N, 88°23'E], *Pinus sibirica-Abies* forest, pitfall traps, 3–10.VI.2010, L.A. Trilikauskas; 1 ♂, 1 ♀ (ISEA O.001.0154), Sheregesh vicinity, subalpine *Picea sibirica* forest, [ca. 52°57'N, 88°02'E], 26.VII.–1.VIII.2013, L.A. Trilikauskas. **Republic of Khakassia: Ust'-Abakanskiy District:** 1 ♀ (ISEA O.001.0270), Kuznetskiy Alatau Mt. Range, 20 km NE of Balyksu, right tributary of Kainzas River, [ca. 53°36'N, 89°20'E], 1000 m a.s.l., forest, 22–23.V.1997, R.Y. Dudko; 1 ♀ (ISEA O.001.0271), Kuznetskiy Alatau, 7–20 km NE of Balyksu, Terensug River valley, [ca. 53°30'N, 89°19'E], 24.V.1997, R.Y. Dudko. **Tashtypskiy District:** 3 ♂ (ISEA O.001.0272), Abakanskiy Mt. Range system, Choochek Mt. Range, 20 km SSE of Mrassu, [ca. 52°07'N, 88°33'E], bold mountain (golets), 1600–1800 m a.s.l., 7–19.VII.1999, D.E. Lomakin; 2 ♂ (ISEA O.001.0273), Abakanskiy Mt. Range, ca. 20 km SSE of Mrassu, [ca. 52°08'N, 88°38'E], upper line of forest, ca. 1500 m a.s.l., 16–20.VII.1999, D.E. Lomakin. **KAZAKHSTAN: East Kazakhstan Province**: 3 ♂ (ISEA O.001.0279), Ivanovskiy Mt. Range, ca. 10 km S of Ridder [=Leninogorsk], [ca. 50°15'N, 83°29'E], *Abies-Larix* forest, 1700 m a.s.l., 30–31.V.1996, R.Y. Dudko; 1 ♀ (ISEA O.001.0277), Ivanovskiy Mt. Range, upper reaches of Gromotukha River, [ca. 50°12'N, 83°45'E–50°14'N, 83°47.5'E], *Larix* forest, 1400–1800 m a.s.l., 3–5.VI.1996, R.Y. Dudko; 1 ♀ (ISEA O.001.0278), ca. 15 km NE of Ridder [=Leninogorsk], Belaya Uba River valley, Poperechnoe, [ca. 50°26'N, 83°47'E], 9.VI.1996, R.Y. Dudko.

Etymology. The species is named in honour of Aleksandr V. Zateev, the director of the Katunsky Biosphere Reserve, who greatly helped the first author during fieldwork in the reserve.

Diagnosis. *Sabacon zateevi* **sp. nov.** is morphologically similar to *S. sergeidedicatum*, differs in shape of penis—subparallel lateral sides in *S. sergeidedicatum* and club-shaped in *S. zateevi* **sp. nov.**—cheliceral glands and palpal coxa. The main diagnostic characters to differentiate between the two species are given in Table 1.

TABLE 1. Diagnostic characters of *Sabacon zateevi* **sp. nov.** and *S. sergeidedicatum*

Character	*Sabacon sergeidedicatum*	*Sabacon zateevi* **sp. nov.**
Basal segment of chelicera	with long cheliceral gland occupying two thirds of the segment length (Figs 22, 45–49, 51–55)	with cheliceral gland occupying half of the segment length (Figs 25, 50, 56)
Distal segment of chelicera	the segment is curved inwards retrolaterally, prolaterally with a projection centrally (Fig. 22, arrow); basal half curved inwards ventrally (Figs 45–49, arrow)	almost flat retrolaterally, prolaterally with a projection in the apical half (Fig. 25, arrow); basal half straight ventrally (Fig. 50, arrow)
Palpal coxa	with an arrowhead-shaped basal knob ventrally in both sexes (Fig. 28, arrow; Figs 57–63)	with a small hump-like basal projection in both sexes (Fig. 31, arrow; Figs 64–65)
Penis	with subparallel sides and thinner glans, with truncus at basal third slightly thinner or equal in width as the widest section (Figs 34, 36–40)	broadest in apical half, club-shaped, with glans almost the same width as the middle section, with truncus at basal third two times thinner than broadest section (Figs 41–44)



FIGURES 57–65. *Sabacon sergeidedicatum* Martens, 1989 (male 57–62, female 63: 57 Tomsk ISEA O.001.0274; 58–59 Shorsky National Park ISEA O.001.0255; 60 Khakassia ISEA O.001.0272; 61, 63 near Iogach ISEA O.001.0028; 62 Kazakhstan ISEA O.001.0279) and *S. zateevi* sp. nov. (64 male paratype ISEA O.001.0286; 65 female paratype ISEA O.001.0281): 57–62, 64 Male palpal coxae, retrolateral view; 63, 65 Female palpal coxae, retrolateral view. Scales: 0.1 mm.

Description. MALE (Holotype). *Measurements.* Body 3.10 long, 1.7 wide. Cephalothorax 2.00 long. Eye tubercle 0.25 wide. Clypeus (space between the ocularium and the front margin of the carapace) 0.08 long. Chelicera: basal segment 0.70 long; distal segment 0.57 long; forceps 0.35 long. Penis 1.85 long, 0.12 wide at its base.

TABLE 2. Lengths (in mm) of palp and legs of male holotype/female paratype of *Sabacon zateevi* **sp. nov.**

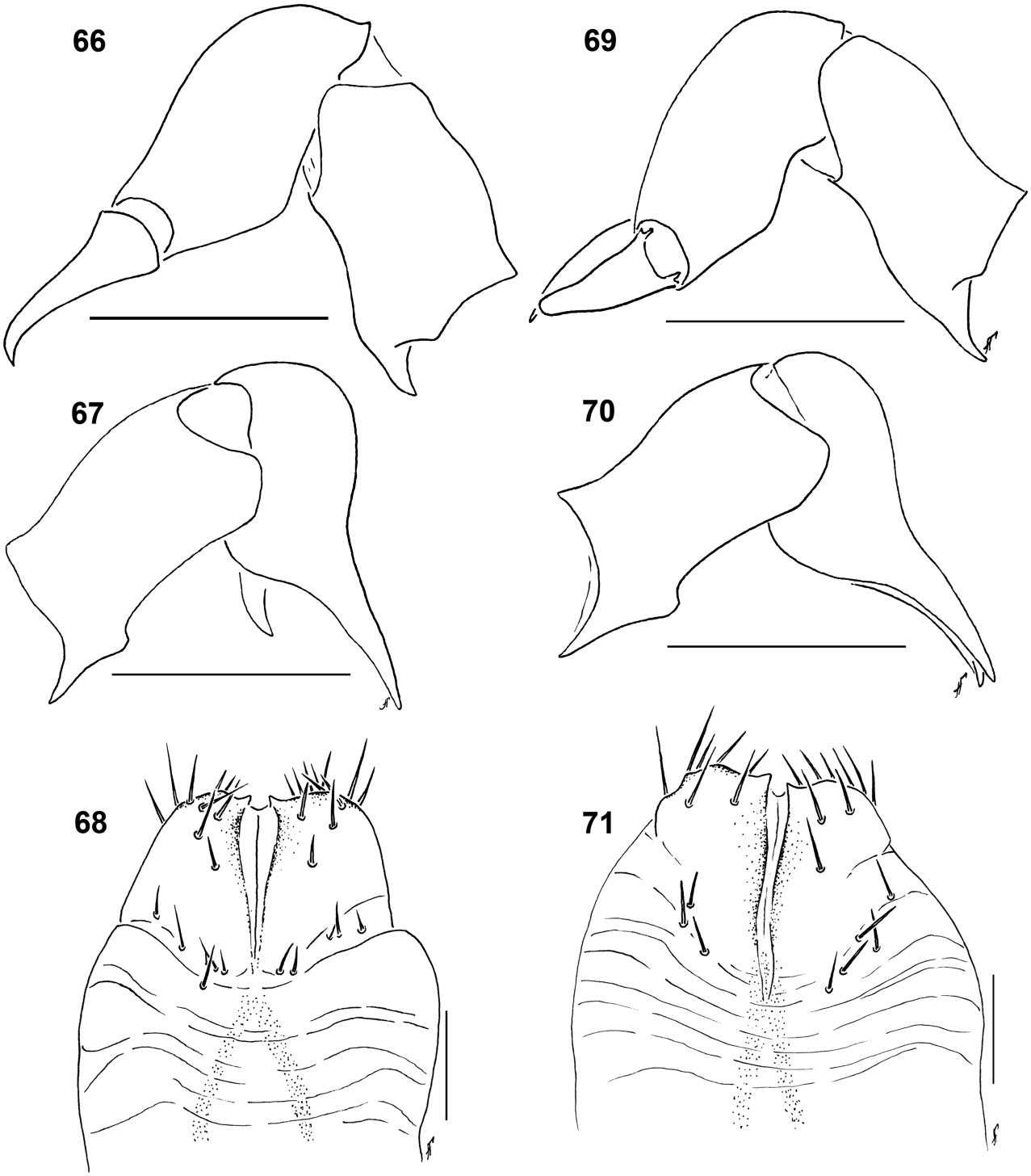
	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palp	0.42/0.35	0.65/0.85	0.75/0.95	–	0.38/0.55	2.20/2.33
Leg I	1.38/1.35	0.60/0.60	1.30/1.30	1.77/1.85	1.70/1.65	6.75/6.75
Leg II	1.65/1.80	0.75/0.65	1.80/1.80	2.50/2.60	2.57/2.90	9.27/9.75
Leg III	1.50/1.90	0.55/0.65	1.30/1.10	2.05/1.65	1.90/1.90	7.30/7.20
Leg IV	1.80/1.80	0.65/0.75	1.55/1.65	2.80/2.70	2.50/2.40	9.30/9.30

Body almost white. Carapace with a light brownish grey (in holotype) to dark grey (Fig. 19) trapezoidal spot; scutum and free tergites slightly tinged with grey (holotype) to dark brown stripe (in some paratypes; Figs 18 and 19, respectively). Ocularium black. Groups of short setae on both sides of the ocularium in the anterior part of the

propeltidium. Scutum and free tergites with transverse rows of setae. Coxae of walking legs with short setae, with decreasing density from the first to the fourth leg.

Scutum oval. Carapace smooth. Metapeltidium medially with a pair of sensory cones.

Chelicerae. Whitish. Basal segment dorsally with cheliceral gland occupying half of its length. Cheliceral gland with numerous setae. Distal segment wide, almost flat retrolaterally, prolaterally with a projection situated in its apical half.



FIGURES 66–71. *Sabacon sergeididicatum* Martens, 1989 (66–68) and *S. zateevi* **sp. nov.** (female paratype ISEA O.001.0281 69–71): 66, 69 Female chelicera, retrolateral view; 67, 70 Same, dorso-prolateral view; 68, 71 Ovipositor, ventral view. Scales: 0.5 mm (66–67, 69–70), 0.1 mm (68, 71).

Pedipalps grey. Palpal patella distally with ventral black teeth. Holotype has two teeth on one pedipalp and four on the other. Paratypes have three teeth on all palps. Palpal coxa with a small, hump-like projection.

Legs grey. Cylindrical in cross-section with longitudinal rows of setae.

FEMALE (Paratype, ISEA 001.8563). In general appearance, similar to the male but larger. Palpal patella without black teeth. Basal segment of chelicerae without cheliceral gland dorsally. Ovipositor as illustrated in Fig. 71.

Habitat and biology. The species is occasionally collected in pitfall traps in subalpine spruce forests. It was hand-collected in these forests exclusively from logs of conifers. Some specimens were also found among stones and plant residues on an island in the floodplain of a small river and on pebbles at the confluence of streams running towards Taimenye Lake. Records of subadult and adult males in the spring and early juveniles in the autumn indicate that the species overwinters at an active stage. Thus, the life cycle of *S. zateevi* **sp. nov.** seems to be similar to that of *S. sergeidedicatum* (see Trilikauskas 2017). All habitats are located from 1300 to 1950 m a.s.l.

Comments. We re-studied material of *S. sergeidedicatum* from Chemeris & Logunov (2001) (except for the Holotype) as well as additional material from ISEA. Our investigation shows that figures 22 and 23 are actually macrographs of the right (Fig. 22) and left (Fig. 23) palps taken from retrolateral and prolateral views, respectively. Moreover, our study of many specimens from populations throughout the species' range shows intraspecific variation in such important taxonomical characters as shape, size and proportions of penis (Figs 34–40), shape of male's chelicerae (Figs 45–49, 51–55) and male's palpal coxae (Figs 57–62). Only one exception among thousands of specimens was found: palpal coxae of one male from Shorsky National Park (Kemerovo Area, Russia) shows absence of arrowhead-shaped basal knob, which might be considered a developmental anomaly. The apical part of arrowhead-shaped basal knob seems to be lost in old specimens (see Figs 57 and 60) but the basal part always stays intact.

Specimens from Kholzun Mt. Range differ from both *S. sergeidedicatum* and *S. zateevi* **sp. nov.** and most likely belong to a new underscribed species. Description of this species is beyond the aims of this paper and will be made in a separate paper.

The Altai Mountains have a large degree of endemism in other invertebrate taxa, e.g. spiders (see Marusik *et al.* 2004; Marusik & Fomichev 2010; Marusik *et al.* 2014, 2019), beetles (see Dudko & Shilenkov 2001; Dudko 2006, Dudko 2011) etc. Finding a new species was not surprising to us. Moreover it is possible that more new species will be revealed especially from the poorly studied Mongolian part of Altai.

Acknowledgments

This work was partly supported by Federal Fundamental Scientific Research Programme, projects 0247-2021-0002 (for LT) and 0247-2021-0004 (for GA). We would like to thank Aleksandr V. Zateev and Tatyana. V. Yashina (Katunsky Biosphere Reserve, Russia) for their help during fieldwork. Dmitri V. Logunov (Manchester, UK) provided critical comments and improved the English of an early draft. Sarah C. Crews (San Francisco, USA) improved the English of a final draft. Nataly Y. Snegovaya (Baku, Azerbaijan), James C. Cokendolpher (Lubbock, USA) and Jeffrey W. Shultz (Maryland, USA) are thanked for their useful comments that helped improve the manuscript.

References

Chemeris, A.N. & Logunov, D.V. (2001) Notes on two species of *Sabacon* Simon, 1879 from the mountains of South Siberia (Arachnida: Opiliones: Sabaconidae). *Arthropoda Selecta,* 9 (3), 207–213.

Dudko, R.Y. & Shilenkov, V.G. (2001) A review of the Palaearctic species of the subgenus *Catonebria* Shilenkov (Coleoptera, Carabidae, Nebria). 1. *Nebria mellyi* Gebler group. *Bulletin de l'Institut Royal des Sciences Natureles de Belgique*, 71, 63–82.

Dudko. R.Y. (2006) A revision of the Palaearctic species of the subgenus *Catonebria* Shilenkov, 1975 (Coleoptera, Carabidae, *Nebria*). 2. *Nebria catenulate*-species group. *Euroasian Entomological Journal*, 5 (1), 17–46 + I–II. [in Russian]

Dudko, R.Y. (2011) Relict beetles (Coleoptera, Carabidae, Agyrtidae) with Altai—East Asian disjunctive range. *Euroasian Entomological Journal*, 10 (3), 349–360 + 348 + VI. [in Russian]

Farzalieva, G.S. & Esyunin, S.L. (2000) The harvestman fauna of the Urals, Russia, with a key to the Ural species (Arachnida:

Opiliones). *Arthropoda selecta*, 8 (3), 183–199.
Gritsenko, N.I. (1979) A new genus of harvestmen (Opiliones, Phalangiinae) from the northern Tien-Shan and Western Altai. *Zoologicheskii Zhurnal*, 58 (2), 264–267.
Koch, L. (1879) Arachniden aus Sibirien und Novaja Semlja eingesammelt von der schwedischen Expedition im Jahre 1875. *Kongliga Svenska Vertenskaps-Akademiens Handlinger*, 16 (5), 1–136.
Martens, J. (1978) Spinnentiere, Arachnida: Weberknechte, Opiliones. *In:* Senglaub, K., Hannenmann, H.J. & Schumann, H. (Eds.), *Die Tierwelt Deutchlands. Vol. 64*. Gustav Fischer Verlag, Jena, pp. 1–464.
Martens, J. (1989) Sibirische Arten der Gattung *Sabacon* Simon, 1879 (Arachnida: Opiliones: Sabaconidae). *Senckenbergiana biologica*, 69 (4/6), 369–377.
Martens, J. (2015) *Sabacon* Simon, 1879 in Palaearctic: A survey of new and known species from France, Nepal, India, Chine, Russia and Japan (Arachnida: Opiliones: Sabaconidae). *In:* Hartmann, M. & Weipert, J. (Eds.), *Biodiversität und Naturausstattung im Himalaya V.* Verein der Freunde & Förderer des Naturkundemuseums Erfurt, Erfurt, pp. 167–210.
Marusik, Y.M., Azarkina, G.N., Koponen, S. (2004) A survey of East Palaearctic Lycosidae (Aranei). II. Genus *Acantholycosa* F. Dahl, 1908 and related new genera. *Arthropoda Selecta*, 12 (2), 101–148.
Marusik, Y.M. & Fomichev, A.A. (2010) A new species of *Parasyrisca* Schenkel, 1963 (Araneae, Gnaphosidae) from the Altai. *Zootaxa*, 2626 (1), 65–68.
https://doi.org/10.11646/zootaxa.2626.1.4
Marusik, Y.M., Fomichev, A.A. & Omelko, M.M. (2014) A survey of East Palaearctic Gnaphosidae (Araneae). 2. Two new *Gnaphosa* Latreille, 1804 species from Western Mongolia. *Zookeys*, 426, 1–9.
https://doi.org/10.3897/zookeys.426.7898
Marusik, Y.M., Fomichev, A.A. & Omelko, M.M. (2019) New data on *Parasyrisca* (Araneae: Gnaphosidae) from Mongolia. *Zootaxa*, 4688 (2), 199–212.
https://doi.org/10.11646/zootaxa.4688.2.2
Shorthouse, D.P. (2010) SimpleMappr, an online tool to produce publication-quality point maps. Available from: http://www.simplemappr.net (accessed 10 April 2021)
Snegovaya, N.Y. & Cokendolpher, J.C. (2021) Further studies on harvestman genus *Homolophus* (Opiliones: Phalangiidae), with descriptions of two new species. *Zootaxa* 4908 (3), 301–353.
https://doi.org/10.11646/zootaxa.4908.3.1
Suzuki, S. (1983) Three new and little-known harvestmen (Arachnida, Opiliones, Phalangiidae) from Korea. *Annotationes Zoologicae Japonenses*, 56 (1), 46–53.
Tchemeris, A.N. (2015) Taxonomic notes on *Acanthomegabunus* Tsurusaki, Tchemeris & Logunov, 2000 (Arachnida: Opiliones: Phalangiidae), with a description of a new species *A. altaicus* sp.n. from the Altai Mountains of Russia and NE Kazakhstan. *Zootaxa,* 3990 (4), 567–574.
https://doi.org/10.11646/zootaxa.3990.4.5
Tchemeris, A.N., Logunov, D.V. & Tsurusaki N. (1999) A contribution to the knowledge of the harvestman fauna of Siberia (Arachnida: Opiliones). *Arthropoda Selecta*, 7 (3), 189–199.
Trilikauskas, L.A. (2013) On the fauna of spiders and harvestmen (Arachnida: Aranei et Opiliones) of Gornaya Shoriya, South Siberia. *Eurasian Entomological Journal*, 12 (5), 438–450.
Trilikauskas, L.A. (2016) On harvestman taxocenes (Arachnida: Opiliones) in dark coniferous forests of the Shorskii National Park. *Nauchnyye issledovaniya v zapovednikakh i natsional'nykh parkakh Yuzhnoy Sibiri*, 5, 59–64. [in Russian]
Trilikauskas, L.A. (2017) Structure and dynamics of a harvestmen population (Arachnida, Opiliones) in chernevaya taiga of the Shorskii Nature National Park, Russia. *Eurasian Entomological Journal*, 16 (5), 450–456. [in Russian]
Tsurusaki, N., Tchemeris, A.N. & Logunov, D.V. (2000a) Redescription of *Scleropilio insolens* from Southern Siberia with comments on the genus *Scleropilio* (Arachnida: Opiliones: Phalangiidae). *Acta Arachnologica*, 49 (1), 87–94.
https://doi.org/10.2476/asjaa.49.87
Tsurusaki, N., Tchemeris, A.N. & Logunov, D.V. (2000b) Two new species of Opiliones from Southern Siberia and Mongolia, with an establishment of a new genus and redefinition of the genus *Homolophus* (Arachnida: Opiliones: Phalangiidae). *Acta Arachnologica*, 49 (1), 73–86.
https://doi.org/10.2476/asjaa.49.73