

New data on the myriapod fauna (Myriapoda: Chilopoda, Diplopoda) of the Republic of Khakassia, central Siberia, Russia

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ABSTRACT. Based on a small material from the Republic of Khakassia, central Siberia, Russia, new information on the myriapod fauna is presented. Two lithobiid species, *Lithobius (Ezembius) ostiacorum* Stuxberg, 1876 and *L. (Monotarsobius) nordenskiöldii* Stuxberg, 1876, are recorded from Khakassia for the first time. Both the genus *Teleckophoron* Gulička, 1972 and its sole species *T. montanum* Gulička, 1972, as well as the family Kirkayakidae they belong to, are also new to the millipede fauna of Khakassia. The distributions of all species encountered are mapped.

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KEY WORDS: geophilomorph centipedes, lithobiomorph centipedes, millipedes, fauna, new records, Siberia.

Новые сведения о фауне многоножек (Myriapoda: Chilopoda, Diplopoda) Республики Хакасия, центральная Сибирь, Россия

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РЕЗЮМЕ. По небольшому материалу из Республики Хакасия (центральная Сибирь, Россия) приводится новая информация о фауне многоножек. Два вида костьянок, *Lithobius (Ezembius) ostiacorum* Stuxberg, 1876 и *L. (Monotarsobius) nordenskiöldii* Stuxberg, 1876, впервые отмечены в Хакасии. Род *Teleckophoron* Gulička, 1972 с единственным видом *T. montanum* Gulička, 1972, а также семейство Kirkayakidae, к которому они принадлежат, также являются новыми для фауны многоножек Хакасии. Для всех видов выполнено картирование находок в исследуемом регионе.

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КЛЮЧЕВЫЕ СЛОВА: многоножки-землянки, многоножки-костянки, двупарноногие многоножки, фауна, новые находки, Сибирь.

Introduction

The Republic of Khakassia is located in the central part of the Asian continent in the south of central Siberia. It spans about 460 km north to south and 200 km west to east (in its widest part), bordering on the Krasnoyarsk Province in the north, east and southeast, the Republic of Tyva in the south, the Republic of Altai in the southwest, and the Kemerovo Area in the west.

The Khakassian Republic is part of the Altai-Sayan region, being characterized by a pronounced variety of physical and geographical structures, as well as a highly diverse vegetation (Kostyakova *et al.*, 2018). The landscape and orographic structures of the Republic vary considerably and range from its plain (Minusinskaya and Chulymo-Yeniseiskaya depressions) to montane parts, i.e. the eastern slopes of the Kuznetskii Alatau and the Abakanskii Mountain Range, and the northern slopes of the Western Sayan Mountains (Semenov, Lysanova, 2016). The study area is subjected to a continental climate, with short summers and long and cold winters, with the average annual temperature of +0.8 °C. January is the coldest month (-18.6 °C), while July is the warmest month (+18.7 °C). The highest amount of annual precipitation (75–90%) falls in summer, the greatest annual level being confined to the mountains (up to 2000 mm), while the leeward slopes and interior depressions receive only 250 mm. July is the most humid month (67–82 mm), while both February and March are the driest ones (4–8 mm) (Kostyakova *et al.*, 2018). Most of the watercourses in the Republic of Khakassia belong to the Yenisei River Basin, the Abakan River being the major tributary, while the northwestern part of the study area pertains to the Ob River Basin, the Tom, Belyi Iyus, Chiorny

Iyus, and Chulym rivers being involved. The vegetation of this territory is characterized by *Pinus sylvestris* L. and *Larix sibirica* Ledeb. forests, while the steppe belt supports forb-grass-sedge meadows (Kostyakova *et al.*, 2018).

To date, based on literature data (Shear, 1990; Mikhailjova, 1993, 2000, 2017; Mikhailjova, Golovatch, 2001; Mikhailjova, Nefediev, 2003; Mikhailjova, Marusik, 2004; Nefediev, Nefedieva, 2017; Nefediev, 2018a, b, 2019a; Nefediev, Farzalieva, 2020), at least 19 species of Myriapoda are known to occur in the Republic of Khakassia, representing 11 genera, 7 families, and 5 orders. The present paper provides new records and a primary inventory of both Chilopoda and Diplopoda of the study area.

The distribution maps were composed using QGIS 3.14.15-Pi.

The material treated here has been deposited in the collections of the Altai State University, Barnaul, Russia (ASU), the Perm State University, Perm, Russia (PSU), and the Zoological Museum of the Lomonosov Moscow State University, Moscow, Russia (ZMUM), as indicated below.

Taxonomic part

Class Chilopoda

Order Geophilomorpha

Family GEOPHILIDAE

Arctogeophilus macrocephalus
Folkmanová et Dobroruka, 1960
Map 1.

MATERIAL EXAMINED. 1 ♂ (ASU), Russia, south of central Siberia, Republic of Kha-



Map 1. Distribution of *Arctogeophilus macrocephalus* (circle) and *Schizoturanius tabescens* (triangle) in the Republic of Khakassia. Previously known localities marked in black, new records given in white.
Карта 1. Распространение *Arctogeophilus macrocephalus* (круг) и *Schizoturanius tabescens* (треугольник) в Республике Хакасия. Черным отмечены ранее известные места находок, новые находки отмечены белым.

kassia, **Beya District**, ca. 6 air-km W of Maina, Ui River valley, 52.987139°N, 91.391917°E, *Pinus sylvestris* forest, ca. 400 m a.s.l., in litter, 21.IX.2019, leg. E.Yu. Shuryshhev.

DISTRIBUTION. Originally described by Folkmanová & Dobroruka (1960) from the European part of Russia (Tatarstan Republic), *A. macrocephalus* is highly widespread from European Russia through Siberia and eastern Kazakhstan to the inland Russian Far East and Sakhalin Island (Zalesskaja *et al.*, 1982; Volkova, 2016; Dyachkov, Tuf, 2019). In Siberia, this species has hitherto been recorded from the Kemerovo and Tomsk areas, the Altai and Khakassian republics, and the Altai and Krasnoyarsk provinces (Byzova, Chadaeva, 1965; Zalesskaja *et al.*, 1982; Vorobiova, 1999; Rybalov, 2002; Vorobiova *et al.*, 2002; Nefediev *et al.*, 2017a, c, 2018; Nefediev, 2019a).

ORDER Lithobiomorpha

Family LITHOBIIDAE

Lithobius (Ezembius) ostiacorum
Stuxberg, 1876
Map 2.

MATERIAL EXAMINED (all Russia, south of central Siberia, Republic of Khakassia). 1 ♀ (PSU-1254), **Shira District**, near Efremkino, 54.469709°N, 89.445864°E, ca. 480 m a.s.l., VII–VIII.2004, leg. E.V. Miroshnichenko; 1 ♂, 2 juv. (ZMUM), **Beya District**, near Novonikolaevka, 53.194961°N, 91.295908°E, site 42, *Padus avium*, ca. 310 m a.s.l., soil samples, 25.V.1986, collector unknown; 1 ♀, 1 juv. (PSU-1465), same District, ca. 6 air-km W of Maina, Ui River valley, 52.987139°N, 91.391917°E,



Map 2. Distribution of *Lithobius (Ezembius) ostiacorum* (triangle) and *L. (E.) princeps* (circle) in the Republic of Khakassia. Previously known localities marked in black, new records given in white.

Карта 2. Распространение *Lithobius (Ezembius) ostiacorum* (треугольник) и *L. (E.) princeps* (круг) в Республике Хакасия. Черным отмечены ранее известные места находок, новые находки отмечены белым.

Pinus sylvestris forest, ca. 400 m a.s.l., in litter, 21.IX.2019, leg. E.Yu. Shuryshv.

DISTRIBUTION. Originally described by Stuxberg (1876a, b) from the Yenisei River region (Krasnoyarsk Province), this species was redescribed by Eason (1976) using Stuxberg's type material. Being widely distributed in Siberia, *Lithobius (E.) ostiacorum* has hitherto been known from the Irkutsk and Kemerovo areas, the Altai and Krasnoyarsk provinces, and the Republic of Altai (Zalesskaja, 1978; Nefediev *et al.*, 2017a, 2018, 2020b; Nefediev, Farzaliyeva, 2020). The southernmost records of this species are known from northern Mongolia (Poloczek *et al.*, 2016, 2017).

REMARKS. This species is formally new to the fauna of the Republic of Khakassia.

Lithobius (Ezembius) princeps
Stuxberg, 1876
Map 2.

MATERIAL EXAMINED. 1 ♂ (PSU-1470), Russia, south of central Siberia, Republic of Khakassia, **Askiz District**, ca. 3 air-km SE of Nankhchul, Askiz River valley, near mouth of Portal River, 53.418861°N, 89.749639°E, *Pinus sylvestris* forest with *Abies sibirica* and *Betula pendula*, ca. 650 m a.s.l., in litter, 1.VIII.2019, leg. A.P. Pavlov.

DISTRIBUTION. This species was originally described by Stuxberg (1876a, b) from near the Podkamennaya Tunguska River (Krasnoyarsk Province), later redescribed by Eason (1976) using Stuxberg's type material. This species was later recorded from eastern Kaza-



Map 3. Distribution of *Lithobius (Monotarsobius) fugax* (circle), *L. (M.) nordenskiöldii* (asterisk) and *Sibirius profugus* (triangle) in the Republic of Khakassia. Previously known localities marked in black, new records given in white.

Карта 3. Распространение *Lithobius (Monotarsobius) fugax* (круг), *L. (M.) nordenskiöldii* (звездочка) и *Sibirius profugus* (треугольник) в Республике Хакасия. Черным отмечены ранее известные места находок, новые находки отмечены белым.

khstan (Tuf, 2007; Tuf *et al.*, 2010; Dyachkov, 2017, 2019), the Tyumen and Omsk areas, and the Republic of Khakassia, all Siberia (Sergeeva, 2010; Bukhhalo *et al.*, 2014; Nefediev *et al.*, 2017b; Nefediev, Farzalieva, 2020).

Lithobius (Monotarsobius) fugax
Stuxberg, 1876
Map 3.

MATERIAL EXAMINED (all Russia, south of central Siberia, Republic of Khakassia). 1 ♀ (PSU-733), **Shira District**, ca. 3 air-km NW of Kommunar, Bolnichnyi Stream valley, 54.364722°N, 89.249167°E, bottom of rocky scree, ca. 840 m a.s.l., 30.VII.1999; 1 ♂, 2 ♀♀ (PSU-734), same District, ca. 10 air-km E of

Shira, 54.513889°N, 90.143056°E, bank of Lake Shira, piles of stones and boulders, ca. 355 m a.s.l., 3.VIII.1999, all leg. P.S. Nefediev; 1 ♀ (PSU-1255), same District, near Efremkino, 54.469709°N, 89.445864°E, ca. 480 m a.s.l., VII–VIII.2004, leg. E.V. Miroshnichenko; 6 ♂♂, 1 ♀ (PSU-816), **Altaiskii District**, near Ochury, Ochurskii Bor, 53.159306°N, 91.609972°E, *Pinus sylvestris* forest, ca. 300 m a.s.l., 30.IX.2008, leg. D.I. Pogrebnyak.

DISTRIBUTION. Originally described by Stuxberg (1876a, b) from the Yenisei River region (Krasnoyarsk Province), this species was later redescribed by Eason (1976) with lectotype designation, and it was synonymized with *Monotarsobius kaszabi* Loksa, 1965, the latter species described from Mongolia. *Lithobius*

(*M. fugax*) was later recorded from the Kemerovo Area and the Republic of Khakassia, both Siberia (Nefediev *et al.*, 2020b; Nefediev, Farzaliyeva, 2020).

Lithobius (Monotarsobius) nordenskoeldii
Stuxberg, 1876
Map 3.

MATERIAL EXAMINED. 1 ♂ (PSU-1466), Russia, south of central Siberia, Republic of Khakassia, **Beya District**, ca. 6 km W of Maina, Ui River valley, 52.987139°N, 91.391917°E, *Pinus sylvestris* forest, ca. 400 m a.s.l., in litter, 21.IX.2019, leg. E.Yu. Shuryshv.

DISTRIBUTION. Originally described by Stuxberg (1876a, b) from the Yenisei River region (Krasnoyarsk Province) and later re-described by Eason (1976) using Stuxberg's type material. This species was later recorded from the Republic of Altai, the Altai Province, and the Irkutsk Area (Nefediev *et al.*, 2017a, 2018, 2020a; Nefediev, Farzaliyeva, 2020).

REMARKS. This is the first record of *L. (M.) nordenskoeldii* in the Republic of Khakassia.

Class Diplopoda

Order Julida

Family JULIDAE

Sibirius profugus (Stuxberg, 1876)
Map 3.

MATERIAL EXAMINED. 1 ♂ (ASU), Russia, south of central Siberia, Republic of Khakassia, **Beya District**, ca. 4 air-km WSW of Bogoslovka, Ui River valley, 52.962222°N, 91.206111°E, mixed forest with *Pinus sylvestris*, *Picea obovata*, *Abies sibirica* and *Betula pendula*, ca. 600 m a.s.l., 22.VII.2019, leg. E.Yu. Shuryshv.

DISTRIBUTION. This species was originally described as *Iulus profugus* from the area between Tomsk and Kansk (Stuxberg 1876a, b), later transferred to *Sibirius* Gulička, 1963

(Lokšina, Golovatch, 1979), redescribed based on material from both the Novosibirsk Area and the Republic of Khakassia (Mikhaljova, 1993), and finally it was sunken as a senior subjective synonym of *Cylindroiulus (Sibirius) dentiger* Gulička, 1963 (Mikhaljova, 2002), a form described from the Kemerovo Area (Gulička, 1963). Being the most widespread species of *Sibirius*, this species is presently known from the Tomsk, Novosibirsk and Kemerovo areas, the Altai and Krasnoyarsk provinces, the republics of Altai and Khakassia (Stuxberg, 1876a, b; Gulička, 1963; Byzova, Chadaeva, 1965; Mikhaljova, 1993, 2002, 2004, 2017; Mikhaljova, Golovatch, 2001; Babenko *et al.*, 2009; Nefediev, 2002a, b, 2018b; Mikhaljova, Nefediev, 2003; Mikhaljova *et al.*, 2007, 2014; Nefediev, Nefedieva, 2007a, b, c, 2011, 2017).

Family NEMASOMATIDAE

Orinisobates sibiricus (Gulička, 1963)
Map 4.

MATERIAL EXAMINED (all Russia, south of central Siberia, Republic of Khakassia). 14 ♂♂, 19 ♀♀, 2 juv. (ASU), **Ust-Abakan District**, ca. 12 air-km W of Ust-Byur, right board of Uibat River valley, 53.825765°N, 90.052647°E, *Pinus sylvestris* forest with *Larix sibirica* and *Betula pendula*, ca. 705 m a.s.l., in litter, 17.VII.2012, leg. A.B. Medvedev; 2 ♂♂, 6 ♀♀ (ASU), same locality, in litter, 18.VII.2012, leg. A.P. Pavlov; 3 ♂♂, 2 ♀♀, 3 exuviae (ASU), **Askiz District**, ca. 3.5 air-km SE of Nankhchul, Askiz River valley, near mouth of Portal River, 53.419057°N, 89.756044°E, edge of *Picea obovata*, *Larix sibirica* and *Betula pendula* forest, under stones, ca. 675 m a.s.l., 4.VIII.2018, leg. O.A. Makarenko; 1 ♀ (ASU), near same locality, 53.419056°N, 89.756056°E, under stones, in litter, 21.VI.2019; 1 ♂ (ASU), same locality, under stones, in litter, 1.VIII.2020, all leg. S.V. Dragan; 1 ♂ (ASU), **Beya District**, ca. 6 air-km W of Maina, Ui River valley, 52.987139°N, 91.391917°E, *Pinus sylvestris* forest, ca. 400 m a.s.l., in litter, 21.IX.2019, leg. E.Yu. Shuryshv.



Map 4. Distribution of *Orinisobates sibiricus* (triangle) and *Teleckophoron montanum* (asterisk) in the Republic of Khakassia. Previously known localities marked in black, new records given in white.
 Карта 4. Распространение *Orinisobates sibiricus* (треугольник) и *Teleckophoron montanum* (звездочка) в Республике Хакасия. Черным отмечены ранее известные места находок, новые находки отмечены белым.

DISTRIBUTION. Originally described as *Isobates sibiricus* by Gulička (1963) from the Kemerovo Area, this species was later transferred first to the subgenus *Orinisobates* (Gulička, 1972), and finally to the genus *Orinisobates* (Lokšina, Golovatch, 1979). The distribution of *O. sibiricus* is mostly confined to Siberia, Russia, viz. the Kemerovo and Irkutsk areas, the republics of Khakassia, Altai and Tyva, and the Krasnoyarsk, Altai and Zabaikalskii provinces (Gulička, 1963, 1972; Byzova, Chadaeva, 1965; Enghoff, 1985; Mikhaljova, 1993, 2002, 2004, 2016, 2017; Mikhaljova, Golovatch, 2001; Mikhaljova, Nefediev, 2003; Nefediev, Nefedieva, 2006, 2007a, b, 2013; Nefedieva, Nefediev, 2008; Nefediev *et al.*, 2014, 2018; Nefedieva *et al.*, 2015; Nefediev, 2018b). This species is also known from the Eastern Kazakhstan and

Almaty areas (both Kazakhstan), and the Talas Area (Kyrgyzstan) (Enghoff, 1985).

Order Chordeumatida

Family KIRKAYAKIDAE

Teleckophoron montanum Gulička, 1972
 Map 4.

MATERIAL EXAMINED. 3 ♂♂, 1 ♀ (ASU), Russia, south of central Siberia, Republic of Khakassia, **Beya District**, ca. 4 air-km WSW of Bogoslovka, Ui River valley, 52.962222°N, 91.206111°E, mixed forest with *Pinus sylvestris*, *Picea obovata*, *Abies sibirica* and *Betula pendula*, ca. 600 m a.s.l., 22.VII.2019, leg. E.Yu. Shuryshhev.

DISTRIBUTION. This species was originally described by Gulička (1972) from the environs of Lake Teletskoye, Republic of Altai, with the type material deposited in the personal collection of the author in Bratislava, Slovakia. The original description was too incomplete, and the illustrations were very schematic. Upon the request of S.I. Golovatch, the holotype was returned to Russia, but without gonopods. According to those reasons, *T. montanum* was listed among *nomina dubia* for a long time. New records of this species from the southern part of the Krasnoyarsk Province finally allowed for a redescription to be published (Mikhaljova, Golovatch, 2001).

REMARKS. The above record of *T. montanum* is formally new to the Republic of Khakassia.

Order Polydesmida

Family POLYDESMIDAE

Schizoturanius tabescens (Stuxberg, 1876)

Map 1.

MATERIAL EXAMINED. 1 ♀ (ASU), Russia, south of central Siberia, Republic of Khakassia, **Beya District**, ca. 4 air-km WSW of Bogoslovka, Ui River valley, 52.962222°N, 91.206111°E, mixed forest with *Pinus sylvestris*, *Picea obovata*, *Abies sibirica* and *Betula pendula*, ca. 600 m a.s.l., 22.VII.2019, leg. E.Yu. Shuryshv.

DISTRIBUTION. Originally described as *Polydesmus tabescens* by Stuxberg (1876a, b) from the Yenisei River region (Krasnoyarsk Province), this species was later transferred to *Schizoturanius* Verhoeff, 1931 (Mikhaljova, 1993), and then proven to be a senior subjective synonym of *Turanodesmus salairicus* Gulička, 1963 (Mikhaljova, Marusik, 2004). *Schizoturanius tabescens* was later recorded from the Tomsk, Novosibirsk, Kemerovo, Tyumen and Irkutsk areas, the Altai Province, and the republics of Altai and Khakassia (Byzova, Chadaeva, 1965; Mikhaljova, 1993, 2004, 2013, 2017; Vorobiova, 1999; Mikhaljova, Golovatch, 2001;

Nefediev, 2001, 2002a, b, c, d, 2019b; Rybalov, 2002; Rybalov, Vorobiova, 2002; Vorobiova *et al.*, 2002; Mikhaljova, Nefediev, 2003; Nefediev, Nefedieva, 2005, 2006, 2007a, b, c, 2011, 2012a, b, 2013, 2017; Nefedieva, Nefediev, 2008; Babenko *et al.*, 2009; Bukhhalo *et al.*, 2014; Nefedieva *et al.*, 2015).

Conclusions

At present, the myriapod fauna of the Republic of Khakassia comprises at least 22 species from 12 genera, 8 families and 5 orders: *Geophilus proximus* C.L. Koch, 1847, *Arctogeophilus macrocephalus* Folkmanová et Dobroruka, 1960, *Escaryus japonicus* Attems, 1927, *E. koreanus* Takakuwa, 1937, *Lithobius* (*Chinobius*) *opinatus* (Zaleskaja, 1978), *L. (Ezembius) ostiacorum* Stuxberg, 1876*, *L. (E.) princeps* Stuxberg, 1876, *L. (Monotarsobius) curtipes* C.L. Koch, 1847, *L. (M.) fugax* Stuxberg, 1876, *L. (M.) nordenskiöldii* Stuxberg, 1876*, *L. (M.) worogowensis* Eason, 1976, *Julus ghilarovi* Gulička, 1963, *Pacifiulus amurenensis* (Gerstfeldt, 1859), *Sibiriulus profugus* (Stuxberg, 1876), *Orinisobates sibiricus* (Gulička, 1963), *Teleckophoron montanum* Gulička, 1972*, *Altajosoma bakurovi* (Shear, 1990), *A. deplanatum* (Stuxberg, 1876), *A. kemerovo* (Shear, 1990), *Shearia khakassica* Mikhaljova, 2000, *Schizoturanius clavatipes* (Stuxberg, 1876), and *S. tabescens* (Stuxberg, 1876). The first records from the Republic of Khakassia are marked with an asterisk (*).

The genus *Teleckophoron* Gulička, 1972, and the family Kirkayakidae it belongs to, are formally new to the Republic of Khakassia.

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References

- Babenko A.S., Nefediev P.S., Nefedieva J.S. 2009. [The fauna and population dynamics of the millipedes (Diplopoda) of the Salair chern taiga] // Vestnik Tomskogo gosudarstvennogo universiteta, Seriya Biologiya. Vol.319. P.182–185 [in Russian].
- Bukhhalo S.P., Galitch D.E., Sergeeva E.V., Vazhenina N.V. 2014. [Synopsis of the invertebrate fauna of the southern taiga in western Siberia (basin of the Lower Irtysh)]. Moscow: KMK Scientific Press. 189 p. [In Russian]
- Byzova Yu.B., Chadaeva Z.V. 1965. [Comparative characteristics of soil fauna of various associations in an Abies sibirica forest (Kemerovo Area)] // Zoologicheskii Zhurnal. T.44. No.3. P.331–339 [in Russian, with English summary].
- Dyachkov Yu.V. 2017. [The first data on the centipede (Chilopoda: Geophilomorpha; Lithobiomorpha) fauna of the Katun Biosphere State Nature Reserve, Altai Mts] // Ukrainian Journal of Ecology. Vol.7. No.4. P.453–456 [in Russian, with English summary].
- Dyachkov Yu.V. 2019. New data on lithobiomorph centipedes (Chilopoda: Lithobiomorpha: Anopsobiidae, Hemicopidae, Lithobiidae) from Kazakhstan // Arthropoda Selecta. Vol.28. No.1. P.8–20.
- Dyachkov Yu.V., Tuf I.H. 2019. New data on the family Geophilidae Leach, 1815 (Chilopoda: Geophilomorpha) from Kazakhstan // Far Eastern Entomologist. No.391. P.24–28.
- Eason E.H. 1976. The type specimens and identity of the Siberian species described in the genus *Lithobius* by Anton Stuxberg in 1876 (Chilopoda: Lithobiomorpha) // Zoological Journal of the Linnean Society. No.58. P.98–127.
- Enghoff H. 1985. The millipede family Nemasomatidae with the description of a new genus and a revision of *Orinisobates* (Diplopoda, Julida) // Entomologica Scandinavica. Vol.16. P.27–67.
- Folkmanová B., Dobroruka L.J. 1960. [A contribution to Chilopoda of the USSR] // Zoologicheskii Zhurnal. Vol.39. No.12. P.1811–1818 [in Russian with German summary].
- Gulička J. 1963. [New millipedes (Diplopoda) from the USSR. Part 1] // Zoologicheskii Zhurnal. Vol.42. No.4. P.518–524 [in Russian with English summary].
- Gulička J. 1972. [New millipedes (Diplopoda) from the USSR. Part 2] // Zoologicheskii Zhurnal. Vol.51. No.1. P.36–45 [in Russian with English summary].
- Kostyakova T.V., Touchan R., Babushkina E.A., Belokopytova L.V. 2018. Precipitation reconstruction for the Khakassia region, Siberia, from tree rings // The Holocene. Vol.28. No.3. P.377–385.
- Lokšina I.E., Golovatch S.I. 1979. Diplopoda of the USSR fauna // Pedobiologia. Vol.19. P.381–389.
- Mikhailjova E.V. 1993. The millipedes (Diplopoda) of Siberia and the Far East of Russia // Arthropoda Selecta. Vol.2. No.2. P.3–36.
- Mikhailjova E.V. 2000. Review of the millipede family Diplomaragnidae (Diplopoda: Chordeumatida) // Arthropoda Selecta. Vol.8 (for 1999). No.3. P.153–181.
- Mikhailjova E.V. 2002. On some poorly-known millipedes from Siberia (Diplopoda) // Arthropoda Selecta. Vol.10 (for 2001). No.3. P.201–207.
- Mikhailjova E.V. 2004. The millipedes (Diplopoda) of the Asian part of Russia. Sofia–Moscow: Pensoft Publ. 292 p.
- Mikhailjova E.V. 2013. [Endemism of the millipedes (Diplopoda) of the Asian part of Russia] // Izucheniye, sokhraneniye i vosstanovleniye estestvennykh landshaftov. Sbornik statei III Mezhdunarodnoi nauchno-prakticheskoi konferentsii. 7–10 October 2013, Volgograd. Moscow: Planeta Publ. P.220–223 [in Russian].
- Mikhailjova E.V. 2016. New species and new records of millipedes (Diplopoda) from the Asian part of Russia // Far Eastern Entomologist. No.316. P.1–25.
- Mikhailjova E.V. 2017. [The millipede fauna (Diplopoda) of the Asian part of Russia]. Vladivostok: Dalnauka Publ. 336 p. [In Russian, with English summary]
- Mikhailjova E.V., Golovatch S.I. 2001. A review of the millipede fauna of Siberia (Diplopoda) // Arthropoda Selecta. Vol.9 (for 2000). No.2. P.103–118.
- Mikhailjova E.V., Marusik Yu.M. 2004. New data on taxonomy and fauna of the millipedes (Diplopoda) from the Russian Far East, Siberia and Mongolia // Far Eastern Entomologist. No.133. P.1–12.
- Mikhailjova E.V., Nefediev P.S. 2003. A contribution to the millipede fauna of Siberia (Diplopoda) // Arthropoda Selecta. Vol.11 (for 2002). No.1. P.81–87.
- Mikhailjova E.V., Nefediev P.S., Nefedieva J.S. 2007. New data on millipedes of the family Julidae (Diplopoda, Julida) from Altai, Siberia // Zootaxa. Vol.1541. P.57–63.
- Mikhailjova E.V., Nefediev P.S., Nefedieva J.S., Sakhnevich M.B., Dyachkov Yu.V. 2014. Review of the millipede genus *Sibirialus* Gulička, 1972, with descriptions of three new species from Altai, Siberia, Russia (Diplopoda, Julida, Julidae) // Zootaxa. Vol.3866. No.1. P.30–52.
- Nefediev P.S. 2001. [On the fauna and ecology of Myriapoda in the environs of the village of Smolenskoe, Altai Province] // S.V. Popov (ed.). Landshafty Zapadnoi Sibiri: problemy issledovaniy, ekologiya i racionalnoye ispolzovaniye. Materialy VII Mezhdunarodnoi mezhvuzovskoi konferentsii, posvyaschionnoi Dnyu Zemli. Biysk: Biysk Pedagogical State University Publ. P.84–86 [in Russian].
- Nefediev P.S. 2002a. [Eco-faunistic investigations of myriapods in the Teguldet District, Tomsk Area] // Lomonosov–2002. Materialy Mezhdunarodnoi konferentsii studentov i molodykh uchionykh. Vol.7. Moscow: Moscow State University Publ. P.40–41 [in Russian].
- Nefediev P.S. 2002b. On the Diplopoda fauna of South-West Siberia // Abstracts of 12th International Congress of Myriapodology. 28 July – 3 August 2002, Mtunzini, KwaZulu-Natal, South Africa. P.30.
- Nefediev P.S. 2002c. [Populations and some ecological peculiarities of myriapods of gray forest soils in the southern of the Tomsk Area] // Biologiya – nauka XXI

- veka. Tezisy 6 Shkoly-konferentsii molodykh uchionykh. Pushchino-on-Oka: Pushchino Scientific Centre RAS Publ. P.138–139 [in Russian].
- Nefediev P.S. 2002d. [The fauna and ecology of myriapods (Myriapoda) of a relict lime grove (village of Kuzedeyevo)] // Student i nauchno-tekhnicheskii progress: Biologiya. Materialy XL Mezhdunarodnoi nauchnoi studencheskoi konferentsii. Novosibirsk: Novosibirsk State University Publ. P.35 [in Russian].
- Nefediev P.S. 2018a. *Julus ghilarovi* Gulička, 1963 s.str.: time to put an end to confusion (Diplopoda: Julida: Julidae) // Arthropoda Selecta. Vol.27. No.4. P.284–292.
- Nefediev P.S. 2018b. New records of millipedes of the order Julida (Diplopoda) from Asian Russia and adjacent regions // Far Eastern Entomologist. No.370. P.12–20.
- Nefediev P.S. 2019a. New records of geophilomorph centipedes (Chilopoda: Geophilomorpha) from natural and anthropogenic habitats of Siberia // Far Eastern Entomologist. No.380. P.23–28.
- Nefediev P.S. 2019b. New records of the millipede genus *Schizoturanus* Verhoeff, 1931 from the Asian part of Russia (Diplopoda: Polydesmida: Polydesmidae) // Russian Entomological Journal. Vol.28. No.3. P.331–339.
- Nefediev P.S., Farzalieva G.Sh. 2020. New records of lithobiid centipedes from Siberia, Russia (Chilopoda: Lithobiomorpha: Lithobiidae) // Arthropoda Selecta. Vol.29. No.2. P.185–198.
- Nefediev P.S., Nefedieva J.S. 2005. [Seasonal fluctuations of diplopod density in some forests of Western Siberia] // B.R. Striganova (ed.). Ekologicheskoe raznoobrazie pochvennoi bioty i biologicheskaya produktivnost pochv. Materialy dokladov IV (XIV) Vserossiiskoi konferentsii po pochvennoi zoologii. 1–4 February 2005, Tyumen. Tyumen: Tyumen State University Publ. P.177–178 [in Russian].
- Nefediev P.S., Nefedieva J.S. 2006. [Regional peculiarities of millipede fauna (Diplopoda) in the south-east of Western Siberia] // V.V. Anyushkin (ed.). Ekologiya Yuzhnoi Sibiri i sopredelnykh territorii. Sbornik materialov X Mezhdunarodnoi shkoly-konferentsii studentov i molodykh uchionykh. Abakan: Khakassian State University Publ. Vol.10. No.1. P.98 [in Russian].
- Nefediev P.S., Nefedieva J.S. 2007a. A brief analysis of the biotopic distribution of millipedes (Diplopoda) in the south-east of Western Siberia // A.I. Taskaev (ed.). Lesnoye pochvovedenie: itogi, problem, perspektivy. Tezisy dokladov Mezhdunarodnoi nauchnoi konferentsii. 4–11 September 2007, Syktyvkar. Syktyvkar: Institute of Biology, Komi Scientific Center, Ural Division of RAS Publ. P.139–140.
- Nefediev P.S., Nefedieva J.S. 2007b. [Biogeographical characteristic of the millipede fauna in the southeast of Western Siberia] // G.P. Ostroverkhova (ed.). Biiraznoobrazie bespozvonochnykh zivotnykh. Sbornik materialov II Vserossiiskoi shkoly-seminara s mezhdunarodnym uchastiem. 24–26 October 2007, Tomsk. Tomsk: Deltaplan Publ. P.159–164 [in Russian].
- Nefediev P.S., Nefedieva J.S. 2007c. [Seasonal dynamics of locomotor activity of millipedes (Diplopoda) in forests of Western Siberia] // V.N. Kazin (ed.). Ekologicheskie problemy unikalnykh prirodnykh i antropogennykh landshaftov. Sbornik materialov Vserossiiskoi nauchno-prakticheskoi konferentsii. 29 November 2007, Yaroslavl. Yaroslavl: Yaroslavl State University Publ. P.98–103 [in Russian].
- Nefediev P.S., Nefedieva J.S. 2011. [Millipedes (Diplopoda) of green plantations of the city of Tomsk and its suburbs] // Kontseptualnye i prikladnye aspekty nauchnykh issledovaniy v oblasti zoologii bespozvonochnykh. Sbornik materialov III Vserossiiskoi shkoly-seminara s mezhdunarodnym uchastiem, posvyashchionnoi 120-letiyu so dnya rozhdeniya Rostislava Petrovicha Berezhkova (1891–1961). 24–27 October 2011, Tomsk. Tomsk: Agraf-Press Publ. P.100–102 [in Russian].
- Nefediev P.S., Nefedieva J.S. 2012a. [Some peculiarities of the distribution of millipedes (Diplopoda) along a soil profile in the south-taiga and small-leaved forests of Western Siberia] // Izvestiya Altaiskogo gosudarstvennogo universiteta, Biologicheskie nauki. Vol.3(75). No.1. P.49–54 [in Russian, with English summary].
- Nefediev P.S., Nefedieva J.S. 2012b. [Some peculiarities of the seasonal dynamics of sex-age structure in millipede populations (Diplopoda) in the southern taiga and small-leaved forests of Western Siberia] // Izvestiya Altaiskogo gosudarstvennogo universiteta, Biologicheskie nauki. Vol.3(75). No.2. P.46–48 [in Russian, with English summary].
- Nefediev P.S., Nefedieva J.S. 2013. [Biodiversity and ecology of millipedes in the environs of Lake Teletskoye (Diplopoda)] // Izvestiya Altaiskogo gosudarstvennogo universiteta, Biologicheskie nauki. Vol.3(79). No.1. P.86–87 [in Russian, with English summary].
- Nefediev P.S., Nefedieva J.S. 2017. New data on the millipede fauna of the Russian Altai, southwestern Siberia (Diplopoda) // Arthropoda Selecta. Vol.26. No.4. P.288–296.
- Nefediev P.S., Dyachkov Yu.V., Nefedieva, J.S. 2014. Fauna and ecology of millipedes (Diplopoda) in the Tigirek State Nature Reserve, Russian Altai // I.H. Tuf, K. Tajovský (eds.). 16th International Congress of Myriapodology. Book of Abstracts. Institute of Soil Biology, BC ASCR & Faculty of Science, Palacký University, Olomouc. P.63.
- Nefediev P.S., Farzalieva G.Sh., Efimov D.A. 2020a. New data on lithobiomorph centipedes (Chilopoda, Lithobiomorpha) from anthropogenic habitats of Siberia // Far Eastern Entomologist. No.418. P.9–14.
- Nefediev P.S., Farzalieva G.Sh., Tuf I.H. 2017a. A preliminary review of the fauna of the Altai State Nature Biosphere Reserve, southwestern Siberia, Russia (Chilopoda: Lithobiomorpha, Geophilomorpha) // Arthropoda Selecta. Vol.26. No.3. P.217–224.
- Nefediev P.S., Farzalieva G.Sh., Tuf I.H., Efimov D.A. 2020b. The first records of lithobiid centipedes

- (Chilopoda: Lithobiomorpha: Lithobiidae) from the Kemerovo Area, southwestern Siberia, Russia // *Invertebrate Zoology*. Vol.17. No.1. P.36–43.
- Nefediev P.S., Farzalieva G.Sh., Tuf I.H., Nedoov Kh.Kh., Niyazov S.T. 2018. Millipede and centipede assemblages on the northern and southern slopes of the lowland Altai, southwestern Siberia, Russia (Diplopoda, Chilopoda) // P. Stoev, G.D. Edgecombe (eds.). *Proceedings of the 17th International Congress of Myriapodology*, Krabi, Thailand. *ZooKeys*. Vol.741. P.219–254.
- Nefediev P.S., Knyazev S.Yu., Farzalieva G.Sh., Tuf I.H. 2017b. A contribution to the myriapod fauna of the Omsk Area, Siberia, Russia (Myriapoda: Diplopoda, Chilopoda) // *Arthropoda Selecta*. Vol.26. No.2. P.113–118.
- Nefediev P.S., Tuf I.H., Farzalieva G.Sh. 2017c. Centipedes from urban areas in southwestern Siberia, Russia (Chilopoda). Part 2. Geophilomorpha // *Arthropoda Selecta*. Vol.26. No.1. P.8–14.
- Nefedieva J.S., Nefediev P.S. 2008. Ecofaunistic investigations of millipedes (Diplopoda) in the environs of Lake Teletskoe // *Myriapoda and Onychophora of the World Diversity, Biology and Importance. Abstracts of 14th International Congress of Myriapodology*. Staatliches Museum für Naturkunde, Görlitz. Peckiana. Vol.6. P.123–124.
- Poloczek A., Pfeiffer M., Schneider R., Mühlenberg M. 2016. The Chilopoda (Myriapoda) of the Khentey-Mountain Range, Northern Mongolia. Communities of different forest-types under a varying fire regime // *European Journal of Soil Biology*. Vol.74. P.114–120.
- Poloczek A., Pfeiffer M., Schneider R., Mühlenberg M., Nefediev P. 2017. The myriapods (Chilopoda and Diplopoda) of the Khentey-Mountain Range. Communities from different forest-types under a varying fire regime // B. Bayartogtokh, Ch. Dulamsuren (eds). *Abstracts of the International Conference on “Biodiversity research of Mongolia”*, Ulaanbaatar, Mongolia. Ulaanbaatar: National University of Mongolia Press. P.35–36.
- Rybalov L.B. 2002. [Zonal and landscape changes in soil invertebrate populations in a near-Yenisei River region of middle Siberia and the role of temperature adaptations in the meridional (zonal) distribution of invertebrates] // *Russian Entomological Journal*. Vol.11. No.1. P.77–86 [in Russian, with English summary].
- Rybalov L.B., Vorobiova I.G. 2002. [Population of soil invertebrates in taiga ecosystems of the middle flow of the Yenisei River] // *Izuchenie, sokhranenie i vosstanovlenie bioraznoobraziya ekosistem na yeniseiskom ekologicheskom transekte: Zhivotnyi mir, etno-ekologicheskie issledovaniya*. Vol.2. Moscow: IEE RAS Publ. P.8–42 [in Russian].
- Semenov Yu.M., Lysanova G.I. 2016. [The landscape map of Khakassia] // *Izvestiya Irkutskogo gosudarstvennogo universiteta, Seriya Nauki o Zemle*. Vol.18. P.128–139 [in Russian with English summary].
- Sergeeva E.V. 2010. [Species diversity of centipedes (Chilopoda) in the southern taiga subzone of Western Siberia] // *Tobolsk Nauchnyi – 2010. Materialy Vserossiyskoi nauchno-prakticheskoi konferentsii*. Tobolsk. P.37–39 [in Russian].
- Shear W.A. 1990. On the Central and East Asian millipede family Diplomaragnidae (Diplopoda, Chordeumatida, Diplomaragnoidea) // *American Museum Novitates*. No.2977. P.1–40.
- Stuxberg A. 1876a. Myriopoder från Sibirien och Waigatsch ön samlade under Nordenskiöldska expeditionen 1875 // *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar*. Årg.33. No.2. S.11–38.
- Stuxberg A. 1876b. On the Myriopoda, from Siberia and Waigatsch Island, collected during the expedition of Prof. Nordenskiöld, 1875 // *Annals and Magazine of Natural History*. Ser.4. Vol.17. P.306–318.
- Tuf I.H. 2007. [Diversity of selected taxa of invertebrates of the Altai (East Kazakhstan)] // *Sovremennye podkhody k zaschite biologicheskoi variativnosti v kontekste dostizheniya ustoichivogo razvitiya Respubliki Kazakhstan*. *Sbornik Mezhdunarodnogo Kazakhstanskogo-Cheshskogo nauchnogo seminara, Ust-Kamenogorsk*. Ust-Kamenogorsk: East Kazakhstan State University Publ. P.56–64 [in Czech, with English summary].
- Tuf I.H., Dányi L., Kuda F., Chlachula J. 2010. Centipedes of Kazakhstan – new records from Altai // *High Mountain Soils Biodiversity*, Tbilisi. Tbilisi: Ilia State University Publ. P.11–12.
- Volkova Yu.S. 2016. An annotated catalogue of geophilomorph centipedes (Chilopoda, Geophilomorpha) from the European part of Russia // *Zoologicheskii Zhurnal*. Vol.95. No.6. P.669–678 [in Russian with English summary].
- Vorobiova I.G. 1999. [Ecological and faunistic characteristics of myriapod populations in the mid-flow region of the Yenisei River] // *Problemy pochvennoi zoologii. Materialy II (XII) Vserossiyskogo soveschaniya po pochvennoi zoologii*. Moscow: KMK Sci. Press. P.33–34 [in Russian].
- Vorobiova I.G., Rybalov L.B., Rossolimo T.E., Zalesskaja N.T. 2002. [Zonal and landscape distribution of the myriapod fauna and populations (Myriapoda) in the Yenisei River basin] // *Izuchenie, sokhranenie i vosstanovlenie bioraznoobraziya ekosistem na Yeniseiskom ekologicheskom transekte: Zhivotnyi mir, etno-ekologicheskie issledovniya*. Vol.2. Moscow: IEE RAS Publ. P.60–71 [in Russian].
- Zalesskaja N.T. 1978. [Identification book of the lithobiomorph centipedes of the USSR]. Moscow: Nauka Publ. 212 p. [In Russian]
- Zalesskaja N.T., Titova L.P., Golovatch S.I. 1982. [The myriapod fauna of the Moscow Region] // M.S. Ghilarov (ed.). *Pochvennye bespozvonochnye Moskovskoi oblasti*. Moscow: Nauka Publ. P.179–200 [in Russian].