

УДК 591.69-599.363.2

**HELMINTH FAUNA OF THE COMMON SHREW *Sorex araneus* L.
IN THE EUROPEAN PART OF THE SPECIES RANGE**

© I. A. Nikonorova,^{1*} R. Binkiene,² S. V. Bugmyrin,¹ E. P. Ieshko¹

¹ Institute of Biology, Karelian Research Centre, Russian Academy of Sciences
Pushkinskaya str. 11, Petrozavodsk, 185910

² Institute of Ecology, Nature Research Center
Akademijos str. 2, Vilnius, LT-08412

* E-mail: nikonmira@mail.ru

Received 02.09.2017

The structure and composition of the helminth fauna of *Sorex araneus* (Soricomorpha: Soricidae) in the European part of the species range are characterized. Ninety nine helminth species have been recorded in total, including 21 trematodes, 39 cestodes, 34 nematodes, 5 acanthocephalans. The high taxonomic diversity of helminths is due to the host's wide range and habitat versatility. Representatives of the Palaearctic faunal complex prevail among the parasites (70 %). A majority of Holarctic and cosmopolitan species were polyxenous parasites found in shrew at larval stages of their development. The helminth fauna mainly comprises species with a complex life cycle, where *S. araneus* serves as a definitive or intermediate host. Comparative analysis of the helminth fauna of *Sorex araneus* in the European part of the species range has demonstrated a high level of difference in local component communities of parasites, mainly owing to rare (or accidental) species. The widespread species generating similarity in the helminth fauna of different parts of the *S. araneus* European range are specific parasites of Soricidae: trematodes *Brachylaima fulvum*, *Rubinstrema exasperatum*, cestodes *Monocercus arionis*, *Staphylocystis furcata*, *Neoskrjabinolepis schaldybini*, *Lineolepis scutigera*, *Ditestolepis diaphana*, *Vigisolepis spinulosa* and nematodes *Aonchotheca kutori*, *Eucoleus oesophagicola*, *Longistriata didas* and *L. codrus*.

Key words: shrews, *Sorex araneus*, diversity of parasites, Europe.

ГЕЛЬМИНТОФАУНА ОБЫКНОВЕННОЙ БУРОЗУБКИ *SOREX ARANEUS* L.
ЕВРОПЕЙСКОЙ ЧАСТИ АРЕАЛА

© И. А. Никонорова,^{1*} Р. Бинкене,² С. В. Бугмырин,¹ Е. П. Иешко¹

¹ Институт биологии КарНЦ РАН
ул. Пушкинская, 11, Петрозаводск, 185910

² Институт экологии, Исследовательский центр дикой природы
ул. Академии, 2, Вильнюс, LT-08412

* E-mail: nikonmira@mail.ru

Поступила 02.09.2017

Проведены исследования структуры и состава гельминтофауны *Sorex araneus* (Soricomorpha: Soricidae) европейской части ареала. Всего в Европе у *S. araneus* регистрируется 99 видов гельминтов, из которых трематод — 21, цестод — 39, нематод — 34, скребней — 5 видов. Высокое таксономическое разнообразие гельминтов определяется широким ареалом и эвритопностью этого вида хозяина. В составе гельминтофауны преобладают представители палеарктического фаунистического комплекса (70 %). Голарктические виды и космополиты в большинстве своем поликсенные паразиты, встречающиеся у бурозубки на личиночной стадии развития. Среди гельминтов значительное большинство паразитов со сложным жизненным циклом, в реализации которых *S. araneus* участвует в роли дефинитивного или промежуточного хозяина. Сравнительный анализ гельминтофауны *S. araneus* европейской части ареала показал высокое своеобразие локальных компонентных паразитарных сообществ, главным образом за счет редких (или случайных) паразитов. Широко распространенными и определяющими сходство гельминтофауны разных районов европейского ареала *S. araneus* являются специфичные паразиты Soricidae: трематоды *Brachylaima fulvum*, *Rubinstrema exasperatum*, цестоды *Monocercus arionis*, *Staphylocystis furcata*, *Neoskrjabinolepis schaldybini*, *Lineolepis scutigera*, *Ditestolepis diaphana*, *Vigisolepis spinulosa* и нематоды *Aonchotheca kutori*, *Eucoleus oesophagicola*, *Longistriata didas* и *L. codrus*.

Ключевые слова: бурозубки, *Sorex araneus*, видовое разнообразие паразитов, Европа.

The common shrew, *Sorex araneus* Linneus, 1758 (Soricomorpha: Soricidae), has a wide distribution in the Palaearctic, occurring from United Kingdom through central, northern and eastern Europe and Asia as far east as Lake Baikal and as far north as the Arctic coast. It is widespread throughout, with the exception of arid steppe and desert areas. In the Mediterranean, it occurs in most European continental areas, with the exception of large parts of Iberia, France, and Italy and the Balkans. There are isolated populations in the Pyrenees and the Massif Central (France). It is recorded from sea level to 2.500 m (Mitchell-Jones et al., 1999). The genetic diversity of this species is unique: 75 chromosomal races have been described, which can correspond to subspecies or geographic populations (Orlov et al., 2004; Orlov et al., 2007; Shchipanov et al., 2009; Shchipanov, Pavlova, 2016). The high genetic heterogeneity of hosts generates the wide geographic variation of local populations that can influence to the species composition of parasites.

Studies of the helminth fauna of the common shrew have been numerous, covering various geographic and landscape zones. On the other hand, papers offering a synthesis are few, and there is in fact only one that closely considers the structure and genesis of European cestodes fauna in shrews (Binkiene et al., 2011).

This paper is an attempt to make modern description of the helminth fauna in *Sorex araneus* in the European part of its range and to assess the biogeographic aspects of its formation relying on published data.

MATERIAL AND METHODS

This analysis of the helminth fauna of the common shrew (*Sorex araneus*) was based on the results of parasitological studies carried out at different times in different parts of Europe: Vasilyev, 1949; Viktorov et al., 1964; Prokopič, Mahnerti, 1970; Baruš et al., 1977; Mas-Coma, Galego, 1977; Romashov, 1983; Pecher, 1996; Okulova et al., 2003; Binkiene et al., 2011.

We carried out a comparative analysis of the species composition of helminths in *S. araneus* using the results of parasitological monitoring surveys (in 17 regions in total) on a broad sample of hosts in the following countries: Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012; Kornienko, Binkiene, 2008); Bulgaria (Prokopič et al., 1974; Genov, 1984; Genov, Georgiev, 1998); Czechia (Prokopič, 1958, 1959, 1972; Prokopič et al., 1974; Našincova, Busta, 1991; Moravec, 2000); United Kingdom (Sharpe, 1964; Lewis, 1968, 1987; Churchfield, 1990; Roots, 1992); Lithuania (Binkiene, 2006; Kornienko, Binkiene, 2008, Kornienko et al., 2016); Moldova (Andrejko, 1973); Poland (Soltys, 1952, 1954; Rybicka, 1959; Żarmowski, 1955, 1960; Kisielewska, 1961; Pojmanska, 1961); Ukraine (Bychovskaya-Pavlovskaya et al., 1970, 1978; Mel'nichenko, Panasenko, 1979; Tkach, 1993; Iskova et al., 1995; Tkach, Bray, 1995; Vysotskaya, 1997; Tkach, Swiderski, 1998); Finland (Erkinaro, Heikura, 1977; Haukisalmi, 1989; Haukisalmi, Henttonen, 1994; Bugmyrin et al., 2003, 2008; Haukisalmi, 2015); France (Jourdane, 1971, 1973; Vaucher, 1971; Vaucher, Durette-Desset, 1973; Ribas et al., 2005); Slovakia (Prokopič, 1958, 1959, 1972; Mituch, 1968; Vaucher, 1971; Prokopič et al., 1974; Matskasi, 1984; Mészáros, 1984; Murai et al., 1992; Stefancikova et al., 1994; Hanzelova, Rysavy, 1996, 1999); Switzerland (Baer, 1932; Vaucher, Hunkeler, 1967; Vaucher, 1971; Vaucher, Durette-Desset, 1973) and regions of Russia: Murmanskaya oblast' (Anikanova et al., 2005); Republic of Karelia (Novikov, 1992; Bugmyrin et al., 2003, 2008; Anikanova et al., 2007, 2009), Republic of Komi (Yushkov, 1995); Republic of Mordovia (Schaldybin, 1964); Samarskaya oblast' (Kirillova, 2004; Kirillova, Kirillov, 2007). The degree of similarity of the helminth fauna was measured by Jaccard index. Cluster analysis (Euclidian distance, Ward's method) was performed and the bootstrap dendrogram was constructed using PAST Ver. 2.17 software (Hammer et al., 2001). The taxonomic positions and full Latin names of taxa are given according to the Fauna Europaea Database (Gibson et al., 2014), Global Cestode Database (<http://tapewormdb.uconn.edu>), and, Keys to the Nematoda (Anderson et al., 2000) and Trematoda (Gibson et al., 2002; Jones et al., 2005; Bray et al., 2008).

RESULTS AND DISCUSSION

The helminth fauna of the common shrew in the European part of the species range includes 99 species (see table).

The systematic list of helminths *Sorex araneus*,
noted in the European part of the range

Species (with synonyms)	Faunistic complex	Country (the author)
Trematoda		
Brachylaimidae		
<i>Brachylaima fulvum</i> Dujardin, 1843 (Syn.: <i>Panopistus europaeus</i> Soltys, 1952; <i>Brachylaemus oesophagei</i> Shaldybin, 1953; <i>Brachylaemus migrans</i> Dujardin, 1845)	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Genov, 1984; Prokopič et al., 1974); Czechia (Prokopic, 1958); Finland (Haukisalmi, 1989; Haukisalmi, Henttonen, 1994); France (Jourdane, 1971, 1973; Ribas et al., 2005); Germany (Pecher et al., 1996); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Poland (Soltys, 1952; Zarmowski, 1960); Russia (Vasilyev, 1949; Schalldybin, 1964; Novikov, 1992; Yushkov, 1995; Anikanova et al., 2005, 2007, 2009; Bugmyrin et al., 2008); Slovakia (Prokopic, 1958; Matskasi, 1984); Spain (Mas-Coma, Gallego, 1977); Ukraine (Bychovskaya-Pavlovskaya et al., 1970; Iskova et al., 1995; Mel'nicenko, Panasenka, 1979; Tkach, 1993; Vysotskaya, 1997); United Kingdom (Churchfield, 1990; Lewis, 1968, 1987; Roots, 1992)
Panopistidae		
<i>Panopistus pricei</i> Sinitsin, 1931	Palaearctic	Czechia (Prokopic, 1958); Slovakia (Prokopič, 1958; Mituch, 1968)
<i>Pseudoleucochloridium soricis</i> (Soltys, 1952) (Syn.: <i>Leucochloridium soricis</i> Soltys 1952; <i>Leucochloridium skrjabini</i> , Shaldybin, 1953)	West Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Genov, 1984; Prokopič et al., 1974); Czechia (Prokopič, 1958); Finland (Haukisalmi, Henttonen, 1994); France (Jourdane, 1971, 1973); Hungary (Murai et al., 1992); Lithuania (Binkiene, 2006); Poland (Soltys, 1954); Russia (Schalldybin, 1964; Yushkov, 1995); Slovakia (Prokopič, 1958; Mituch, 1968); Spain (Mas-Coma, Gallego, 1977); Switzerland (Vaucher, Hunkeler, 1967); Ukraine (Bychovskaya-Pavlovskaya et al., 1970; Iskova et al., 1995; Mel'nicenko, Panasenka, 1979; Tkach, 1993)
<i>Pseudoleucochloridium rotundus</i> Bychovskaja-Pavlovskaja et Kulakova, 1970	Palaearctic	Ukraine (Bychovskaya-Pavlovskaya et al., 1970; Iskova et al., 1995; Vysotskaya, 1997)
Strigeidae		
<i>Strigea falconis</i> Szidat, 1928, larvae (Syn.: <i>Festucaria strigis</i> Fröhlich, 1802; <i>Amphistoma striatum</i> Rudolphi, 1809)	Cosmopolitan	Belarus (Shimalov, 2007, 2012); Romania (Tkach, 1993); Ukraine (Iskova et al., 1995; Tkach, 1993)

Continued table

Species (with synonyms)	Faunistic complex	Country (the author)
<i>S. sphaerula</i> (Rudolphi, 1803), larvae (Syn.: <i>Amphistoma sphaerula</i> Rudolphi, 1803; <i>Holostomum sphaerula</i> of Dujardin, 1845)	Palaearctic	Belarus (Arzamasov et al., 1969; Shimalov, 2007, 2012)
<i>S. strigis</i> (Schrank, 1788), larvae (Syn.: <i>Festucaria strigis</i> , Schrank, 1788)	Palaearctic	Belarus (Shimalov, 2007); Romania (Tkach, 1993); Ukraine (Iskova et al., 1995)
Diplostomidae		
<i>Alaria alata</i> (Goeze, 1782), larvae (Syn.: <i>Planaria alata</i> Goeze, 1782; <i>Distomum putorii</i> Molin, 1858)	Cosmopolitan	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2012); Bulgaria (Genov, 1984; Genov, Georgiev, 1998); Russia (Viktorov et al., 1964; Kirillova, 2004); Slovakia (Štefancikova et al., 1994); Ukraine (Iskova et al., 1995; Mel'nichenko, Panasenko, 1979)
<i>Neodiplostomum major</i> Dubinina, 1950, larvae	Palaearctic	Bulgaria (Genov, 1984); Romania (Tkach, 1993)
<i>N. spathoides</i> Dubois, 1937, larvae	Palaearctic	Romania (Tkach, 1993)
Dicrocoeliidae		
<i>Prosolecithus danubica</i> Tkach et Bray, 1995	Palaearctic	Ukraine (Tkach, Bray, 1995)
<i>Lyperosomum soricis</i> (Diesing, 1858), larvae (Syn.: <i>Distoma soricis</i> Diesing, 1858; <i>Dicrocoelium soricis</i> (Diesing 1858) Joyeux et Baer, 1936)	Palaearctic	Bulgaria (Genov, 1984); Poland (Soltys, 1954); Romania (Tkach, 1993); Slovakia (Prokopic, 1958); Ukraine (Vysotskaya, 1997); United Kingdom (Lewis, 1968, 1987; Churchfield, 1990; Roots, 1992)
<i>L. transcarpaticus</i> , Bychovskaja-Pavlovskaja et Kulakova, 1978, larvae	Palaearctic	Ukraine (Bychovskaya-Pavlovskaya et al., 1978; Iskova et al., 1995)
Prosthogonimidae		
<i>Cephalotrema minutum</i> Baer, 1943, larvae	Palaearctic	Slovakia (Prokopič, 1958)
Plagiorchidae		
<i>Skrjabinoplagiorchis polonicus</i> (Soltys, 1957) (Syn.: <i>Plagiorchis polonicus</i> Soltys, 1957; <i>Skrjabinoplagiorchis morosovi</i> Varenov, 1965)	Holarctic	Belarus (Shimalov, 2007)

Species (with synonyms)	Faunistic complex	Country (the author)
Omphalometridae		
<i>Neoglyphe locellus</i> (Kossack, 1910) (Syn.: <i>Opisthoglyphe locellus</i> , Kossack 1910)	Holarctic	Belarus (Shimalov, 2007); Bulgaria (Genov, 1984); Romania (Tkach, 1993); Russia (Vasilyev, 1949); Ukraine (Iskova et al., 1995; Tkach, 1993)
<i>N. sobolevi</i> (Schaldybin, 1953) (Syn.: <i>Opisthoglyphe sobolevi</i> (Schaldybin 1953); <i>Sorexeglyphe sobolevi</i> (Schaldybin, 1953) Nadtochii, 1965; <i>S. suifunensis</i> Sadvovskaja, 1952; <i>Opisthoglyphe soricis</i> Pojmanska, 1956)	Holarctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Finland (Haukisalmi, 1989; Haukisalmi, Henttonen, 1994; Bugmyrin et al., 2003); Hungary (Murai et al., 1992); Lithuania (Binkiene, 2006); Poland (Pojmanska, 1961); Romania (Tkach, 1993); Russia (Schaldybin, 1964; Viktorov et al., 1964; Yushkov, 1995; Anikanova et al., 2005, 2007, 2009; Kirillova, 2004); Switzerland (Vaucher, Hunkeler, 1967); Ukraine (Iskova et al., 1995; Mel'nichenko, Panasenko, 1979; Tkach, 1993); United Kingdom (Lewis, 1987; Roots, 1992)
<i>Rubenstrema exasperatum</i> (Rudolphi, 1819) (Syn.: <i>Distoma exasperatum</i> Rudolphi, 1819; <i>Opisthoglyphe exasperatum</i> Dollfus, 1949)	Palaearctic (West Palaearctic)	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Genov, 1984); Czechia (Prokopic, 1958); Finland (Haukisalmi, 1989); Hungary (Murai et al., 1992); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Poland (Pojmanska, 1961; Soltys, 1952; Zarmowski, 1960); Romania (Tkach, 1993); Russia (Vasilyev, 1949; Schaldybin, 1964; Viktorov et al., 1964; Novikov, 1992; Yushkov, 1995; Anikanova et al., 2005; Kirillova, 2004; Anikanova et al., 2007, 2009); Slovakia (Prokopic, 1958; Mituch, 1968); Ukraine (Bychovskaya-Pavlovskaya et al., 1970; Iskova et al., 1995; Mel'nichenko, Panasenko, 1979; Tkach, 1993; Vysotskaya, 1997); United Kingdom (Churchfield, 1990)
<i>R. opisthovitellinus</i> (Soltys, 1954) (Syn.: <i>Opisthoglyphe opisthovitellinus</i> Soltys, 1954; <i>Plagiorchis opisthovitellinus</i> Soltys, 1954)	Palaearctic (West Palaearctic)	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Genov, 1984); Czechia (Prokopic, 1958; Nasincova, Busta, 1991); Finland (Haukisalmi, 1989; Haukisalmi, Henttonen, 1994); Lithuania (Binkiene, 2006); Poland (Zarmowski, 1960; Pojmanska, 1961); Romania (Tkach, 1993); Ukraine (Tkach, 1993; Iskova et al., 1995)
Troglorematidae		
<i>Nephrotrema truncatum</i> (Leuckart, 1842) (Syn.: <i>Distoma (Soricitrema) baeri</i> Bykhovskaja-Pavlov-	Palaearctic (West Palaearctic)	Bulgaria (Prokopic et al., 1974; Genov, 1984); France (Jourdane, 1971, 1973; Ribas et al., 2005); Russia (Vasilyev, 1949); Slovakia (Mituch, 1968); Spain

Species (with synonyms)	Faunistic complex	Country (the author)
skaja, Vysotzkajab et Kulakova, 1970)		(Mas-Coma, Gallego, 1977); Ukraine (Bychovskaya-Pavlovskaya et al., 1970, Iskova et al., 1995; Vysotskaya, 1997)
Nanophyetidae		
<i>Skrjabinophyetus soricis</i> Jourdane, 1973, larvae	Palaearctic (West Palaearctic)	France (Jourdane, 1973); Slovakia (Matskasi, 1984)
Cestoda		
Hymenolepididae		
<i>Novobrachylepis triovaria</i> (Karpenko, 1990) (Syn.: <i>Bachylepis triovaria</i> (Karpenko, 1990); <i>Mathevolepis triovaria</i> Karpenko, 1990)	Palaearctic	Russia (Kirillova, 2004)
<i>Coronacanthus integrus</i> (Hamann, 1891) (Syn.: <i>Taenia integrus</i> Hamann, 1891; <i>Hymenolepis polyacantha</i> Baer, 1931; <i>Coroacanthus polyacantha</i> (Baer, 1931) Spasskii 1954; <i>Dicranotaenia polyacantha</i> (Baer, 1931) Lopez-Neyra, 1942; <i>Hymenolepis integra</i> Joyeuxet Baer, 1952; <i>Cysticercoid braidburni</i> Lal, 1952)	Palaearctic	Czechia (Prokopič, 1958); Moldova (Andrejko, 1973); Slovakia (Prokopič, 1958; Mituch, 1968; Stefancikova et al., 1994)
<i>C. omissa</i> (Baer et Joyeux, 1943) (Syn.: <i>Hymenolepis omissa</i> Baer et Joyeux, 1943; <i>Hymenolepis anacetabulata</i> Soltys, 1954; <i>Acotylelepis anacetabulata</i> (Soltys, 1954) Yamaguti, 1959; <i>Coronacanthus spasskii</i> Prokopic, 1957)	Palaearctic	Slovakia (Mituch, 1968)
<i>Ditestolepis diaphana</i> (Cholodkowsky, 1906) (Syn.: <i>Hymenolepis diaphana</i> , Cholodkowsky, 1906; <i>Neoskrjabinolepis diaphana</i> (Cholodkowsky, 1906) Kobulej, 1953; <i>Dicranotaenia diaphana</i> (Cholodkowsky, 1906) Skrjabin et Mathevossian, 1948; <i>Soricinia diaphana</i> (Cholodkowsky, 1906) Zarnowski, 1955; <i>Sinuterilepis spasskii</i> Sadovskaja, 1965)	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Belgium (Vaucher, 1971); Bulgaria (Prokopic et al., 1974; Genov, 1984; Genov, Georgiev, 1998); Czechia (Prokopic, 1958, 1972; Prokopic et al., 1974); Denmark (Vaucher, 1971); Finland (Haukisalmi, 1989; Bugmyrin et al., 2003, 2008; Haukisalmi, 2015); France (Jourdane, 1971; Vaucher, 1971); Germany (Vaucher, 1971); Holland (Vaucher, 1971); Hungary (Murai et al., 1992); Lithuania (Binkiene, 2006); Norway (Vaucher, 1971); Poland (Soltys, 1952; Zarnowski, 1955; Rybicka,

Species (with synonyms)	Faunistic complex	Country (the author)
<p><i>Gulyaevolepis tripartita</i> (Zarnowski, 1955) (Syn.: <i>Soricinia tripartita</i> Zarnowski, 1955; <i>Vamirolepis tripartita</i> (Zarnowski, 1955) Zarnowski, 1956; <i>Ditestolepis tripartita</i> (Zarnowski 1955); <i>Ecrinolepis tripartita</i> (Zarnowski, 1955) Gulyaev, 1991)</p>	Palearctic	<p>1959; Kisielewska, 1961); Russia (Vasilyev, 1949; Schaldybin, 1964; Yushkov, 1995; Okulova et al., 2003; Anikanova et al., 2005, 2007, 2009; Bugmyrin et al., 2003, 2008; Kirillova, 2004); Slovakia (Mituch, 1968; Prokopić, 1958; Stefankova et al., 1994); Spain (Mas-Coma, Galego, 1977); Sweden (Vaucher, 1971); Switzerland (Vaucher, Hunkeler, 1967; Vaucher, 1971); Ukraine (Mel'nichenko, Panasenko, 1979; Tkach, 1993); United Kingdom (Roots, 1992)</p> <p>Bulgaria (Genov, Georgiev, 1998); Czechia (Prokopić, 1972); Finland (Haukisalml, 1989; Haukisalml, 2015); Lithuania (Binkiene, 2006); Norway (Vaucher, 1971); Poland (Zarnowski, 1955; Rybicka, 1959; Kisielewska, 1961); Russia (Okulova et al., 2003; Anikanova et al., 2005, 2007, 2009); Slovakia (Murai, Meszaros, 1984); Sweden (Vaucher, 1971); Switzerland (Vaucher, Hunkeler, 1967; Vaucher, 1971)</p>
<p><i>Hilmylepis</i> (?) <i>kodrensis</i> Spassky et Andrejko, 1969 a species <i>inquirenda</i> (Vasileva et al., 2004)</p>	Palearctic	Moldova (Andrejko, 1973)
<p><i>Lineolepis scutigera</i> (Dujardin, 1845) (Syn.: <i>Hymenolepis toxometra</i> Baer, 1932); <i>Taenia scutigera</i> Dujardin, 1845; <i>Choanotaenia scutigera</i> Dujardin, 1845; <i>Hymenolepis scutigera</i> (Dujardin, 1845) nec Dollfus, 1961; <i>Staphylocystis toxometra</i> (Baer, 1932) Yamaguti, 1959 sensu Spassky et Andrejko, 1970)</p>	Palearctic	<p>Austria (Vaucher, 1971); Belarus (Shimalov, 2012); Belgium (Vaucher, 1971); Bulgaria (Genov, 1984; Genov, Georgiev, 1998; Prokopić et al., 1974); Czechia (Prokopić, 1958, 1972; Prokopić et al., 1974); Denmark (Vaucher, 1971); Finland (Haukisalml, 1989; Haukisalml, Henttonen, 1994; Bugmyrin et al., 2003; Haukisalml, 2015); France (Jourdan, 1971; Vaucher, 1971); Germany (Vaucher, 1971; Pecher et al., 1996); Holland (Vaucher, 1971); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Norway (Vaucher, 1971); Poland (Zarnowski, 1955; Kisielewska, 1961; Pojmanska, 1961); Russia (Vasilyev, 1949; Novikov, 1992; Okulova et al., 2003; Anikanova et al., 2005, 2007, 2009); Romania (Tkach, 1993), Slovakia (Mituch, 1968; Murai, Meszaros, 1984); Slovakia (Prokopić, 1958, 1972); Spain (Mas-Coma, Galego, 1977); Sweden (Vaucher, 1971); Switzerland (Baer, 1932; Vaucher, Hunkeler, 1967; Vaucher, 1971); Ukraine (Vysotskaya, 1997); United Kingdom (Sharpe, 1964; Lewis, 1968, 1987; Churchfield, 1990; Roots, 1992)</p>

Species (with synonyms)	Faunistic complex	Country (the author)
<i>Neoskrjabinolepis merkushevae</i> Kornienko et Binkiene, 2008	Palaearctic	Belarus, Lithuania (Kornienko, Binkienė, 2008); Finland (Haukisalml, 2015)
<i>N. schaldybini</i> Spassky, 1947 (Syn.: <i>Hymenolepis scalaris</i> (Dujardin, 1845) sensu Baer, 1932; <i>Hymenolepis singularis</i> (Cholodkowsky, 1912) sensu Baylis, 1934; <i>Hymenolepis scutigera</i> (Dujardin, 1845) sensu Dollfus, 1961; <i>Hymenolepis schaldybini</i> (Spassky, 1947) Vaucher, 1971; <i>Neoskrjabinolepis singularis</i> sensu Prokopič et Genov 1974)	Palaearctic	Austria (Vaucher, 1971); Belarus (Merkusheva, Bobkova, 1981); Belgium (Vaucher, 1971); Bulgaria (Genov, 1984; Genov, Georgiev, 1998); Denmark (Vaucher, 1971); Finland (Haukisalml, 1989; Haukisalml, Henttonen, 1994; Bugmyrin et al., 2008; Haukisalml, 2015); France (Jourdan, 1971; Vaucher, 1971); Germany (Pecher et al., 1996; Vaucher, 1971); Holland (Vaucher, 1971); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Norway (Vaucher, 1971); Poland (Pojmanska, 1961); Russia (Schaldybin, 1964; Novikov, 1992; Yushkov, 1995; Kirillova, 2004; Anikanova et al., 2005, 2007, 2009; Bugmyrin et al., 2008); Slovakia (Vaucher, 1971; Murai, Meszaros, 1984; Štefancikova et al., 1994; Hanzelova, Rysavy, 1996); Spain (Mas-Coma Galego, 1977); Sweden (Vaucher, 1971); Switzerland (Baer, 1932; Vaucher, Hunkeler, 1967; Vaucher, 1971); Ukraine (Tkach, 1993); United Kingdom (Sharpe, 1964; Lewis, 1968, 1987; Churchfield, 1990; Roots, 1992)
<i>N. singularis</i> (Cholodkowsky, 1912) (Syn.: <i>Hymenolepis singularis</i> Cholodkowsky 1912); <i>Dicranotaenia singularis</i> (Cholodkowsky, 1912) Lopez-Neyra, 1942)	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Prokopič et al., 1974); Czechia (Prokopič, 1958, 1972; Prokopič et al., 1974); Denmark (Vaucher, 1971); Finland (Haukisalml, 1989; Haukisalml, Henttonen, 1994; Bugmyrin et al., 2003; Haukisalml, 2015); France (Vaucher, 1971); Germany (Vaucher, 1971); Holland (Vaucher, 1971); Hungary (Murai et al., 1992); Lithuania (Binkiene, 2006); Norway (Vaucher, 1971); Poland (Soltys, 1952; Zarnowski, 1955; Rybicka, 1959; Kisielewska, 1961; Pojmanska, 1961); Russia (Vasilyev, 1949; Viktorov et al., 1964; Okulova et al., 2003; Bugmyrin et al., 2003; Anikanova et al., 2007); Slovakia (Prokopič, 1958, 1972; Mituch, 1968; Hanzelova, Rysavy, 1996); Sweden (Vaucher, 1971); Switzerland (Baer, 1932; Vaucher, Hunkeler, 1967; Vaucher, 1971); Ukraine (Mel'nichenko, Panasenko, 1979); United Kingdom (Sharpe, 1964; Lewis, 1968, 1987; Churchfield, 1990; Roots, 1992)

Species (with synonyms)	Faunistic complex	Country (the author)
<i>Neomylepis magnirostellata</i> (Baer, 1931) (Syn.: <i>Vampirolepis heleni</i> Shaldybin, 1964; <i>Hymenolepis magnirostellata</i> Baer, 1931; <i>Vampirolepis magnirostellata</i> (Baer, 1931) Spasskii, 1954; <i>Rodentolepis magnirostellata</i> (Baer, 1931) Tkach et Zhumbekova, 1996)	Palaearctic	Belarus (Shimalov, 2007, 2012); Bulgaria (Genov, 1984); Czechia (Prokopic, 1958, 1972; Prokopic et al., 1974); Slovakia (Prokopic, 1958, 1972; Mituch, 1968; Hanzelova, Rysavy, 1996)
<i>Pseudobothrialepis mathevosiana</i> Schaldybin, 1957 (Syn.: <i>Cryptocotylepis globosoides</i> (Soltys, 1954); <i>Hymenolepis globosoides</i> (Soltys, 1954) sensus Vaucher, 1971)	Palaearctic	Belgium (Vaucher, 1971); Czechia (Prokopic, 1972); Finland (Haukisalmi, 1989; Haukisalmi, Henttonen, 1994; Haukisalmi, 2015); France (Jourdane, 1971); Holland (Vaucher, 1971); Norway (Vaucher, 1971); Russia (Schaldybin, 1964; Okulova et al., 2003; Kirillova, 2004; Anikanova et al., 2007); Slovakia (Mituch, 1968; Hanzelova, Rysavy, 1996)
<i>Skrjabinacanthus jacutensis</i> Spasskii et Morosov, 1959 (Syn.: <i>Hymenolepis jacutensis</i> (Spassky et Morosov, 1959) Vaucher, 1971)	Palaearctic	Belgium (Vaucher, 1971); France (Jourdane, 1971); Russia (Okulova et al., 2003); United Kingdom (Roots, 1992)
<i>Soricinia infirma</i> (Zarnowski, 1956) (Syn.: <i>Insectivorolepis infirma</i> Zarnowsky, 1956; <i>Hymenolepis infirma</i> Zarnowsky, 1955; <i>Ditestolepis secunda</i> Schaldybin, 1964)	West Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007); Belgium (Vaucher, 1971); Bulgaria (Prokopic et al., 1974; Genov, 1984; Genov, Georgiev, 1998); Czechia (Prokopic, 1972); Finland (Haukisalmi, 1989; Haukisalmi, Henttonen, 1994; Bugmyrin et al., 2003; Haukisalmi, 2015); France (Vaucher, 1971); Germany (Vaucher, 1971); Poland (Zarnowski, 1955); Slovakia (Murai, Meszaros, 1984); Spain (Mas-Coma, Galego, 1977); Russia (Schaldybin, 1964; Yushkov, 1995); Switzerland (Vaucher, Hunckler, 1967; Vaucher, 1971); United Kingdom (Roots, 1992)
<i>S. globosa</i> (Baer, 1931) (Syn.: <i>Hymenolepis globosa</i> Baer, 1931; <i>Dicranotaenia globosa</i> (Baer, 1931) Lopez-Neyra, 1942)	West Palaearctic	Bulgaria (Prokopic et al., 1974); Czechia (Prokopic, 1958); Slovakia (Prokopic, 1958; Mituch, 1968; Hanzelova, Rysavy, 1996)
<i>S. soricis</i> (Baer, 1927) (Syn.: <i>Hymenolepis minuta</i> Baer, 1925; <i>Hymenolepis soricis</i> Baer, 1928)	West Palaearctic	Belarus (Merkusheva, Bobkova, 1981; Shimalov, 2012); Czechia (Prokopic, 1958); Finland (Haukisalmi, 1989); Lithuania (Kornienko et al., 2016); Moldova (Andrejko, 1973); Russia (Kirillova, 2004); Slovakia (Prokopic, 1958; Mituch, 1968; Hanzelova, Rysavy, 1996)

Species (with synonyms)	Faunistic complex	Country (the author)
<i>Spasskylepis ovaluteri</i> Shaldybin, 1964 (Syn.: <i>S. phoedorovi</i> Karpenko, 1983; <i>Hymenolepis diaphana</i> Cholodkowski, 1906 sensu Vaucher, 1971 <i>pro parte</i>)	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981); Lithuania (Binkiene, 2006); Finland (Haukisalml, 2015); Russia (Schaldybin, 1964; Yushkov, 1995; Anikanova et al., 2005, 2007, 2009)
<i>Staphylocystoides stefanskii</i> (Zarnowski, 1954) (Syn.: <i>Hymenolepis stefanskii</i> Zarnowski, 1954; <i>Zarnovskiiella stefanskii</i> (Zarnowski, 1954) Spassky et Andreiko, 1970; <i>Vampirolepis stefanskii</i> (Zarnowski, 1954) Zarnowski, 1955; <i>Neoskrjabinolepis stefanskii</i> (Zarnowski, 1954) Shaldybin, 1964)	Palaearctic	Belgium (Vaucher, 1971); Czechia (Prokopič, 1972); Lithuania (Binkiene, 2006); Finland (Haukisalml, 2015); France (Jourdan, 1971; Vaucher, 1971); Poland (Soltys, 1954; Zarnowski, 1955; Rybicka, 1959); Russia (Schaldybin, 1964; Anikanova et al., 2009); Slovakia (Murai, Meszaros, 1984); Switzerland (Vaucher, Hunkeler, 1967; Vaucher, 1971); Ukraine (Tkach, Swiderski, 1998)
<i>Staphylocystis alpestris</i> (Baer, 1931) Spassky, 1950 (Syn.: <i>Hymenolepis alpestris</i> Baer, 1931; <i>Dicranotaenia alpestris</i> (Baer, 1931) Skrjabin et Mathevossian, 1945)	Palaearctic	Slovakia (Prokopič, 1959; Mituch, 1968; Hanzelova, Rysavy, 1996)
<i>S. furcata</i> (Stieda, 1862) (Syn.: <i>Taenia furcata</i> Stieda, 1862; <i>Dicranotaenia furcata</i> (Stieda, 1862) Lopez-Neyra, 1942; <i>Dicranotaenia furcata</i> (Stieda, 1862) Skrjabin et Mathevossian, 1948; <i>Dicranotaenia fulleborni</i> (Hilmy, 1936) Kobulej et Versenyi, 1953; <i>Hymenolepis furcata</i> (Stieda, 1862) Meggitt, 1924; <i>Lepidotrias furcata</i> (Stieda, 1862) Cohn, 1869; <i>Weinlandia furcata</i> (Stieda, 1862) Mayer, 1925; <i>Hymenolepis uncinata</i> (Stieda, 1862) sensu Baer, 1932)	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Belgium (Vaucher, 1971); Bulgaria (Prokopic et al., 1974; Genov, 1984); Czechia (Prokopič, 1958, 1972; Prokopič et al., 1974); Finland (Haukisalml, 1989; Haukisalml, Henttonen, 1994; Bugmyrin et al., 2003, 2008; Haukisalml, 2015); France (Jourdan, 1971; Vaucher, 1971); Holland (Vaucher, 1971); Hungary (Murai et al., 1992); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Norway (Vaucher, 1971); Poland (Soltys, 1952; Zarnowski, 1955; Rybicka, 1959; Kisielewska, 1961; Pojmanska, 1961); Romania (Tkach, 1993); Russia (Schaldybin, 1964; Yushkov, 1995; Okulova et al., 2003; Kirillova, 2004; Anikanova et al., 2005, 2007, 2009; Bugmyrin et al., 2008); Slovakia (Prokopic, 1958, 1972; Mituch, 1968; Murai, Meszaros, 1984; Hanzelova, Rysavy, 1996); Spain (Mas-Coma, Galego, 1977); Sweden (Vaucher, 1971); Switzerland (Baer, 1932; Vaucher, Hunkeler, 1967; Vaucher, 1971); Ukraine (Mel'nicenko, Panasenko, 1979; Tkach, 1993); United Kingdom (Lewis, 1987; Churchfield, 1990; Roots, 1992)

Species (with synonyms)	Faunistic complex	Country (the author)
<i>Staphylocystis pistillum</i> (Dujardin, 1845) (Syn.: <i>Taenia pistillum</i> (Dujardin, 1845); <i>Taenia pistillum</i> Dujardin, 1845; <i>Dicranotaenia pistillum</i> (Dujardin, 1845) Lopez-Neyra, 1942; <i>Staphylocystis micracanthus</i> Villot, 1877; <i>Hymenolepis pistillum</i> (Dujardin, 1845) Fuhrman, 1926)	Palaearctic	Poland (Soltys, 1954); Russia (Vasilyev, 1949); Slovakia (Prokopic, 1958; Mituch, 1968; Hanzelova, Rysavy, 1996)
<i>S. tiara</i> (Dujardin, 1845) (Syn.: <i>Taenia tiara</i> (Dujardin, 1845); <i>Dicranotaenia tiara</i> (Dujardin, 1845) Lopez-Neyra 1942; <i>Hymenolepis tiara</i> (Dujardin, 1845) Janicki, 1906; <i>Hymenolepis furcata</i> (Stieda, 1862) sensus Sosnina, 1961)	Palaearctic	Belarus (Shimalov, 2007); Russia (Vasilyev, 1949)
<i>Triodontolepis bifurca</i> (Hamann, 1891) (Syn.: <i>Taenia bifurca</i> Hamann 1891; <i>Hymenolepis tridontophora</i> Soltys, 1954; <i>Vampirolepis tridontophora</i> (Soltys 1954) Prokopic, 1957; <i>Triodontolepis tridontophora</i> (Soltys, 1954) Yamaguti, 1959)	Palaearctic (West Palaearctic)	Slovakia (Mituch, 1968, Štefančíkova et al., 1994; Hanzelova, Rysavy, 1996)
<i>T. hamanni</i> (Mrazek, 1891) (Syn.: <i>Vampirolepis hamanni</i> (Mrazek, 1891); <i>Cysticercoides hamanni</i> Mrazek, 1891; <i>Hymenolepis hamanni</i> Joyeux et Baer, 1952; <i>Hymenolepis neomydis</i> Baer, 1931; <i>Dicranotaenia neomydis</i> Lopez-Neyra, 1942; <i>Vampirolepis neomydis</i> (Baer, 1931) Spassky, 1954)	Palaearctic (West Palaearctic)	Slovakia (Mituch, 1968; Štefančíkova et al., 1994; Hanzelova, Rysavy, 1996)
<i>T. skrjabini</i> Spasskii et Andrejko, 1968	Palaearctic	Moldova (Andrejko, 1973)
<i>Urocystis prolifer</i> Villot, 1880 (Syn.: <i>Pseudodiorchis multispinosa</i> Zarnowski, 1955; <i>Pseudodiorchis kampinosi</i> Rybicka, 1958; <i>Hymenolepis curiosa</i> Stamer, 1955; <i>Echinoproboscillepis kedroviensis</i> Sadovskaja, 1965; <i>Coronacanthus parviamata</i> Sawada et Harada, 1990)	Palaearctic	Belarus (Shimalov, 2012); Belgium (Vaucher, 1971); Bulgaria (Prokopic et al., 1974; Genov, 1984; Genov, Georgiev, 1998); Finland (Haukisalmi, 2015); France (Jourdane, 1971; Vaucher, 1971); Germany (Pecher et al., 1996; Vaucher, 1971); Holland (Vaucher, 1971); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Poland (Rybicka, 1959; Kisieleska, 1961); Russia (Anikanova et al., 2007,

Continued table

Species (with synonyms)	Faunistic complex	Country (the author)
<i>Vampirolepis khalili</i> (Hilmy, 1936) (Syn.: <i>Hymenolepis khalili</i> Hilmy, 1936)	Palaearctic	2009); Slovakia (Prokopic, 1972); Switzerland (Vaucher, Hunkeler, 1967; Vaucher, 1971); Ukraine (Tkach, 1993); United Kingdom (Roots, 1992) Slovakia (Mituch, 1968; Hanzelova, Rysavy, 1996)
<i>Vigisolepis spinulosa</i> (Cholodkovsky, 1906) (Syn.: <i>Hymenolepis spinulosa</i> Cholodkovsky, 1906; <i>Vigisolepis barbosclex</i> Spasskii, 1949; <i>Anatinella spinulosa</i> (Dubinina, 1953))	Palaearctic	Austria (Vaucher, 1971); Belarus (Arzamassov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Belgium (Vaucher, 1971); Bulgaria (Prokopic et al., 1974; Genov, 1984; Genov, Georgiev, 1998); Czechia (Prokopic, 1958, 1972; Prokopic et al., 1974); Denmark (Vaucher, 1971); Finland (Haukisalmi, 1989; Bugmyrin et al., 2003; Haukisalmi, 2015); France (Vaucher, 1971); Germany (Vaucher, 1971); Holland (Vaucher, 1971); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Norway (Vaucher, 1971); Poland (Soltys, 1952; Rybicka, 1959; Kisielewska, 1961); Russia (Vasilyev, 1949; Schaldybin, 1964; Viktorov et al., 1964; Novikov, 1992; Yushkov, 1995; Okulova et al., 2003; Kirillova, 2004; Anikanova et al., 2007, 2009); Slovakia (Prokopic, 1958, 1972; Mituch, 1968; Murai, Meszaros, 1984; Hanzelova, Rysavy, 1996); Sweden (Vaucher, 1971); Switzerland (Baer, 1932; Vaucher, Hunkeler, 1967; Vaucher, 1971); Ukraine (Mel'nichenko, Panasenko, 1979); United Kingdom (Sharpe, 1964)
Taeniidae		
<i>Taenia martis</i> (Zeder, 1803), larvae (Syn.: <i>Halysis martis</i> Zeder, 1803; <i>Fimbriotaenia martis</i> (Zeder, 1803) Kornyushin et Sharpilo, 1986)	Holarctic	Russia (Yushkov, 1995)
<i>Versteria mustelae</i> (Gmelin, 1790), larvae (Syn.: <i>Taenia mustelae</i> Gmelin, 1790; <i>Halysis mustelae</i> Zeder, 1803; <i>Fimbriotaenia mustelae</i> (Gmelin, 1790) Kornyushin et Sharpilo, 1986)	Holarctic	Bulgaria (Genov, 1984); Russia (Anikanova et al., 2007, 2009)

Species (with synonyms)	Faunistic complex	Country (the author)
Davaineidae		
<i>Otiditaenia conoideis</i> (Bloch, 1782), larvae (Syn.: <i>Taenia conoideis</i> Bloch, 1782; <i>Taenia cuneata</i> Batsch, 1786; <i>Otiditaenia eupodotidis</i> Beddard, 1912; <i>Schistometra conoideis</i> (Bloch, 1782) Cholodkovsky, 1912; <i>Schistometra embiensis</i> Cholodkovsky, 1915; <i>Schistometra togata</i> Cholodkovsky, 1912; <i>Schistoetra wettsteini</i> Weithofer, 1916)	Palaearctic	Czechia (Prokopic, 1958); Slovakia (Prokopic, 1958)
Paruterinidae		
<i>Cladotaenia circi</i> Yamaguti, 1935, larvae	Holarctic	Bulgaria (Genov, 1984; Genov, Georgiev, 1998)
<i>C. globifera</i> (Batsch, 1786), larvae (Syn.: <i>Taenia globifera</i> Batsch, 1786)	Holarctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Prokopič et al., 1974; Genov, 1984); Russia (Anikanova et al., 2007, 2009)
Dilepididae		
<i>Dilepis undula</i> (Schrank, 1788), larvae (Syn.: <i>Dilepis vulpis</i> Petrov et Janchev, 1960; <i>Taenia undulata</i> Rudolphi, 1810; <i>Taenia angulata</i> Rudolphi, 1810)	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Prokopič et al., 1974; Genov, 1984; Genov, Georgiev, 1998); Czechia (Prokopic, 1972); Finland (Haukisalmi, 1989; Haukisalmi, Henttonen, 1994; Haukisalmi, 2015); Lithuania (Binkiene, 2006); Russia (Okulova et al., 2003; Anikanova et al., 2005, 2007, 2009; Novikov, 1992); Yushkov, 1995); Slovakia (Hanzelova, Rysavy, 1999); Switzerland (Vaucher, Hunkeler, 1967); Ukraine (Vysotskaya, 1997)
<i>Hepatocestus hepaticus</i> (Baer, 1932) (Syn.: <i>Monopylidium hepaticum</i> Baer, 1932; <i>Choanotaxia hepatica</i> (Baer, 1932))	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981); Czechia (Prokopic, 1958, 1972); Finland (Haukisalmi, 1989; Haukisalmi, 2015); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Poland (Soltys, 1952; Żarnowski, 1955; Kisielewska, 1961); Russia (Novikov, 1992; Anikanova et al., 2007, 2009); Slovakia (Prokopic, 1958, 1972; Hanzelova, Rysavy, 1999); Switzerland (Baer, 1932; Vaucher, Hunkeler, 1967; Vaucher, 1971); Ukraine (Mel'nichenko, Panasenko, 1979); United Kingdom (Lewis, 1987; Churchfield, 1990; Roots, 1992)

Species (with synonyms)	Faunistic complex	Country (the author)
<p><i>Monocercus arionis</i> (Siebold, 1859) (Syn.: <i>Molluscotaenia crassiscolex</i> (von Linstow, 1890); <i>Cystucercus arionis</i> Siebold, 1850; <i>Taenia crassiscolex</i> Linstow, 1890; <i>Choanotaenia arionis</i> (Siebold, 1850), Clerc, 1903; <i>Monopilidium soricinum</i> Cholodkowsky, 1906; <i>Amobotaenia subterranea</i> Cholodkowsky, 1906; <i>Anomotaenia subterranea</i> (Cholodkowsky, 1906) Fuhrmann, 1908; <i>Choanotaenia soricina</i> (Cholodkowsky, 1906) Meggitt, 1924; <i>Monopilidium scutigerum</i> (Dujardin, 1845) Baer, 1928; <i>Rodentotaenia crassiscolex</i> (Linstow 1890) Matevosyan, 1963; <i>Molluscotaenia crassiscolex</i> (Linstow, 1890) Spasskii et Andreiko, 1969; <i>Choanotaenia crassiscolex</i> (Linstow, 1890) Vaucher, 1971)</p>	Palearctic	<p>Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Prokopic et al., 1974; Genov, 1984; Genov, Georgiev, 1998); Czechia (Prokopic, 1958, 1972); Finland (Haukisalmi, 1989; Haukisalmi, Henttonen, 1994; Bugmyrin et al., 2003, 2008; Haukisalmi, 2015); France (Jourdane, 1971, Vaucher, 1971); Hungary (Murai et al., 1992); Germany (Pecher et al., 1996); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Poland (Soltys, 1952; Żarnowski, 1955; Rybicka, 1959); Romania (Tkach, 1993); Russia (Vasilyev, 1949; Schaldybin, 1964; Novikov, 1992; Yushkov, 1995; Okulova et al., 2003; Kirillova, 2004; Anikanova et al., 2005, 2007, 2009; Bugmyrin et al., 2008); Slovakia (Prokopic, 1958, 1972; Mituch, 1968; Murai, Meszaros, 1984; Štefancikova et al., 1994); Spain (Mas-Coma, Galego, 1977); Switzerland (Baer, 1932; Vaucher, Hunkeler, 1967; Vaucher, 1971); Ukraine (Mel'nichenko, Panasenko, 1979; Tkach, 1993; Vysotskaya, 1997); United Kingdom (Sharpe, 1964; Lewis, 1968, 1987; Churchfield, 1990; Roots, 1992)</p>
<p><i>Polycercus lumbrici</i> Villot, 1883, larvae (Syn.: <i>Taenia paradoxa</i> Rudolphi, 1802; <i>Polycercus paradoxa</i> (Rudolphi, 1802) Spasskaya et Spasskii, 1970; <i>Drepanidotaenia paradoxa</i> (Rudolphi, 1802) Parona, 1899; <i>Choanotaenia paradoxa</i> (Rudolphi, 1802) Cohn, 1899; <i>Parachoanotaenia paradoxa</i> (Rudolphi, 1802) Lühe, 1910; <i>Icterotaenia paradoxa</i> (Rudolphi, 1802) Railliet et Henry, 1909; <i>Paricterotaenia paradoxa</i> (Rudolphi, 1802) Fuhrmann, 1932; <i>Sacciuterina paradoxa</i> (Rudolphi, 1802) Matheovossian, 1963; <i>Sacciuterina paradoxa</i> var. <i>gasowskiae</i> Matheovossian, 1963)</p>	Palearctic	<p>Belarus (Arzamasov et al., 1969); Russia (Anikanova et al., 2009)</p>
<p><i>Sacciuterina paradoxa</i> (Rudolphi, 1802), larvae (Syn.: <i>Taenia paradoxa</i> Rudolphi, 1802; <i>Polycercus paradoxa</i> (Rudolphi, 1802))</p>	Palearctic	<p>Belarus (Merkusheva, Bobkova, 1981; Shimalov, 2007); Lithuania (Binkiene, 2006)</p>

Species (with synonyms)	Faunistic complex	Country (the author)
Diphyllobothriidae		
<i>Spirometra erinacei-europaei</i> (Rudolphi, 1819), larvae (Syn.: <i>Diphyllobothrium erinaceieuropaei</i> (Rudolphi, 1919))	Cosmopolitan	Bulgaria (Genov, 1984; Genov, Georgiev, 1998); Russia (Anikanova et al., 2007)
Nematoda Capillariidae		
<i>Aonchotheca kutori</i> (Rukhlyadeva, 1946) (Syn.: <i>Capillaria kutori</i> Rukhlyadeva, 1964; <i>Capillaria ventricola</i> Soltys, 1952)	Palaearctic (European)	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Prokopic et al., 1974; Genov, 1984); Czechia (Prokopic, 1958; Moravec, 2000); Finland (Haukisalmi, 1989; Bugmyrin et al., 2003, 2008); Lithuania (Binkiene, 2006); Poland (Soltys, 1952); Romania (Tkach, 1993); Slovakia (Prokopic, 1958; Mituch, 1968); Spain (Mas-Coma, Galego, 1977); Russia (Schaldybin, 1964; Yushkov, 1995; Anikanova et al., 2005, 2007, 2009; Bugmyrin et al., 2008); Ukraine (Mel'nichenko, Panasenko, 1979; Tkach, 1993); United Kingdom (Sharpe, 1964; Roots, 1992)
<i>A. minuta</i> (Chen, 1937) (Syn.: <i>Capillaria minuta</i> Chen, 1937)	Palaearctic	Russia (Yushkov, 1995)
<i>A. petrovi</i> (Rukhlyadeva, 1946) (Syn.: <i>Capillaria petrovi</i> Rukhlyadeva, 1946)	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981); Czechia (Prokopic, 1958; Prokopic et al., 1974; Moravec, 2000); Russia (Schaldybin, 1964; Yushkov, 1995; Kirillova, 2004); Slovakia (Prokopic, 1958; Mituch, 1968); Ukraine (Mel'nichenko, Panasenko, 1979)
<i>Calodium cholidicola</i> (Soltys, 1952) (Syn.: <i>Capillaria cholidicola</i> Soltys, 1952)	Palaearctic	Bulgaria (Prokopic et al., 1974); Poland (Soltys, 1952); Slovakia (Prokopic, 1958); United Kingdom (Wakelin, 1968, Lewis, 1987; Roots, 1992)
<i>C. hepaticum</i> (Bancroft, 1893) Moravec, 1982 (Syn.: <i>Capillaria hepatica</i> Bancroft, 1893; <i>Trichocephalus hepaticum</i> Bancroft, 1893)	Cosmopolitan	Slovakia (Mituch, 1968, Stefancikova et al., 1994)
<i>C. soricicola</i> (Yokogawa et Nishigori, 1924) (Syn.: <i>Hepaticola soricicola</i> Yokogawa et Nishigori, 1924)	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Prokopic et al., 1974, Genov, 1984); Czechia (Moravec, 2000); Hungary (Murai et al., 1992); Lithuania (Binkiene, 2006); Poland (Soltys, 1952); Slovakia (Štefancikova et al., 1994); Romania (Tkach, 1993); Russia (Vasilyev,

Species (with synonyms)	Faunistic complex	Country (the author)
<i>Eucoleus oesophagicola</i> (Soltys, 1952) (Syn.: <i>Capillaria oesophagicola</i> Soltys, 1952; <i>Capillaria blarinae</i> Ogren, 1953; <i>Capillaria oschmarini</i> Nadtocii et Rasskazova, 1971; <i>Eucoleus bernardi</i> Romashov, 1983; <i>Thominx oesophagicola</i> (Soltys, 1952))	Palaearctic	1949; Yushkov, 1995; Kirillova, 2004; Anikanova et al., 2007, 2009) Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Genov, 1984; Prokopic et al., 1974); Czechia (Prokopic, 1958; Prokopic et al., 1974); Finland (Bugmyrin et al., 2003); Lithuania (Binkiene, 2006); Poland (Soltys, 1952); Romania (Tkach, 1993); Slovakia (Prokopic, 1958; Mituch, 1968; Murai, Meszaros, 1984); Spain (Mas-Coma, Galego, 1977); Ukraine (Tkach, 1993); United Kingdom (Lewis, 1968, 1987; Churchfield, 1990; Roots, 1992); Russia (Schaldybin, 1964; Romashov, 1983; Yushkov, 1995; Kirillova, 2004; Anikanova et al., 2005, 2007, 2009)
<i>Liniscus incrassatus</i> Diesing, 1851 (Syn.: <i>Capillaria incrassata</i> Diesing, 1851; <i>C. capillaris</i> (Linstow, 1882); <i>Capillaria incrassata</i> (Diesing, 1851), Travassos, 1915; <i>Capillaria capillaris</i> Linstow, 1882; <i>Capillaria sunci</i> Chen, 1937; <i>Capillaria urinicola</i> Soltys, 1952; <i>Capillaria linstowi</i> , Travassos, 1914; <i>Capillaria exilis</i> Stiles et Staneley, 1932; <i>Trichosoma (Liniscus) incrassata</i> Diesing, 1850, Stossich, 1890; <i>Trichosoma capillare</i> Linstow, 1882; <i>C. uncinicola</i> Soltys, 1952)	Palaearctic	Austria (Prokopic, Mahnerti, 1970); Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Prokopic et al., 1974; Genov, 1984); Czechia (Prokopic, 1958; Moravec, 2000); Finland (Bugmyrin et al., 2003, 2008); Lithuania (Binkiene, 2006); Poland (Soltys, 1952); Romania (Tkach, 1993); Slovakia (Prokopic, 1958; Mituch, 1968; Murai, Meszaros, 1984); Spain (Mas-Coma, Galego, 1977); Ukraine (Mel'nichenko, Panasenko, 1979; Tkach, 1993); United Kingdom (Churchfield, 1990; Lewis, 1968, 1987; Roots, 1992); Russia (Vasilyev, 1949; Schaldybin, 1964; Viktorov et al., 1964; Kirillova, 2004; Anikanova et al., 2007, 2009; Bugmyrin et al., 2008)
Soboliphymatidae		
<i>Soboliphyme soricis</i> Baylis et King, 1932	Palaearctic	Belarus (Merkusheva, Bobkova, 1981); Czechia (Prokopic, 1958); Norway (Barus et al., 1977); Poland (Soltys, 1952); Russia (Okulova et al., 2003; Kirillova, 2004; Anikanova et al., 2007, 2009; Bugmyrin et al., 2008); Slovakia (Murai, Meszaros, 1984)
Dioctophymatidae		
<i>Dioctophyme renale</i> (Goeze, 1782), larvae (Syn.: <i>Ascaris renale</i> Goeze, 1782)	Cosmopolitan	Czechia (Prokopic, 1958)

Species (with synonyms)	Faunistic complex	Country (the author)
Trichinellidae		
<i>Trichinella spiralis</i> (Owen, 1835), larvae (Syn.: <i>Trichina spiralis</i> Owen, 1835)	Cosmopolitan	Belarus (Merkusheva, Bobkova, 1981)
Oxuridae		
<i>Syphacia obvelata</i> (Rudolphi, 1802) (Syn.: <i>Ascaris obvelata</i> Rudolphi, 1802)	Cosmopolitan	Slovakia (Mituch, 1968); Ukraine (Vysotskaya, 1997)
Stroglyoididae		
<i>Parastrongyloides winchesi</i> Morgan, 1928	Holarctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Genov, 1984; Prokopic et al., 1974); Czechia (Prokopic, 1958); Finland (Haukisalmi, 1989; Haukisalmi, Henttonen, 1994; Bugmyrin et al., 2003, 2008); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Romania (Tkach, 1993); Russia (Vasilyev, 1949; Anikanova et al., 2005, 2007, 2009; Bugmyrin et al., 2003, 2008); Slovakia (Prokopič, 1958; Murai, Meszaros, 1984); Spain (Mas-Coma, Galego, 1977); Ukraine (Mel'nichenko, Panasenko, 1979; Trach, 1993); United Kingdom (Churchfield, 1990; Roots, 1992)
Heligmosomidae		
<i>Longistriata codrus</i> Thomas, 1953 (Syn.: <i>Longistriata depressa</i> Dujardin, 1845)	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Genov, 1984; Prokopic et al., 1974); Finland (Haukisalmi, 1989; Haukisalmi, Henttonen, 1994; Bugmyrin et al., 2003, 2008); France (Vaucher, Durette-Desset, 1973); Germany (Pecher et al., 1996); Lithuania (Binkiene, 2006); Moldova (Andrejko, 1973); Romania (Tkach, 1993); Slovakia (Prokopic, 1958; Prokopic et al., 1974; Mituch, 1968; Murai, Meszaros, 1984); Russia (Vasilyev, 1949; Yushkov, 1995; Kirillova, 2004; Anikanova et al., 2005, 2007; Bugmyrin et al., 2008); Switzerland (Vaucher, Durette-Desset, 1973); Ukraine (Mel'nichenko, Panasenko, 1979; Tkach, 1993); United Kingdom (Churchfield, 1990; Roots, 1992)
<i>L. didas</i> Thomas, 1953 (Syn.: <i>Longistriata pseudo-didas</i> Vaucher et Durette-Desset, 1973)	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981); Bulgaria (Genov, 1984; Prokopic et al., 1974); Czechia

Species (with synonyms)	Faunistic complex	Country (the author)
<i>L. paradoxi</i> Shaldybin, 1964	Palaearctic	(Prokopic, 1958); Finland (Haukisalmi, 1989; Haukisalmi, Henttonen, 1994; Bugmyrin et al., 2003, 2008); France (Vaucher, Durette-Desset, 1973); Germany (Pecher et al., 1996); Lithuania (Binkiene, 2006); Romania (Tkach, 1993); Slovakia (Prokopic, 1958; Mituch, 1968; Murai, Meszaros, 1984); Spain (Mas-Coma, Galego, 1977); Russia (Yushkov, 1995; Anikanova et al., 2005, 2007; Bugmyrin et al., 2008); Switzerland (Vaucher, Durette-Desset, 1973); Ukraine (Mel'nichenko, Panasenko, 1979); United Kingdom (Churchfield, 1990; Roots, 1992)
<i>L. thomasi</i> Desportes et Chabaud, 1961	Palaearctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981), Moldova (Andrejko, 1973); Russia (Schaldybin, 1964; Kirillova, 2004)
<i>L. trus</i> Thomas, 1953	Palaearctic	United Kingdom (Churchfield, 1990)
		Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981); Bulgaria (Prokopič et al., 1974); Lithuania (Binkiene, 2006); Russia (Yushkov, 1995; Anikanova et al., 2007); Spain (Mas-Coma, Galego, 1977); Switzerland (Vaucher, Durette-Desset, 1973); Ukraine (Mel'nichenko, Panasenko, 1979); United Kingdom (Churchfield, 1990; Roots, 1992)
Heligmonellidae		
<i>Tricholinstowia linstowi</i> (Travassos, 1918) (Syn.: <i>Longistriata vigisi</i> Petrov et Savinov, 1959)	Palaearctic	Czechia (Prokopic, 1958); Slovakia (Prokopič, 1958)
Angiostrongylidae		
<i>Stefanskostrongylus soricis</i> (Soltys, 1954) (Syn.: <i>Angiostrongylus soricis</i> , Soltys, 1954)	Holarctic	Belarus (Shimalov, 2007); Slovakia (Mituch, 1968; Stefancikova et al., 1994); Russia (Anikanova et al., 2007, 2009); United Kingdom (Roots, 1992)
Crenosomatidae		
<i>Paracrenosoma skrjabini</i> (Pologentsev, 1935), larvae (Syn.: <i>Crenosoma skrjabini</i> Pologentsev, 1935)	Palaearctic	Slovakia (Mituch, 1968); Ukraine (Tkach, 1993)
Ascarididae		
<i>Porrocaecum depressum</i> (Zeder, 1800), larvae (Syn.: <i>Ascaris depressum</i> Zeder, 1800)	Cosmopolitan	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981); Moldova (Andrejko, 1973); Poland (Soltys, 1952); Russia (Yushkov, 1995; Kirillova, 2004);

Continued table

Species (with synonyms)	Faunistic complex	Country (the author)
<i>P. talpae</i> (Schrank, 1788), larvae (Syn.: <i>Ascaris talpae</i> Schrank, 1788) <i>Porrocaecum</i> sp., larvae	Cosmopolitan	Anikanova et al., 2005, 2007, 2009; Bugmyrin et al., 2008); Switzerland (Baer, 1932); Ukraine (Mel'nichenko, Panasenko, 1979) Lithuania (Binkiene, 2006); Spain (Mas-Coma, Galego, 1977); United Kingdom (Churchfield, 1990) Belarus (Merkusheva, Bobkova, 1981; Shimalov, 2007, 2012); Bulgaria (Genov, 1984; Prokopič et al., 1974); Czechia (Prokopič, 1958; Prokopič et al., 1974); Finland (Erkinaro, Heikura, 1977); Lithuania (Binkiene, 2006); Poland (Soltys, 1952); Romania (Tkach, 1993); Russia (Vasilyev, 1949; Okulova et al., 2003; Anikanova et al., 2007, 2009); Slovakia (Prokopic, 1958; Murai, Meszaros, 1984; Stefancikova et al., 1994); Spain (Mas-Coma, Galego, 1977); United Kingdom (Sharpe, 1964; Lewis, 1968, 1987; Roots, 1992)
Gongylonematidae		
<i>Gongylonema soricis</i> Fain, 1955, larvae	Palaearctic	Belarus (Merkusheva, Bobkova, 1981; Shimalov, 2007)
Spirocercidae		
<i>Ascarops strongylina</i> (Rudolphi, 1819), larvae (Syn.: <i>Spiroptera strongylina</i> Rudolphi, 1819)	Cosmopolitan	Belarus (Arzamasov et al., 1969; Shimalov, 2007, 2012); Bulgaria (Genov, 1984)
<i>Physocephalus sexalatus</i> (Molin, 1860), larvae (Syn.: <i>Spiroptera sexalatus</i> Molin, 1860)	Cosmopolitan	Belarus (Arzamasov et al., 1969; Shimalov, 2007); Bulgaria (Genov, 1984); Lithuania (Binkiene, 2006)
Spiruridae		
<i>Agamospirura minutissima</i> Sharpilo, 1976, larvae	Palaearctic	Lithuania (Binkiene, 2006); Russia (Anikanova et al., 2007)
<i>Spirura talpae</i> (Gmelin, 1790) (Syn.: <i>Ascaris strumosa</i> Froelich, 1791; <i>Ascaris talpae</i> Gmelin, 1790)	Palaearctic	Russia (Kirillova, 2004)
Physalopteridae		
<i>Physaloptera kotlani</i> Kobulej et Versheni, 1953	Palaearctic	Bulgaria (Prokopič et al., 1974; Genov, 1984); Czechia (Prokopic, 1958); Slovakia (Prokopic, 1958; Mituch, 1968)
<i>Pseudophysaloptera soricina</i> (Baylis, 1934)	Palaearctic	Russia (Kirillova, 2004); Slovakia (Murai, Meszaros, 1984)
<i>P. formosana</i> (Yokogawa, 1922)	Palaearctic	Slovakia (Mituch, 1968)

Species (with synonyms)	Faunistic complex	Country (the author)
Acuariidae		
<i>Skrjabinoclava soricis</i> (Tiner, 1951) (Syn.: <i>Dispharynx soricis</i> Tiner, 1951; <i>Synhimantus rhopalocephalus</i> Soltys, 1952; <i>Stammerinema soricis</i> Tiner, 1951)	Holarctic	Belarus (Arzamasov et al., 1969; Merkusheva, Bobkova, 1981); Bulgaria (Prokopič et al., 1974, Genov, 1984); Poland (Soltys, 1952); Slovakia (Prokopic, 1958; Mituch, 1968); Ukraine (Mel'nicenko, Panasenko, 1979; Tkach, 1993); United Kingdom (Lewis, 1987; Churchfield, 1990)
<i>Paracuaria soricis</i> Jančev, 1972	Palaearctic	Bulgaria (Prokopic et al., 1974; Genov, 1984)
Acanthocephala		
Centrorhynchidae		
<i>Centrorhynchus aluconis</i> (Muller, 1780), larvae (Syn.: <i>C. inequalis</i> (Rudolphi, 1808); <i>C. olssonii</i> Lundstrom, 1942; <i>C. otidis</i> (Schränk, 1788))	Palaearctic	Russia (Kirillova, 2004; Kirillova, Kirillov, 2007); Ukraine (Tkach, 1993); United Kingdom (Lewis, 1968; Roots, 1992; Churchfield, 1990); Romania (Tkach, 1993)
<i>C. buteonis</i> (Schränk, 1788), larvae (Syn.: <i>Centrorhynchus caudatus</i> (Zeder, 1803); <i>Centrorhynchus polyacanthoides</i> (Creplin, 1825))	Palaearctic	Austria (Prokopič, Mahnerti, 1970); Czechia (Prokopič, 1958); Poland (Soltys, 1952); Slovakia (Prokopič, 1958; Murai, Meszaros, 1984)
<i>Sphaerostris teres</i> (Rudolphi, 1819), larvae (Syn.: <i>Sphaerostris picae</i> (Rudolphi, 1819))	Palaearctic	Ukraine (Tkach, 1993)
Polymorphidae		
<i>Polymorphus minutus</i> (Zeder, 1800), larvae (Syn.: <i>Echinorhynchus minutus</i> , Goeze, 1782)	Palaearctic	Slovakia (Mituch, 1968)
Moniliformida: Moniliformidae		
<i>Moniliformis moniliformis</i> (Bremsler, 1811), larvae (Syn.: <i>Echinorhynchus canis</i> Porta, 1914, <i>Echinorhynchus grassii</i> Railliet, 1893; <i>Echinorhynchus miniliformis</i> Bremsler, 1811)	Cosmopolitan	Russia (Kirillova, 2004; Kirillova, Kirillov, 2007)

The most common helminths are cestodes (Platyhelminthes: Cestoda), represented by 39 species of 6 families — Hymenolepididae (28), Taeniidae (2), Davaineidae (1), Paruterinidae (2), Dilepididae (5), Diphylobothriidae (1 species). A major part (70 %) of the cestodes belong to the Palaearctic faunal complex, 25 % are Holarctic, and 5 % are cosmopolitan species. The common shrew is a definitive host for 30 worm species (from fam. Hymenolepididae and Dilepididae), a paratenic or an intermediate host for 6 species (*Taenia martis*, *T. mustelae*, *Otiditaenia conoides*, *Cladotaenia circi*, *C. globifera*, *Spirometra erinaeci-europaei*). The cestodes *Dilepis undula*, *Polycercus lumbrici* and *P. paradoxa* are parasites of birds that accidentally infect shrews and do not reach full size and maturity in them.

Nematode fauna is characterized by high diversity: 34 species of 16 families — Capillariidae (8 species), Soboliphmatidae (1), Dioctophymatidae (1), Stroglyoididae (1), Heligmonellidae (1), Heligmosomidae (5), Angiostrongylidae (1), Crenosomatidae (1), Trichinellidae (1), Ascarididae (3), Gongyloneematidae (1), Spirocercidae (2), Spiruridae (2), Physalopterae (3), Acuariidae (2), Oxuridae (1 species). Around 60 % of the species belong to the Palaearctic faunal complex, 24 % are cosmopolitan, 16 % have Holarctic distribution. Nematode parasites of *Sorex araneus* demonstrate a variety of life cycles. The common shrew is a definitive host for 24 species. A majority of them (16 species) are geohelminths with a direct life cycle (mainly from families Capillariidae and Heligmosomidae), while the rest are biohelminths that infest shrews when they ingest intermediate hosts, mainly earthworms (*Soboliphyme soricis*, *Stefanskostrongylus soricis*, *Spirura talpae*, *Physaloptera kotlani*, *Pseudophysaloptera soricina*, *P. formosana*, *Skrjabinoclava soricis*, *Paracuaria soricis*). Ten nematode species (see table) parasitize *S. araneus* at the larval stages.

The trematode diversity is represented by 21 species of 9 families — Brachylaimidae (2), Panopistidae (2), Strigeidae (3), Diplostomidae (3), Dicrocoeliidae (3), Plagiorchiidae (1), Omphalometridae (4), Troglotrematidae (1) and Prosthogonimidae (1). Palaearctic species prevail in the trematode fauna (75 %), the shares of Holarctic and cosmopolitan species being 15 and 10 %, respectively. For 8 trematode species (*Brachylaima fulvum*, *Pseudoleucochloridium soricis*, *P. rotundus*, *Neoglyphe sobolevi*, *N. locellus*, *Rubensstrema exasperatum*, *R. opisthovitellinus*, *Nephrotrema truncatum*) the common shrew is a definitive host. The rest of the species have been found at the larval stage, and *S. araneus* is not an obligate component of their life cycles.

Spiny-headed worms (Acanthocephala) are represented in *S. araneus* by 5 widespread species: *Centrorhynchus buteonis*, *C. aluconis*, *Sphaerirostris teres*, *Polymorphus minutus*, *Moniliformis moniliformis*, for whom the shrew is a reservoir host. The definitive hosts for acanthocephalans are mammals and birds.

We chose to carry out comparative analysis of the helminth fauna in *Sorex araneus* populations from the following selected countries: Belarus, Bulgaria, Czechia, Finland, France, Lithuania, Moldova, Poland, Slovakia, Switzerland, United Kingdom, Ukraine and regions of Russia: Murmanskaya oblast', Republic of Karelia, Republic of Komi, Republic of Mordovia, Samarskaya oblast' (17, in total), where parasitological surveys were based on extensive host sampling.

The greatest number of helminths in *S. araneus* from 17 component communities was found in Slovakia — 56, Belarus — 49, Bulgaria — 40, Ukrai-

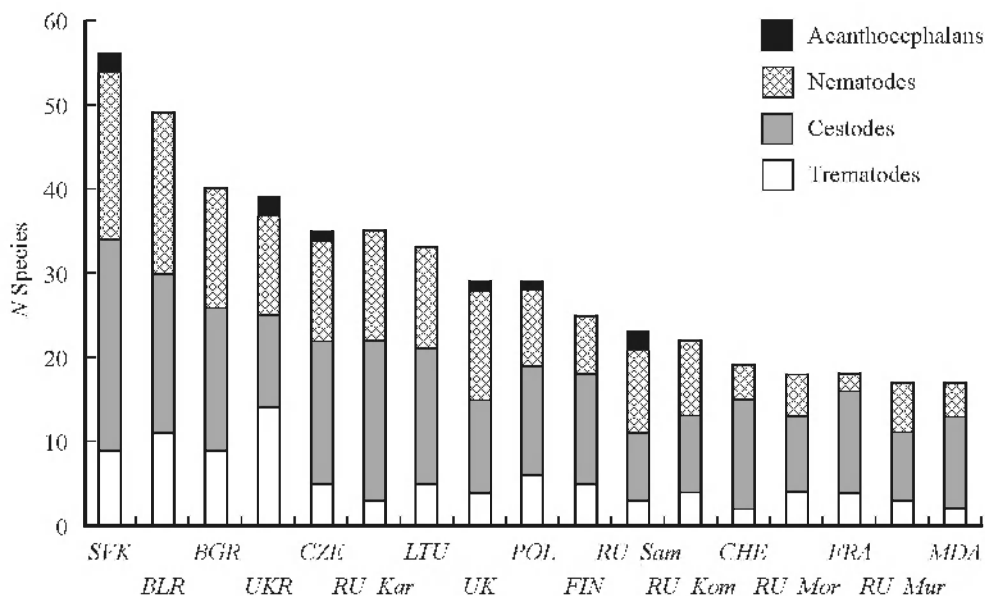


Fig. 1. Species richness of the helminth fauna in *Sorex araneus* from different European regions. BGR — Bulgaria, BLR — Belarus, CHE — Switzerland, CZE — Czechia, FIN — Finland, FRA — France, LTU — Lithuania, MDA — Moldova, POL — Poland, RU_Kar — Republic of Karelia, RU_Kom — Republic of Komi, RU_Mor — Republic of Mordovia, RU_Mur — Murmansk oblast', RU_Sam — Samara oblast', SVK — Slovakia, UK — United Kingdom, UKR — Ukraine.

ne — 39 species; and the lowest number was found in Murmansk Region and Moldova — 17 species (fig. 1). In a majority of regions, the most numerous groups in the helminth fauna were cestodes and nematodes. Trematodes were present in all regions, but their species richness was high in only a few (e. g. in Belarus and Ukraine), mainly owing to the species that parasitize the common shrew at the larval stages. Acanthocephalans were found only in 6 of the 17 regions (Czechia, Poland, Ukraine, Slovakia, United Kingdom, Samarskaya oblast').

Mean pairwise (136 pairs in total) Jaccard index for the regions in question was 0.39 (mode (M_o) — 0.33), scattered from 0.16 to 0.66. The highest similarity values were obtained for the helminth faunae of neighbor areas in Northern Europe: Finland — Lithuania (0.66), Karelia — Lithuania (0.65), Murmansk — Finland (0.62). When the species using *S. araneus* as an intermediate or reservoir host are excluded from the list of parasites, the similarity of the helminth fauna species composition between the compared regions becomes higher. Mean K_j was 0.44 ($M_o = 0.57$) with the interval of 0.18—0.72. Cluster analysis (Ward's method) revealed only two groups with bootstrap probability above 80 %: France — Switzerland and Czechia — Slovakia (fig. 2). Although there is no evidence in the dendrogram to strictly support other clustering, it is noteworthy that members of pairs with similar helminth fauna compositions are also geographically close to one another.

The relatively low similarity level in the helminth fauna of the common shrew or, in other words, uniqueness of local component communities of parasites is due to the high proportion of rare species in them. Thus, of the 99 helminth species known from the common shrew in the Europe, 30 species (34 %)

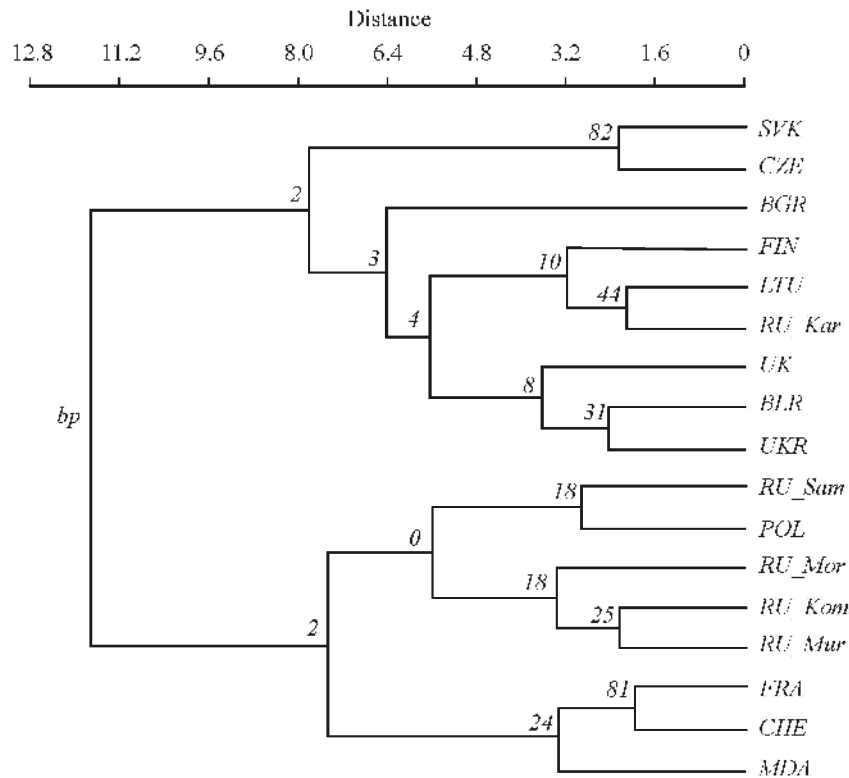


Fig. 2. Results of the cluster analysis (Ward's method) of the helminth fauna in *Sorex araneus* (definitive host) from 16 European regions (*bp* — bootstrap probability).
Abbreviations of country names as in fig. 1.

were found in only one of the 17 European regions, and 22 species occurred in 2 or 3 study sites.

Only 2 species — cestodes *Monocercus arionis* (fam. Dilepididae) and *Staphylocystis furcata* (fam. Hymenolepididae) were found in *S. araneus* in all the regions covered by this study. A wide distribution was noted for 10 species, recorded from 12—16 regions: trematodes *Brachylaima fulvum* (fam. Brachylaimidae) and *Rubensstrema exasperatum* (fam. Omphalometridae), cestodes *Neoskrjabinolepis schaldybini*, *Lineolepis scutigera*, *Ditestolepis diaphana* and *Vigisolepis spinulosa* (fam. Hymenolepididae), nematodes *Aonchotheca kutori*, *Eucoleus oesophagicola* (fam. Capillariidae), *Longistriata didas* *L. codrus* (fam. Heligmosomidae). All these helminths were specialist parasites of insectivorous mammals, and prevailed in terms of abundance in the component communities of parasites in *S. araneus* in a majority of the investigated regions.

This study has demonstrated that the helminth fauna of the common shrew is noted for high taxonomic diversity, which is largely due to the host's wide range and habitat versatility. Representatives of the Palearctic faunal complex prevail in the helminth fauna (70%). A majority of Holarctic (15%) and cosmopolitan (15%) species are polyxenous parasites found in shrews at the larval stage of their development. There predominate (83%) parasites with a complex life cycle, for whom *S. araneus* is a definitive or intermediate host. The diversity of parasites with direct life cycle mainly consists of nematodes of the family Helig-

mosomidae. Comparative analysis of the helminth fauna of *Sorex araneus* in the European part of the species range has demonstrated a high level of difference in local component communities of parasites, mainly owing to rare (or accidental) species, for which the probability of detection is increased by enlarging the host sample size. The widespread species generating similarity in the helminth fauna of different parts of the *S. araneus* European range are specific parasites of Soricidae: trematodes *Brachylaima fulvum*, *Rubensstrema exasperatum*, cestodes *Monocercus arionis*, *Staphylocystis furcata*, *Neoskrjabinolepis schaldybinii*, *Lineolepis scutigera*, *Ditestolepis diaphana*, *Vigisolepis spinulosa*, and nematodes *Aonchotheca kutori*, *Eucoleus oesophagicola*, *Longistriata didas* and *L. codrus*.

ACKNOWLEDGEMENT

The studies were funded from the Federal budget of Russia under the state order (N 0221-2014-0030).

References

- Anderson R. C. 2000. Nematode parasites of vertebrates. Their development and transmission. 2nd Edition. CAB International, Wallingford. 650 p.
- Andrejko O. F. 1973. Review of insectivorous (Insectivora) helminths from the USSR and the adjacent countries. *Parazity Zhivotnyh i Rasteniy*. 9: 3—33. [In Russian].
- Anikanova V. S., Bugmyrin S. B., Ieshko E. P. 2007. Methods for collection and study of helminths in small mammals. Petrozavodsk, Karelian Research Centre of RAS. 145 p. [In Russian].
- Anikanova V. S., Ieshko E. P., Boyko N. S. 2005. Helminths of shrews of genus *Sorex* (Soricidae, Insectivora) from the Kandalaksha Reserve. *Parazitologiya*. 39 (6): 559—568. [In Russian].
- Anikanova V. S., Ieshko E. P., Bugmyrin S. B. 2009. Dynamics of the helminth fauna in the common shrew (*Sorex araneus* L.) from cut-over lands of different age in Karelia. *Parazitologiya*. 43 (1): 79—89. [In Russian].
- Arzamasov I. G., Merkusheva I. V., Mihulap O. N., Chikilevskaya I. V. 1969. Insectivores and their parasites from Byelorussia. Minsk, Nauka i Technika. 175 p. [In Russian].
- Baer J. G. 1932. Contribution à la faune helminthologique de Suisse (Deuxieme partie). *Revue Suisse de Zoologie*. 39 (1): 1—57.
- Barus V., Tenora F., Wiger R. 1977. Further occurrence of some helminths in Rodentia and Insectivora from Fenoscandia. *Folia Parasitologica*. 24: 127—128.
- Binkiené R. 2006. Helminth fauna of shrews (*Sorex* spp.) in Lithuania. *Acta Zooogica Lituanica*. 16: 241—245.
- Binkiené R., Kontrimavichus V., Hoberg E. P. 2011. Overview of the cestode fauna of European shrews of the genus *Sorex* with comments on the fauna in *Neomys* and *Crocidura* and an exploration of historical processes in post-glacial Europe. *Helminthologia*. 48 (4): 207—228. doi: 10.2478/s11687-011-0031-5.
- Bray A., Gibson D. I., Jones A. 2008. Keys to the Trematoda. Vol. 3. London, CAB International and The Natural History Museum. 824 p.
- Bugmyrin S. B., Bespyatova L. A., Anikanova V. S., Ieshko E. P. 2008. The parasite fauna of small mammals from the Friendship Park (Finland) and the Kostamus Nature Reserve (Russia). *Transactions of Karelian Research Centre of Russian Academy of Science*. 13: 32—40. [In Russian].
- Bugmyrin S. B., Ieshko E. P., Anikanova V. S., Bespyatova L. A. 2003. On the fauna of small mammal parasites in the Paanajarvi and Oulanka national parks. *Transacti-*

- ons of Karelian Research Centre of the Russian Academy of Sciences. 3: 97—101. [In Russian].
- Bychovskaya-Pavlovskaya I. E., Vysotzkaya S. O., Kulakova A. P. 1970. Trematodes of small mammals from Transcarpathian region. *Parazitologiya*. 4 (1): 25—33. [In Russian].
- Bychovskaya-Pavlovskaya I. E., Vysotzkaya S. O., Kulakova A. P. 1978. *Lyperobosomum transcabpathicus* a new name for *Lyperosomum soricis* Bychovskaja-Pavlovskaja, Vysotzkaja et Kulakova, 1970. *Parazitologiya*. 12 (2): 188. [In Russian].
- Churchfield S. 1990. The natural history of shrews. Cornell, Comstock Publishing Associates, a Division of Cornell University Press. 178 p.
- Erkinaro E., Heikura K. 1977. Dependence of *Porrocaecum* sp. (Nematoda) occurrences on the sex and age of the host (Soricidae) in Northern Finland. *Aquilo Ser Zoologica*. 17: 37—41.
- Genov T. 1984. Helminths of insectivorous and rodents in Bulgaria. Sofia, Publishing House of the Bulgarian Academy of Sciences. 348 p. [In Bulgarian].
- Genov T., Georgiev B. 1998. Cestoda. In: Michev T., Georgiev B., Petrova A., Styneva M. (eds). Biodiversity of the Srebarna Biosphere Reserve. Checklist and bibliography. Sofia, Coopublished by Context and Pensoft. 160 p.
- Gibson D., Bray R., Hunt D., Georgiev B., Scholz T., Harris P., Bakke T., Pobjmanska T., Niewiadomska K., Kostadinova A., Tkach V., Bain O., Durette-Desset M., Gibbons L., Moravec F., Petter A., Dimitrova Z., Buchmann K., Valtonen E., de Jong Y. 2014. Fauna Europaea: Helminths (Animal Parasitic). *Biodiversity Data Journal*. 2: e1060. doi: 10.3897/BDJ.2.e1060.
- Gibson D. I., Jones A., Bray A. 2002. Keys to the Trematoda. Vol. 1. London, CAB International and the Natural History Museum. 521 p.
- Hammer O., Harper D., Ryan P. 2001. PAST: Paleontological statistics software package for education and data analysis. *Palaeontologia Electronica*. 4 (1): 9.
- Hanzelová V., Rysavý B. 1996. Synopsis of cestodes in Slovakia IV. Hymenolepididae (continued). *Helminthologia*. 33 (4): 213—222.
- Hanzelová V., Rysavý B. 1999. Synopsis of cestodes in Slovakia V. Dilepididae, Dipylidiidae and Paruterinidae. *Helminthologia*. 36 (2): 111—117.
- Haukisalmi V. 1989. Intestinal helminth communities of *Sorex* shrews in Finland. *Annales Zoologici Fennici*. 26: 401—409.
- Haukisalmi V., Henttonen H. 1994. Distribution patterns and microhabitat segregation in gastrointestinal helminths of *Sorex* shrews. *Oecologia*. 97: 236—242. doi: 10.1007/BF00323155.
- Haukisalmi V. 2015. Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates in Finland. *ZooKeys*. 533: 1—61. doi.org/10.3897/zookeys.533.6538.
- Iskova N. I., Sharpilo V. P., Sharpilo L. D., Tkach V. V. 1995. Catalogue of helminths of vertebrates in the Ukraine. Trematodes of terrestrial vertebrates. Kiev. 93 p. [In Russian].
- Jones A., Bray A., Gibson D. I. 2005. Keys to the Trematoda. Vol. 2. London, CAB International and The Natural History Museum. 745 p.
- Jourdane J. 1971. Helminthes parasites des micromammiferes des Pyrenees — Orientales II. Les Plathelminthes de Soricinae. *Annals of Parasitology Humaine et Comparee*. 46 (5): 553—574. [In French].
- Jourdane J. 1973. Two new species of Trematoda found in Soricinae from the Pyrenees. *Annals of Parasitology Humaine et Comparee*. 48 (3): 667—676. [In French].
- Kirillova N. J. 2004. Helminthes fauna of insectivorous mammals (Insectivora) of Samarskaja Luka. *Proceedings of the Samara Scientific Center of the Russian Academy of Sciences*. 6 (2): 334—340. [In Russian].
- Kirillova N. J., Kirillov A. A. 2007. First finding of the *Centrorhynchus aluconis* (Muller, 1780) (Giganthorhynchidae) and *Moniliformis moniliformis* Bremser, 1811 (Moniliformidae) larvae in shrews (Insectivora: Soricidae) of the fauna of Russia. *Parazitologiya*. 41 (1): 82—85. [In Russian].
- Kisieliewska K. 1961. Circulation of tapeworms of *Sorex araneus araneus* L. in biocenosis of Bialoweza National Park. *Acta Parasitologica Polonica*. 9: 331—396.

- Kornienko S. A., Binkiené R. 2008. *Neoskrjabinolepis merkushevae* sp. n. (Cyclophyllidea, Hymenolepididae), a new cestode from shrews from the Palaearctic region. *Folia Parasitologica*. 55 (2): 136—140.
- Kornienko S. A., Binkiené R., Tkach V. V. 2016. Revision of the genus *Soricinia* Spassky et Spasskaja, 1954 (Cestoda: Cyclophyllidea: Hymenolepididae) with redescriptions of three species, an amended generic diagnosis and an identification key to species. *Systematic Parasitology*. 93 (5): 451—465. doi: 10.1007/s11230-016-9639-7.
- Lewis J. W. 1968. Studies on the helminth parasites of voles and shrews from Wales. *Journal of Zoology*. 154 (3): 313—331.
- Lewis J. W. 1987. Helminth parasites of British rodents and insectivores. *Mammal Review*. 17 (2): 81—93.
- Mas-Coma S., Gallego J. 1977. Conocimientos actuales sobre la helmintofauna de micromamíferos (Insectivora; Rodentia) en España. In: Cordelo del Campillo M. et al. (eds). *Índice-Catálogo de Zooparásitos Ibéricos. III. Cestodos, IV. Nematodos y Anejos*. León. 3—4: 165—205.
- Matskasi I. 1984. Trematodes from insectivorous mammals in the Sergov Mountains (Western Carpathians, Czechoslovakia). *Miscellanea Zoologica Hungarica*. 2: 15—16.
- Mel'nicenko E. D., Panasenko N. A. 1979. On helminthofauna of certain insectivorous mammals of the Middle Dnieper area. *Vestnik zoologii*. 5: 79—81. [In Russian].
- Merkusheva I. V., Bobkova A. F. 1981. Helminths of domesticated and wild animals in Belarus. Minsk, Nauka i Tehnika. 120 p. [In Russian].
- Mitchell-Jones A. J., Amori G., Bogdanowicz W., Krystufek B., Reijnders P. J. H., Spitzenberger F., Stubbe M., Thissen J. B. M., Vohralik V., Zima J., Andera M. 1999. *The Atlas of European Mammals*. London, Academic Press. 484 p.
- Mituch J. 1968. Index helminthum. *Studia Helminthologica*. 2: 221—279.
- Moravec F. 2000. Review of capillariid and trichosomoidid nematodes from mammals in the Czech Republic and the Slovak Republic. *Acta Societatis Zoologicae Bohemicae*. 64 (3): 271—304.
- Murai É., Mészáros F. 1984. Helminths from small mammals in the Cergov Mountains (Western Carpathians, Czechoslovakia). *Miscellanea Zoologica Hungarica*. 2: 7—28.
- Murai É., Mészáros F., Sey O. 1992. On parasitic helminths of mammals living in the environs of Lake Balaton. *Parasitologia Hungarica*. 25: 23—36.
- Nasincova V., Bušta J. 1991. The life cycle of *Rubinstrema opisthovitelinum* Soltys, 1954 (Trematoda: Omphalometrodae). *Folia Parasitologica*. 38 (3): 217—224.
- Novikov M. V. 1992. The trematodes and cestodes of *Sorex araneus* L. in Valaam island (Ladoga Lake, USSR). *Memorias do Instituto Oswaldo Cruz*. 87: 155—160.
- Okulova N. M., Sivkov A. V., Gulyaev V. D. 2003. Helminths of shrews of genus *Sorex* (Soricidae, Insectivora) from Pichinega reserve. *Theriological Research*. 2: 97—106. [In Russian].
- Orlov V. N., Bulatova N. Sh., Kozlovskii A. I., Balakirev A. E. 2004. Hierarchy of intraspecific taxa of the common shrew, *Sorex araneus* (Insectivora), and taxonomic structure of species in mammals. *Zoologicheskii Zhurnal*. 83 (2): 199—212. [In Russian].
- Orlov V. N., Kozlovsky A. I., Okulova N. M., Balakirev A. E. 2007. Postglacial recolonisation of European Russia by the common shrew *Sorex araneus*. *Russian Journal of Theriology*. 6 (1): 97—104. [In Russian].
- Pecher W. T., Mokhtari-Derakhshan F., Böckeier W. 1996. Epidemiologische Bemerkungen zur Helminthen fauna von zwei Spitzmausarten (*Sorex araneus* L. 1758, *S. minutus* L., 1766) mit unterschiedlichen ökologischen Ansprüchen. *Mitteilungen der Österreichischen Gesellschaft für Tropenmedizin Parasitologie*. 18: 183—190. [In German].
- Pojmanska T. 1961. Investigations on the occurrence and biology of trematodes of *Sorex araneus* L. in Bialowieza National Park. *Acta Parasitologica Polonica*. 23: 305—330. [In Polish].
- Prokopic J. K. 1958. The parasitic helminths of Insectivora in Czechoslovakia. *Zoologicheskii Zhurnal*. 38 (2): 174—182. [In Russian].

- Prokopič J. 1959. The parasitic helminths of insectivora in CSR. *Česka Parasitologicka*. 6: 87—134. [In Czech].
- Prokopic J., Mahnert V. 1970. Über Helminthen der Kleinseuger (Insectivora, Rodentia) Tirols (Osterreichs). *Berichte des Naturwissenschaftlich-medizinischen Vereins in Innsbruck*. 58: 143—154.
- Prokopic J. 1972. Biocenotical study on cestodes of small mammals in various biotopes. *Acta Scientiarum Naturalium Academiae Scientiarum Bohemoslovaca*. 6 (10): 1—68.
- Prokopič J., Karapchanski I., Genov T., Janchev J. 1974. Ecological analysis of the helminth fauna of the small mammals in different biotopes and different regions of Europe. *Izvestiya na Tsentralnata Khelmitologichna Laboratoriya*. 17: 119—144. [In Bulgarian].
- Ribas A., Casanova J. C., Miquel J., Fons R., Guisset C., Feliu C. 2005. On the fauna of digenetic trematodes, parasites of small mammals, in the Natural Reserves of Py and Mantet (Oriental Pyrenees, France). *Helminthologia*. 42 (2): 71—75.
- Romashov B. V. 1983. Esophageal capillariids of shrews: *Eucoleus oesophagicola* (Soltys 1952) and *E. bernardi* sp. n. (Nematoda: Capillariidae). *Helminthologia*. 20 (3): 187—196.
- Roots C. D. 1992. Morphological and Ecological Studies on the Helminth Parasites of British Shrews. Ph. D. Thesis, University of London, London. 140 p.
- Rybicka K. 1959. Tapeworms of forest micromammals (Rodentia and Insectivora) from Kampinos Wilderness. *Acta Parasitologica Polonica*. 7 (18): 393—421.
- Schalldybin L. S. 1964. Fauna of helminths of mammals from Mordovian state reserve. *Uchenye Zapiski Gorkovskogo Pedagogicheskogo Instituta*. 48 (3): 52—81. [In Russian].
- Sharpe G. I. 1964. The helminth parasites of some small mammal communities. I. The parasites and their hosts. *Parasitology*. 54: 145—154.
- Shchipanov N. A., Bulatova N., Pavlova S. V., Shchipanov A. N. 2009. The common shrew (*Sorex araneus*) as a model species in ecological and evolutionary studies. *Zoologicheskii Zhurnal*. 88 (8): 975—989. [In Russian].
- Shchipanov N. A., Pavlova S. V. 2016. Multilevel subdivision in the *araneus* species group of the genus *Sorex*. Chromosomal differentiation. *Biology Bulletin*. 43 (8): 876—892. doi: 10.1134/S106235901608015X.
- Shimalov V. V. 2007. Helminthfauna in insectivores (Mammalia:Insectivora) of canal banks in meliorated territories. *Parasitologiya*. 41 (3): 201—205. [In Russian].
- Shimalov V. V. 2012. Monitoring of the helminth of insectivorous of meliorative canal banks in Belorussian Polesie. *Parasitologiya*. 46 (6): 472—478.
- Soltys A. 1952. The helminthes of common shrew (*Sorex araneus* L.) of the National Park of Bialowieza (Poland). *Annales Universite Marie Curie Sklodowska*. 5: 165—202. [In Polish].
- Soltys A. 1954. Helminthofauna of Soricidae in the Bialowieza National Park. *Acta Parasitologica Polonica*. 16: 353—402. [In Polish].
- Štefancíková A., Gajdos O., Macko J. K., Tomasovicová O. 1994. Helminth fauna of small mammals in the urban and suburban area of Kosice. *Biologia*. 49 (2): 147—157.
- Tkach V. V. 1993. First report on the helminths of insectivores from the Danube delta. *Analele Stiintifice ale Institutului Delta Dunarii*. 2: 197—201.
- Tkach V. V., Bray R. A. 1995. *Prosolecithus danubica* n. sp. (Digenea: Dicrocoeliidae), a new digenean from shrews on islands of the Danube delta. *Parasite*. 2: 133—140.
- Tkach V., Swiderski Z. 1998. Differentiation and ultrastructure of the oncospherical envelopes in the hymenolepidid cestode *Staphylocystoides stefanskii* (Zarnowski, 1954). *Acta Parasitologica*. 43 (4): 222—231.
- Vasilyev V. V. 1949. Parasites fauna of rodents and insectivorous from vicinity of Leningrad. *Uchenye Zapiski Leningradskogo Gosudarstvennogo Universiteta, Seriya Biologicheskikh Nauk*. 101 (19): 73—80. [In Russian].
- Vasileva G. P., Vaucher C., Tkach V. V., Genov T. 2004. Taxonomic revision of *Hilmylepis* Skryabin et Matevosyan, 1942 (Cyclophyllidea: Hymenolepididae). *Systematic Parasitology*. 59: 45—63.

- Vaucher C. 1971. Parasitic Cestoda in Soricidae in Europe. Anatomical study, taxonomic review and biology. *Revue Suisse de Zoologie*. 78 (1): 1—113.
- Vaucher C., Durette-Desset M.-C. 1973. Nematodes héligmosomes parasites of insectivores Soricidae of the region Holarctique. *Annals of Parasitology and Human Compere.* 48 (1): 135—167. [In French].
- Vaucher C., Hunkeler P. 1967. Contribution to the study of cestodes and trematodes parasites of micromammals in Switzerland I. *Bulletin of the Neuchatel Society of Natural Sciences*. 90: 161—184.
- Viktorov L. B., Golovin O. V., Savinov V. A. 1964. Materials on helminths fauna of insectivorous mammal from Kalininskaya oblast. *Uchenye Zapiski Kalininskogo Gosudarstvennogo Pedagogicheskogo Instituta*. 31: 289—292. [In Russian].
- Vysotskaya O. S. 1997. Helminths of small mammals from Zakarpatskaya oblast (Eastern Carpathians, Ukraine). *Parazitologiya*. 31 (4): 346—353. [In Russian].
- Yushkov V. F. 1995. Helminths of mammals. Fauna of the European Western North of Russia. Vol. III. SPb.: Nauka. 201 p. [In Russian].
- Żarnowski E. 1955. Parasitic worms of forest micromammals (Rodentia and Insectivora) of the enviroment of Pulawy (district Lublin). I. Cestoda. *Acta Parasitologica Polonica*. 8: 127—168. [In Polish].
- Żarnowski E. 1960. Parasitic worms of forest micromammals (Rodentia and Insectivora) of the enviroment of Pulawy (district Lublin). II. Trematoda. *Acta Parasitologica Polonica*. 3: 279—368. [In Polish].