Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates in Finland

Voitto Haukisalmi

Finnish Museum of Natural History Luomus, P. O. Box 17, P. Rautatiekatu 13, 00014 University of Helsinki, Finland

Corresponding author: Voitto Haukisalmi (voitto.haukisalmi@helsinki.fi)

Academic editor: B. Georgiev | Received 11 September 2015 | Accepted 9 October 2015 | Published 9 November 2015

Abstract
A checklist of tapeworms (Cestoda) of vertebrates (fishes, birds and mammals) in Finland is presented, based on published observations, specimens deposited in the collections of the Finnish Museum of Natural History (Helsinki) and the Zoological Museum of the University of Turku, and additional specimens identified by the present author. The checklist includes 170 tapeworm species from 151 host species, comprising 447 parasite species/host species combinations. Thirty of the tapeworm species and 96 of the parasite/host species combinations have not been previously reported from Finland. The total number of tapeworm species in Finland (170 spp.) is significantly lower than the corresponding figure for the Iberian Peninsula (257 spp.), Slovakia (225 spp.) and Poland (279 spp.). The difference between Finland and the other three regions is particularly pronounced for anseriform, podicipediform, charadriiform and passeriform birds, reflecting inadequate and/or biased sampling of these birds in Finland. It is predicted that there are actually ca. 270 species of tapeworms in Finland, assuming that true number of bird tapeworms in Finland corresponds to that in other European countries with more comprehensive knowledge of the local tapeworm fauna. The other main pattern emerging from the present data is the seemingly unexplained absence in (northern) Fennoscandia of several mammalian tapeworms that otherwise have extensive distributions in the Holarctic region or in Eurasia, including the northern regions. Previously unknown type specimens, that is, the holotype of Bothrimum nylandicus Schneider, 1902 (a junior synonym of Diplocotyle olrikii Krabbe, 1874) (MZH 127096) and the syntypes of Caryophyllaeides fennica (Schneider, 1902) (MZH 127097) were located in the collections of the Finnish Museum of Natural History.

Keywords
Cestoda, tapeworms, fishes, birds, mammals, checklist, fauna, Finland, species diversity
Introduction

There are no comprehensive checklists or other faunistic reviews of tapeworms (Cestoda) of vertebrates in northern Europe, although the cestodes of fishes have been recently reviewed in Latvia (Kirjušina and Vismanis 2007) and Finland (Pulkkinen and Valtonen 2012). Among other host groups, the cestode fauna of rodents and shrews has been intensively studied in northern Europe (see, for example, Haukisalmi 1986, 1989, Haukisalmi et al. 1994, Bugmyrin et al. 2003, Anikanova et al. 2007). However, the cestode fauna of birds and large mammals in northern Europe has received surprisingly little attention, with the exception of a recent series of studies on taeniid cestodes of carnivores in Finland and Sweden (Lavikainen et al. 2006, 2011, 2013, Haukisalmi et al. 2011).

Comprehensive checklists of cestodes covering all vertebrate groups have, however, been published at least for France (Joyeux and Baer 1936), Spain and Portugal (Cordero del Campillo et al. 1994), Slovakia (Synopsis of cestodes in Slovakia I–V: Macko et al. 1993, 1994, Hanzelová et al. 1995, Hanzelová and Ryšavý 1996, 1999), Poland (Pojmańska et al. 2007) and Belarus (Merkusheva and Bobkova 1981). Because of recent developments in tapeworm taxonomy, the older checklists, such as those of Joyeux and Baer (1936), are naturally somewhat outdated. Tapeworm taxonomy has long flourished in Russia and the former USSR, resulting in major faunistical and systematical reviews of cestodes of all vertebrate groups. The most appropriate example is the “Essentials (or Fundamentals) of Cestodology” – series, started in 1951, and now including 14 volumes. However, there are evidently no proper checklists or faunistic reviews summarizing information on tapeworms of all vertebrate classes in the European part of Russia.

The main purpose of the present study is to provide a comprehensive list of tapeworm species reported or found from Finland, including two of the former Finnish territories lost as a consequence of the Second World War (Karelia and Petsamo regions). The study concerns all vertebrate groups present in Finland, but no tapeworms are known from Finnish elasmobranchs, amphibians and reptiles. Besides published reports, specimens deposited in the collections of the two major Finnish natural history museums were examined for the presence of otherwise unknown species. The present checklist also includes as yet undescribed, more or less cryptic mammalian tapeworms identified by molecular methods (for example, Haukisalmi et al. 2008, 2009a, Lavikainen et al. 2013).

The present faunistic data from Finland are compared with the existing checklists from Europe, particularly the most recent ones from the Iberian Peninsula, Slovakia and Poland. These comparisons allow the identification of host and cestode groups that need to be examined more comprehensively to obtain a better idea of the overall cestode diversity in Finland and northern Europe in general.

Materials and methods

The list of tapeworm species of Finland, including the former territories in northern and south-eastern parts of the country, is based on published observations, speci-
Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates...

...mensch deposited in the collections of the Finnish Museum of Natural History, Helsinki (MZH) and the Zoological Museum of the University of Turku, Finland (ZMUT), as well as additional specimens identified by the present author. For each cestode species, all known definitive and intermediate host species are listed with references for published records. The checklist does not, however, provide a complete list of references. Instead, the first known reference and, if available, one or more recent ones with additional information on the particular cestode species, such as DNA sequence data, distribution and biology, is given for each cestode species/host species combination. The checklist does not include regions or localities for the cestode records, except for the former Finnish territories.

When specimens of a particular cestode species have been deposited in museum collections (in Finland or elsewhere), this has been indicated in the list, separately for each host species. However, collection/accession numbers are still unavailable for most of the specimens deposited in the Finnish museums (Helsinki and Turku). The specimens in the collections of both Finnish museums are generally old, commonly from the early 20th century. Most of the specimens in the Finnish Museum of Natural History are stored in 80% ethanol (originally usually in formaldehyde), whereas the entire material in the Turku museum consists of specimens on slides.

Most of the cestodes are reported in their hosts as the adult stages, mainly because the metacestodes of most tapeworms parasitize invertebrates, which were excluded from the present list. Also, there is limited information on metacestodes parasitizing invertebrates from Finland, most of the existing data coming from the parasites of fishes (Valtonen et al. 2012). *Diphyllobothrium dendriticum* (Nitzsch, 1824), *Schistocephalus cottii* Chubb, Seppälä, Lüscher, Milinski & Valtonen, 2006, *S. pungitii* Dubinina, 1959, *Taenia martis* (Zeder, 1803), *Versteria mustelae* (Gmelin, 1790), *Echinococcus equinus* Williams & Sweatman, 1963 and *E. granulosus* (Batsch, 1786) are only known as metacestodes from Finland.

Three workers stand out as collectors of older museum specimens of Finnish cestodes. Kaarlo M. Levander (1867–1943) and Guido Schneider (1867–1948) collected cestodes and other helminths of marine and freshwater fishes from Finland. The latter also published several faunistic and taxonomic papers on fish tapeworms, including descriptions of new taxa (e.g. Schneider 1902b, 1904, 1905). Knowledge of the tapeworm fauna of Finnish birds is based largely on the collections and original identifications of Väinö H. Pekkola (1880–1953). Pekkola never published any data on tapeworms he collected, but fortunately a major part of his extensive collections is deposited in MZH and ZMUT.

Tapeworms available for study (other than museum specimens) originate from three main sources. Practically all the existing knowledge of the Finnish tapeworm fauna of rodents and shrews is based on specimens collected in connection with research projects led by Heikki Henttonen (Natural Resources Institute Finland Luke, previously Finnish Forest Research Institute) from the late 1970’s until the present. Several tapeworm species and tapeworm/host species combinations new to Finland were identified among the tapeworms collected by specialists at the Finnish Safety Authority
Evira (Marja Isomursu, Antti Oksanen). In addition, Antti Lavikainen (Haartman Institute, University of Helsinki) has recently collected and identified (by molecular methods) several taeniid species and taeniid/host species combinations new to Finland.

The geographical distribution of tapeworms of the field vole *Microtus agrestis* in Fennoscandia (Fig. 2) is based partly on published sources (Haukisalmi 1986, Haukisalmi et al. 1994, 2004, 2009a) and partly on the tapeworm collections of H. Henttonen, V. Haukisalmi and coworkers from Finland, northern Norway and Denmark, and on the field vole material collected by Maarit Jaarola from Sweden (Jaarola and Tegelström 1995, 1996, Jaarola et al. 1997).

The identifications of vouchers and other specimens deposited in museum collections were checked, except when the specimens were in poor condition or when the rostellar hooks were lacking. The original identifications of cestodes without existing voucher specimens were accepted as such, the names modified to follow current taxonomy. The latter was derived from several sources, the seminal book “Keys to the cestode parasites of vertebrates” (Khalil et al. 1994) forming the backbone of the genus-level classification. However, the genus name *Passerilepis* Spasskii & Spasskaya, 1954 has been used for *Microsomacanthus* Lopez-Neyra, 1942 –like cestodes parasitizing passerine birds, instead of merging them with the latter genus. Other major deviations from the classification scheme of Khalil et al. (1994) concern the *Anoplocephaloides* Baer, 1923 and *Paranoplocephala* Lühe, 1910 -like species (*Anoplocephalidae*) of rodents and *Taenia* Linnaeus, 1758 -like species (*Taeniidae*) of carnivores, recently revised by Haukisalmi (2009) and Haukisalmi et al. (2014), and Nakao et al. (2013), respectively.

Species-level taxonomy and identification are based on publications too numerous to be listed here, but the following books and papers may be mentioned as particularly important sources: Joyeux and Baer 1936 (all tapeworms), Scholz et al. 2007 (*Proteocephalus*), Spasskaya 1966 (hymenolepidids of birds), Spasskaya and Spasskii 1977, 1978 (dilepidids of birds), Matevosyan 1969 (paruterinids of birds), Spasskii 1951, Rausch 1976, Beveridge 1978 (anoplocephalids), Vaucher 1971 (tapeworms of shrews) and Abuladze 1964 (taeniids). However, recent changes in species names have also been considered.

Tapeworms that could not be identified to species were included in the list if they were morphologically clearly different from other (congeneric) species. The checklist includes only those synonyms and misidentifications that have been used in publications concerning the Finnish cestode fauna or in museum specimens.

The scientific names of hosts follow Froese and Pauly (2015, fishes), Dickinson and Remsen (2013, birds), Dickinson and Christidis (2014, birds) and Wilson and Reeder (2005, mammals).

**Results**

The present checklist of tapeworms of Finland includes 170 parasite species from 151 host species, comprising 447 parasite species/host species combinations (see Appendix).
Fishes, birds and mammals have 31, 80 and 67 tapeworm species, respectively. There is a slight overlap in the tapeworm faunas of the three main host groups, because the life-cycles of diphyllobothriids (eight species) and *Cladotaenia globifera* (Batsch, 1786) (Paruterinidae) include hosts representing two different vertebrate classes (birds and fishes, mammals and fishes, and birds and mammals). Among birds, the highest tapeworm diversity is found in anseriforms (34 spp.), charadriiforms (18 spp.) and passeriforms (14 spp.) (Table 1).

The checklist includes 30 tapeworm species and 96 parasite species/host species combinations (including the 30 “new” species) that have not been previously reported from Finland, marked as “Present study” in the references/source column. Four of the Finnish tapeworm species are sporadic imported parasites of humans and domestic animals not exhibiting natural transmission in Finland (see Discussion). Eight of the tapeworm species in the present checklist have been recorded only from the former territories of Finland, either from the Petsamo (Pechenga) region at the coast of the Arctic Ocean or from Karelia in the south-east of Finland.

The Finnish tapeworms represent seven orders and 18 families. As expected, the order Cyclophyllidea is the most diverse element of the Finnish cestode fauna (134 species or 80% of the total diversity), Hymenolepididae (61 spp.) being the most species-rich family.

The total number of tapeworm species in Finland (170 spp.) is lower than the corresponding figure for the Iberian Peninsula (257 spp.), Slovakia (225 spp.) and Poland (279 spp.) (Fig. 1). The difference between Finland and the other three regions is particularly pronounced for birds, the Finnish species diversity being only 46–70% of the corresponding diversity in the other regions. Among birds, the tapeworm fauna of anseriforms, podicipediforms, charadriiforms and passeriforms is usually significantly lower in Finland than in the other parts of Europe (Table 1). The species diversity of tapeworms in galliform birds in Finland is also unexpectedly low, partly because no cestodes have been reported from Finnish chickens (*Gallus gallus domesticus*).

In addition, there is low tapeworm diversity in mammals in Finland (67 spp.) compared with that in the Iberian Peninsula (106 spp.). The latter difference is partly due to the presence of tapeworms of marine mammals in Spain and Portugal (12 spp.); such tapeworms are not known from Finland, because the only regularly occurring and breeding marine mammals in Finland are seals (*Halichoerus grypus* and *Pusa hispida*), which do not carry host-specific tapeworms. However, Finnish seals accidentally carry fish-transmitted tapeworms of water birds and predatory fishes.

The holotypes of five species of tapeworms originate from Finland: *Schistocephalus cotti*, *Paranoplocephala jarrelli* Haukisalmi, Henttonen & Hardman, 2006, *P. kalelai* (Tenora, Haukisalmi & Henttonen, 1985), *Catenotaenia benttoneni* Haukisalmi & Tenora, 1993 and *Taenia arctos* Haukisalmi, Lavikainen, Laaksonen & Meri, 2011 (see Checklist for collection numbers). The MZH collection also includes a slide of *Bothrimononus nylandicus* Schneider, 1902 from Finland that is marked by Guido Schneider as “typ-ex”, although he did not designate a type specimen in his publication (Schneider 1902a). The date and locality of the specimen match with those given in the original description. Therefore, this specimen is identified as the holotype of *B. ny-
Table 1. The number of tapeworm species in various bird orders in the Iberian Peninsula (Spain and Portugal), Slovakia, Poland, and Finland. For source references, see Materials and methods. If a tapeworm species occurs in more than one bird order, it has been excluded from the data.

| Order           | Iberian Peninsula | Slovakia | Poland | Finland |
|-----------------|-------------------|----------|--------|---------|
| Anseriformes    | 15                | 55       | 65     | 34      |
| Galliformes     | 12                | 10       | 9      | 3       |
| Gaviiformes     | -                 | -        | 3      | 6       |
| Podicipediformes| 2                 | 10       | 17     | 5       |
| Pelecaniformes  | -                 | -        | 2      | 1       |
| Ciconiiformes   | 2                 | 6        | 6      | -       |
| Accipitridiformes| -                 | 1        | 4      | 1       |
| Gruiformes      | 3                 | 6        | 2      | 1       |
| Charadriiformes | 32                | 18       | 32     | 18      |
| Phoenicopteriformes| -                 | -        | 3      | -       |
| Columbiformes   | 10                | 1        | -      | 1       |
| Strigiformes    | 1                 | -        | -      | 1       |
| Caprimulgiformes| 1                 | -        | -      | -       |
| Apodiformes     | 6                 | -        | 1      | 2       |
| Coraciiformes   | 1                 | -        | -      | -       |
| Piciformes      | -                 | 1        | 2      | 3       |
| Passeriformes   | 23                | 28       | 21     | 14      |
Figure 2. The geographical distribution of tapeworms of the field vole Microtus agrestis in Fennoscandia. All species except *Hymenolepis* (s.l.) *asymmetrica* (Hymenolepididae) represent the family Anoplocephalidae. Grey symbols, species absent; black symbols, species present. The number of voles examined for helminths in each locality varies considerably, but is usually more than ten (several hundred in Kilpisjärvi and Pallasjärvi in western Finnish Lapland).
Bothrimonus nylandicus is presently considered a junior synonym of Diplocoyle olrikii Krabbe, 1874 (see Burt and Sandeman 1969). In addition, two specimens in ethanol, clearly representing previously unknown syntypes of Caryophyllaeides fennica (Schneider, 1902) from Finland (MZH 127097), were located in the MZH collection (see Schneider 1902b).

Discussion

General characteristics of the tapeworm fauna of mammals in Finland

This section describes various features of the tapeworm fauna of shrews, rodents (particularly voles and lemmings) and carnivores in Finland. The mammalian tapeworms are among the most extensively studied parasites in Finland, and practically all of them have been subject to molecular systematic analysis of some form. By contrast, evidently no published DNA sequence data exist for tapeworms of fishes and birds from Finland, with the exception of Caryophyllaeides fennica (see Brabec et al. 2012, Scholz et al. 2014), Diphyllobothrium ditremum and D. latum (see Wicht et al. 2010).

One of the main patterns emerging from the present data is the seemingly unexplained absence in (northern) Fennoscandia of several mammalian tapeworms that have extensive distributions in the Holarctic region or in Eurasia.

Shrews

There are six species of shrews (Soricidae) in Finland, five species of Sorex and the water shrew Neomys fodiens. According to the present checklist, Sorex shrews have 15 species of tapeworms, most of them hymenolepidids, parasitizing shrews in the adult stage [this figure excludes Dilepis undula (Schrank, 1788) and Polycercus sp., parasites of birds that do not reach full size and maturity in shrews]. The smaller and scarcer species of Sorex shrews (S. minutus with 6 species, S. caecutiens with 12 species) have more depauperate tapeworm assemblages than the larger ones, particularly when compared with the numerically dominant S. araneus (with 15 species) (see also Haukisalmi 1989). However, their faunas are overlapping in the sense that all the tapeworms of the smaller shrews also parasitize the larger ones. The only (partial) deviation to this pattern may be Staphylocystoides stefanski (Żarnowski, 1954), which has been found most frequently from the pygmy shrew S. minutus in Finland (one record from S. araneus). On the other hand, S. stefanski is known to parasitize six species of Sorex in Eurasia (Binkienė et al. 2011). The tapeworm fauna of the smallest and scarcest Sorex species, the least shrew S. minutissimus, is unknown in Finland.

The tapeworm fauna of Sorex shrews in Finland is very similar to that found elsewhere in Europe and western Eurasia. In Europe, there are only two species that have not been found from Finland, that is, Skrjabinacanthus jacutensis Spasskii & Morozov,
1959 and *Soricinia soricis* (Baer, 1928). *Skrjabinacanthus jacutensis* is a rare parasite of *Sorex* shrews with an extensive but very patchy distribution in Eurasia (Binkienė et al. 2011). It is possible that it occurs in Finland, but has not been found yet because of its rarity. The apparent absence of *S. soricis* in Finland may be due to the fact that it has been confused with *Soricinia infirma* (Żarnowski, 1955) (see Karpenko 1999).

Among the tapeworms of *Sorex* shrews, only *Spaskylepis ovaluteri* Schaldybin, 1964 can be regarded as a northern species; according to Binkienė et al. (2011) it has not been reported further south than Belarus in Europe, and it seems to have a northern distribution also elsewhere in Eurasia.

The molecular systematic analysis of Haukisalmi et al. (2010b) indicated that there is a *Ditestolepis* species in the taiga shrew *Sorex isodon* in Finland that is distinct from the type species *Ditestolepis diaphana* (Cholodkovsky, 1906) and related species representing other genera. Because there should not be other *Ditestolepis* species in Europe or western Eurasia (Binkienė et al. 2011), the cestode from *S. isodon* may be a previously unknown species. Alternatively, it may one of the poorly known *Ditestolepis* species described from Japan (see the Global Cestode Database; Caira et al. 2012).

The water shrews of the genus *Neomys* have an almost entirely separate tapeworm fauna when compared with the genus *Sorex*, although there is a number of scattered records of *Sorex* tapeworms parasitizing *Neomys* shrews (Binkienė et al. 2011). The tapeworm fauna of *Neomys fodiens* and *N. anomalus* in Europe comprise 15 species, all of them hymenolepidids (Binkienė et al. 2011, 2015), whereas only two tapeworm species are known from *N. fodiens* in Finland. One of these is typically a parasite of *Sorex* shrews [*Vigisolepis spinulosa* (Cholodkovsky, 1906)], and the other (*Polycercus* sp.) is a parasite of birds that accidentally infects shrews and other mammals (reported also from the raccoon dog *Nyctereutes procyonoides* in the present checklist). The specific identity of *V. spinulosa* from the water shrew has been confirmed by DNA sequences (Haukisalmi et al. 2010b).

The apparent absence of host-specific tapeworms of *Neomys* in Finland could be due to biased sampling of water shrews and restricted distribution of freshwater amphipod crustaceans (Segerstråle 1954), the intermediate hosts of tapeworms of water shrews (Georgiev et al. 2006). The absence of host-specific tapeworms in *Neomys* in Finland seems to follow the general pattern for other parts of the northern Europe (Binkienė et al. 2011). Binkienė et al. (2011) suggested that the reason for the absence or extreme rarity of host-specific tapeworms in *Neomys* in the north is the low abundance of the definitive hosts. However, the restricted/patchy distribution of the amphipod intermediate hosts and their low numbers in the diet of water shrews seems to be an equally plausible explanation.

**Rodents (voles and lemmings)**

Finland has a relatively diverse fauna of arvicoline rodents (Cricetidae), consisting of nine species of voles, including the introduced muskrat *Ondatra zibethicus*, and two species of lemmings.
In Finland, voles and lemmings have ten species of tapeworms parasitic in the adult stage, eight of them anoplocephalids, one catenotaeniid and one hymenolepidid cestode. The Finnish/northern European tapeworm fauna of arvicoline rodents can be classified into three main types: “endemics” of northernmost Europe (two species), species with a Holarctic distribution (one species) and species with extensive European/western Eurasian distribution (seven species).

*Paranoplocephala kalelai* (Tenora, Haukisalmi & Henttonen, 1985) and *Lemminia fellmani* (Haukisalmi & Henttonen, 2001), parasitizing voles of the genus *Myodes* (particularly the grey-sided vole *M. rufocanus*) and the Norwegian lemming *Lemmus lemmus*, respectively, appear to have distributions restricted to northern Fennoscandia. Based on the present knowledge, these species could be classified as the only endemic tapeworms of northern Europe.

The restricted distribution of *P. kalelai* seems curious, because its primary definitive host (*M. rufocanus*) has a continent-wide distribution in northern Eurasia. It is possible that *P. kalelai* has been misidentified in earlier studies. For example, the extensive faunistical study of mammalian helminths in the north-west of the Ural mountains (Yushkov 1995) lists *Aprostatandrya macrocephala* (Douthitt, 1915), *A. caucasica* (Kirshenblat, 1938) and *Paranoplocephala omphalodes* (Hermann, 1783) as parasites of the grey-sided vole [the valid name of *A. macrocephala* is *Paranoplocephala macrocephala* (Douthitt, 1915) and *A. caucasica* is considered a junior synonym of *P. omphalodes*; see Haukisalmi et al. 2014]. Of these species, *P. macrocephala* is morphologically rather similar to *P. kalelai* (see Tenora et al. 1985a, Haukisalmi et al. 2007) and may have been confused with the latter. It is now known that *P. macrocephala* has a strictly North American distribution, parasitizing voles of the genus *Microtus* and geomyid rodents there (Haukisalmi and Henttonen 2003, Haukisalmi et al. 2004), although this name still appears as a parasite of arvicoline rodents in Eurasia. Thus, the true distribution of *P. kalelai* remains to be verified, but, based on the collections of the Beringian Coevolution Project (Hoberg et al. 2003, Cook et al. 2005), it does not occur in *M. rufocanus* in easternmost Siberia (Chukotka Peninsula and adjacent regions).

If the restricted northern distribution of *P. kalelai* is found to be real, this would support the idea that *P. kalelai* has diverged as a result of a host shift from a northern European *Microtus* lineage (most likely *M. oeconomus*) to the Fennoscandian subclade of *M. rufocanus* after its divergence from the Siberian *M. rufocanus* populations (Cook et al. 2004, Haukisalmi et al. 2007). This scenario is supported by two phylogenetic/phylogeographic analyses on tapeworms of the genus *Paranoplocephala* (see Haukisalmi et al. 2004, 2007).

*Lemminia fellmani* is known only from the Norwegian lemming *L. lemmus* (a Fennoscandian endemic) from the mountains of southern Norway (Finse, type locality) and from northern Finland (Lapland) (Haukisalmi and Henttonen 2001). However, a morphologically and genetically related, congeneric cestode occurs in *Lemmus trimucronatus* is Alaska (Haukisalmi et al. 2010b), but it is uncertain if it is conspecific with *L. fellmani*. No tapeworms have been found from the wood lemming *Myopus schisti-
color in Finland, although *Lemminia gubanovi* (Gulyaev & Krivopalov, 2003) occurs in this host in eastern Siberia (Gulyaev and Krivopalov 2003).

*Paranoplocephala jarrelli* Haukisalmi, Henttonen & Hardman, 2006 is known to parasitize the tundra/root vole *Microtus oeconomus* (and accidentally other *Microtus* species) from northern Finland to Alaska (Haukisalmi et al. 2004), therefore being the only tapeworm of Finnish rodents to have a Holarctic distribution, with the possible exception of *L. fellmani* (above). The conspecificity of *P. jarrelli* populations in northern Finland, Hungary, the Russian Far East (Magadan) and Alaska has been verified by molecular methods (Haukisalmi et al. 2004).

Among the seven Finnish rodent tapeworms with an extensive European/western Eurasian distribution, *Anoplocephaloides* cf. *dentata* (Galli-Valerio, 1905), *Microcephaloides* cf. *variabilis* (Douthitt, 1915), *Microticola blanchardi* (Moniez, 1891), *Paranoplocephala omphalodes* (Hermann, 1783) and *Hymenolepis* (s.l.) *asymmetrica* Janicki, 1904 are primarily parasites of *Microtus* voles, *Catenotaenia henttoneni* is a parasite of *Myodes* voles (*M. glareolus* and *M. rutilus*) and *Eurotaenia gracilis* (Tenora & Murai, 1980) is a host-generalist parasite of voles and lemmings.

Present data for the geographical distribution of tapeworms of the field vole *Microtus agrestis* in Fennoscandia (Fig. 2) show that the range of *A. cf. dentata*, *M. cf. variabilis*, *M. blanchardi* and *E. gracilis* extends to the northernmost Fennoscandia, whereas *P. omphalodes* and *H. asymmetrica* are absent from the truly northern regions. Of the latter two species, *P. omphalodes* has a more northerly distribution than *H. asymmetrica*. The absence of these species from northernmost Finland is primarily based on nearly 40 years’ monitoring of arvicoline rodents and their helminths in western Finnish Lapland by H. Henttonen and coworkers, although extensive helminth datasets have been gathered also from other northern localities in Finland. The absence of these two species from the north seems peculiar, because their main definitive host (*M. agrestis*) occurs in the whole of the Fennoscandia, and is often the numerically dominant rodent species in open habitats throughout its range (Myllymäki et al. 1977).

It is noteworthy that no tapeworms of the genus *Arostrilepis* Mas-Coma & Tenora, 1997 (Hymenolepididae) have been reported from Finland or elsewhere from Fennoscandia, except for the finding of *A. horrida* (von Linstow, 1901) from the bank vole *M. glareolus* from southern Norway (Baruš et al. 1977) and Russian Karelia (Mozgovoj et al. 1966). *Arostrilepis* species are ubiquitous parasites of arvicolines (and sporadically other rodents) in the Holarctic region, their range encompassing the central and southern Europe. Of the 12 valid species of *Arostrilepis*, at least eight occur in Eurasia (see the Global Cestode Database; Caira et al. 2012).

Another Holarctic tapeworm species evidently missing from Fennoscandia is *Anoplocephaloides lemmi* (Rausch, 1952), a parasite of lemmings of the genus *Lemmus* in northern Siberia and North America. The absence of this species seems real, because hundreds of Norwegian lemmings have been examined for helminths in Finnish Lapland and southern Norway by H. Henttonen and coworkers. It is hard to propose any general explanation for the absence of *Arostrilepis* species in most of Fennoscandia, but the absence of *A. lemmi* and another host-specific, Holarctic tapeworm species of *Lem-
mus spp. [Arostrilepis beringiensis (Kontrimavichus & Smirnova, 1991)] may be the result of the severe population bottle-neck experienced by L. lemmus in Fennoscandia during the the last glacial maximum (Fedorov and Stenseth 2001, Haukisalmi and Henttonen 2001, Haukisalmi et al. in press).

Hymenolepis diminuta (Rudolphi, 1819) (a parasite of Rattus spp.) and H. hibernia Montgomery, Montgomery & Dunn, 1987 (a parasite of Apodemus spp.) may also be listed as “missing” species, although there do not exist extensive helminthological studies for rats in Finland. The unverified record of H. “diminuta” from Apodemus flavicollis (Raitis 1968; no voucher specimen exists), may, however, represent the latter tapeworm species.

Carnivores

There are 14 species of terrestrial carnivores in Finland. The present study lists 17 tapeworm species parasitizing carnivores in the adult stage, Taeniidae (nine species) being the dominant element of the fauna. However, the taeniid fauna of Finnish carnivores should also include two additional species, Taenia martis and Versteria mustelae (parasites of mustelids), which have been found so far only as metacestodes from rodents. The metacestode of the latter species has also been found unexpectedly from the otter Lutra lutra. There are no published studies on tapeworms of mustelids in Finland.

Five of the Finnish carnivore tapeworms [Dipylidium caninum (Linnaeus, 1758), Taenia solium (Linnaeus, 1758), Echinococcus equinus, E. granulosus s.s., E. multilocularis Leuckart, 1863] are clearly imported parasites that are not transmitted in Finland. The identification of recent imported infections of taeniid metacestodes in humans is based on DNA sequences (Lavikainen 2005, A. Lavikainen, unpubl.).

Echinococcus multilocularis is one of the tapeworm species that is mysteriously absent from Finland, although it has a Holarctic distribution and the definitive hosts (red fox Vulpes vulpes and other canids, including the raccoon dog) and intermediate hosts (rodents) are present in Finland. In addition, Taenia crassiceps (Zeder, 1800), a parasite of foxes that occurs basically throughout the Holarctic region, has not been found in Finland despite very extensive long-term studies on helminths of rodents (intermediate hosts of T. crassiceps) in Finland (H. Henttonen et al., unpublished). The absence of E. multilocularis and T. crassiceps may due to the fact that the density of the red fox, their primary definitive host, is below an (unknown) critical density for successful transmission of the parasite, and/or due to the pronounced density fluctuations of arvicoline rodents in Finland (Henttonen and Haukisalmi 2000). However, E. multilocularis has recently appeared in Denmark and Sweden (Kapell and Saeed 2000, Osterman Lind et al. 2011, Wahlström et al. 2012), and is predicted to spread to Finland as well.

Taenia pisiformis, with canids (including dog) as definitive hosts and hares as intermediate hosts, has evidently disappeared from Finland. In the 1940–50s, T. pisiformis was still a very common parasite in the country, known as the “bladder worm disease” of hares (Lampio 1946, 1950). However, no metacestodes of T. pisiformis were found
Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates...

from hares in early 1980s (Soveri and Valtonen 1983), and a recent survey of *Taenia* tapeworms in wolves from Finland and Sweden based on molecular identification (Lavikainen et al. 2011) also failed to find it. It is clear that the hunters’ awareness of the transmission of the parasite (hare offal should not be fed to dogs) and anthelmintic treatment of hunting dogs have played a major role in the disappearance of this parasite, but do not completely explain it, because suitable wild hosts are still numerous in Finland.

Recently, molecular methods have had a revolutionary impact on taeniid systematics. For example, the application of DNA based methods has enabled distinction of more or less cryptic, new species of *Taenia*, including *T. arctos*, a parasite of bears (definitive host) and cervids (intermediate hosts) in Finland, Alaska and Canada (Haukisalmi et al. 2011, Catalano et al. 2014). *Taenia arctos* had previously been confused with other *Taenia* species, mainly with *Taenia krabbei* Moniez, 1879, but it was found to be a genetically and biologically distinct entity (Lavikainen et al. 2010). Recently, another new species of *Taenia*, with the lynx (*Lynx lynx*) as a definitive host and cervids as intermediate hosts, has been found in Finland based on the molecular identification of adults and metacestodes (V. Haukisalmi, A. Lavikainen et al., unpubl.).

**Tapeworm diversity in different parts of Europe**

One of the main patterns emerging from the present checklist and associated comparisons is that the tapeworm fauna of vertebrates in Finland is significantly less speciose than the corresponding fauna in other parts of Europe. The difference is mainly due to the low number of bird tapeworms in Finland.

Such a pronounced difference may be a real one or due to a number of confounding factors, including differences in latitude, available habitats (freshwater, marine, montane etc.), the number of host species present and the proportion of host species examined (adequately) for tapeworms. It is not possible to determine how these factors (interactively) determine the variation in tapeworm diversity in Europe, but the last factor probably explains most of the variation.

First, most of the tapeworms of vertebrates considered here have a wide European or western Eurasian (or more extensive) distribution, and are expected to occur in Fennoscandia, provided that their definitive and intermediate hosts are present. Therefore, latitude alone should not explain the differences in tapeworm diversity among regions. The availability of habitats is not a sufficient explanation either, because Finland is a long country stretching from the Baltic Sea (Gulf of Finland) to near the Arctic Ocean, and freshwater habitats (including thousands of lakes) are ubiquitous. Semi-montane landscape prevails in northern Finland (Lapland). The number of vertebrate host species certainly affects tapeworm diversity, and the high overall tapeworm diversity in the Iberian Peninsula is probably partly explained by this factor. However, there are no marked differences in vertebrate diversity between Slovakia, Poland and Finland, except that there are slightly fewer species of fishes and water birds in Slovakia because of the absence of marine habitats.
These patterns favour the idea that low tapeworm diversity in Finland is mainly due to insufficient sampling of vertebrates, particularly anseriform, podicipediform, charadriiform and passeriform birds. The tapeworm fauna of Poland, which is among the best known in Europe (Pojmańska et al. 2007), forms the most suitable model when predicting the true number of tapeworm species in Finland. The diversity of vertebrates is roughly equal in Poland and Finland, and there are no major faunistical differences either. In addition, Poland and Finland are both situated on the Baltic sea.

The tapeworms of fishes and mammals in Finland are relatively well known and the number of tapeworm species in these hosts is taken as such. In Poland, there are 172 species of tapeworms in birds, which is taken as the predicted number for the Finnish fauna. Based on this method, there should be ca. 270 species of tapeworms in Finland, instead of the 170 species listed in the present study.

Acknowledgements

I acknowledge the following persons for providing tapeworms, intestines or intact hosts from Finland: Heikki Henttonen, Antti Lavikainen, Antti Oksanen, Marja Isomursu, Jukka Niemimaa, Juha Laakkonen, Janne Sundell, Paavo Hellstedt, Eva Kallio, Ilpo K. Hanski, Ari Puolakoski and Netta Lempiäinen. Besides collecting a very large number of specimens, H. Henttonen has played a crucial role in research concerning the fauna and ecology of helminths of small mammals in Finland (and elsewhere). Rolf A. Ims and Nigel Yoccoz provided field voles from northeren Norway, and Maarit Jaarola kindly allowed me to use her extensive collections of field voles from Sweden. Lotta M. Hardman, Michael Hardman and Jarkko Hantula performed many of the existing molecular phylogenetic analyses on tapeworms of Finnish rodents; Lotta is thanked also for guiding me patiently into the mysterious world of DNA and phylogenetics. I have enjoyed collaboration with A. Lavikainen, who has made pioneering research on the fauna and molecular systematics of tapeworms of Finnish carnivores and humans. Hans Silfverberg, E. Tellervo Valtonen, Seppo Saari and A. Lavikainen are acknowledged for help with the literature pertaining to the Finnish cestode fauna. Varpu Vahtera gave invaluable help with the tapeworm collection of the Zoological Museum of the University of Turku. I am also indebted to the late František Tenora, who was first to study the helminths of rodents in Finland (with H. Henttonen and the present author) and who introduced us to the fascinating world of tapeworm systematics. Ian Beveridge, Heikki Henttonen, Roman Kuchta, Arseny Makarikov and Gergana Vasileva provided helpful comments on the manuscript.

References

Abuladze KI (1964) Taeniata of animals and man and diseases caused by them (English translation). Nauka, Moscow, 549 pp.
Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates...

Andersen KI, Valtonen ET (1990) On the infracommunity structure of adult cestodes in freshwater fishes. Parasitology 101: 257–264. doi: 10.1017/S0031182000063319

Anikanova VS, Bugmyrin SV, Ieshko EP (2007) Metody sbora i izucheniya gel’mintov melkh mlekopitayuschih [Methods for collection and study of helminths in small mammals]. Karelskii Nauchnyi Centr RAN, Petrozavodsk, 145 pp.

Baruš V, Tenora F, Wiger R (1977) Further occurrence of some helminths in Rodentia and Insectivora from Fennoscandia. Folia Parasitologica 24: 127–128.

Beveridge I (1978) A taxonomic revision of the genera Citottaenia Riehm, 1881, Ctenotaenia, Railliet, 1893, Mosgovoyia Spasskii, 1951 and Pseudocitottaenia Tenora, 1976. (Cestoda: Anoplocephalidae). Mémoires du Muséum National d’Histoire Naturelle, Série A, Zoologie 107: 1–64.

Binkienė R, Kontrimavichus V, Hoberg EP (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: 207–228. doi: 10.2478/s11687-011-0031-5

Binkienė R, Kornienko SA, Tkach VV (2015) Soricinia genovis n. sp. from Neomys fodiens in Bulgaria, with redescription of Soricinia globosa (Baer, 1931) (Cyclophyllidea: Hymenolepididae). Parasitology Research 114: 209–218. doi: 10.1007/s00436-014-4180-6

Brabec J, Scholz T, Kralova-Hromadova I, Bazsalovicsova E, Olson PD (2012) Substitution saturation and nuclear paralogs of commonly employed phylogenetic markers in the Caryophyllidea, an unusual group of non-segmented tapeworms (Platyhelminthes). International Journal for Parasitology 42: 259–267. doi: 10.1016/j.ijpara.2012.01.005

Brügelz J, Valtonen ET (1986) Hymenolepidid cestodes of ducks from the island of Hailuoto in the Bay of Bothnia. In: 28. International Symposium über die Erkrangungen der Zootiere, Rostock (Germany), April-May 1986. Akademie-Verlag, Berlin, 123–128.

Bugmyrin SV, Ieshko EP, Anikanova VS, Bespyatova LA (2003) K faune parazitov melkh mlekopitayuschih nationalnych parkov “Paanayarvi”, “Oulanka” [On the fauna of parasites of small mammals in the national parks Paanajärvi and Oulanka]. In: Priroda natsionalnogo parka “Paanayarvi”. Petrozavodsk, 97–101.

Burr MDB, Sandeman IM (1969) Biology of Bothriocephalus (=Diplocotyle) (Pseudophyllidea: Cestoda). Part I. History, description, synonymy, and systematics. Journal of the Fisheries Research Board of Canada 26: 975–997. doi: 10.1139/f69-095

Caira JN, Jensen K, Barbeau E (2012) Global Cestode Database. World Wide Web electronic publication. http://tapewormdb.uconn.edu/

Catalano S, Lejeune M, Verocai GG, Duignan PJ (2014) First report of Taenia arctos (Cestoda: Taeniidae) from grizzly (Ursus arctos horribilis) and black bears (Ursus americanus) in North America. Parasitology International 63: 389–391. doi: 10.1016/j.parint.2013.12.012

Chubb JC, Seppälä T, Luscher A, Milsinski M, Valtonen ET (2006) Schistocephalus cotti n. sp. (Cestoda : Pseudophyllidea) plerocercoids from bullheads Cottus gobio L. in an Arctic river in Finland, with a key to the plerocercoids of the Palaearctic species of the genus. Systematic Parasitology 65: 161–170. doi: 10.1007/s11230-006-9047-5

Chubb JC, Valtonen ET, McGeorge J, Helle E (1995) Characterisation of the external features of Schistocephalus solidus (Mueller, 1776) (Cestoda) from different geographical regions.
and an assessment of the status of the Baltic ringed seal *Phoca hispida botnica* (Gmelin) as a definitive host. Systematic Parasitology 32: 113–123. doi: 10.1007/BF00009510

Cook JA, Hoberg EP, Koehler A, Henntonen H, Wickström L, Haukisalmi V, Galbrequh K, Chernyavski F, Dokuchaev N, Lahzukhtkin A, MacDonald SO, Hope A, Waltari E, Runck A, Veitch A, Popko R, Jenkins E, Kutz S, Eckerlin R (2005) Beringia: Intercontinental exchange and diversification of high latitude mammals and their parasites during the Pliocene and Quaternary. Mammal Study 30: S33–S44. doi: 10.3106/1348-6160(2005)30[33:bi eado]2.0.co;2

Cook JA, Runck AM, Conroy CJ (2004) Historical biogeography at the crossroads of the northern continents: molecular phylogenetics of red-backed voles (Rodentia: Arvicolinae). Molecular Phylogenetics and Evolution 30: 767–777. doi: 10.1016/S1055-7903(03)00248-3

Cordero del Campillo M, Castañón Ordóñez L, Reguera Feo A (1994) Índice-Catálogo de Zooparásitos Ibéricos. Universidad de León, León, 650 pp.

Deksne G, Laakkonen J, Näreaho A, Jokelainen P, Holmala K, Kojola I, Sukura A (2013) Endoparasites of the Eurasian Lynx (*Lynx lynx*) in Finland. Journal of Parasitology 99: 229–234. doi: 10.1645/GE-3161.1

Dickinson EC, Christidis L (2014) The Howard and Moore complete checklist of the birds of the world. 4th edition, vol. 2, Passerines. Aves Press, Eastbourne, UK, 752 pp.

Dickinson EC, Remsen JVJ (2013) The Howard and Moore complete checklist of the birds of the world. 4th edition, vol. 1, Non-passerines. Aves Press, Eastbourne, UK, 461 pp.

Fagerlund (1890) Ett fall af echinococcus. Utdrag ur protokollen förda vid Finska Läkaresällskapets sammanträden den 4 oktober 1890. Finska Läkaresällskapets Handlingar 32: 744.

Faltin R (1914) Ett fall af lefverechinococcus. Finska Läkaresällskapets Handlingar 57: 279–288.

Fedorov VB, Stenseth NC (2001) Glacial survival of the Norwegian lemming (*Lemmus lemmus*) in Scandinavia: inference from mitochondrial DNA variation. Proceedings of the Royal Society of London - Series B: Biological Sciences 268: 809–814. doi: 10.1098/rspb.2001.1584

Freeman RS (1964a) Helminth parasites of the red fox in Finland 1963–1964. In: 1. International Congress of Parasitology, Rome (Italy), September 1964. Pergamon Press, London, 482.

Freeman RS (1964b) Leveä heisimato ja trikiini luonnonvaraisissa ketuissa Suomessa. Suomen eläinlääkärilehti 70: 279–282.

Froese R, Pauly D (2015) FishBase. www.fishbase.org

Georgiev BB, Bray RA, Littlewood DT (2006) Cestodes of small mammals: Taxonomy and life cycles. In: Morand S, Krasnov BR, Poulin R (Eds) Micromammals and macroparasites. From evolutionary ecology to management. Springer-Verlag, Tokyo, 647. doi: 10.1007/978-4-431-36025-4_3

Gibson DI, Valtonen ET (1983) Two interesting records of tapeworms from Finnish waters. Aquilo Ser. Zoologica 22: 45–49.

Gulyaev VD, Krivopalov AV (2003) Novyj vid cestody Paranoplocephala gubanovi sp. n. (Cyclophyllidea: Anoplocephalidae) ot lesnogo lemminga Myopus schisticolor Vostochnoj Sibiri [A new cestode species Paranoplocephala gubanovi sp. n. (Cyclophyllidea: Anoplocephalidae) from *Myopus schisticolor* from East Siberia]. Parazitologiya 37: 488–495.
Hanzelová V, Ryšavý B (1996) Synopsis of cestodes in Slovakia IV. Hymenolepidae (continued). Helminthologia 33: 213–222.
Hanzelová V, Ryšavý B (1999) Synopsis of cestodes in Slovakia V. Dilepididae, Dipyldidae and Paruterinidae. Helminthologia 36: 111–117.
Hanzelová V, Ryšavý B, Šnábel V (1995) Synopsis of cestodes in Slovakia III. Cyclophyllidea: Amabiliidae, Acoleidae, Catenotaeniidae, Davaineidae and Hymenolepidae (in part). Helminthologia 32: 67–73.
Haukisalmi V (1986) Frequency distributions of helminths in microtine rodents in Finnish Lapland. Annales Zoologici Fennici 23: 141–150.
Haukisalmi V (1989) Intestinal helminth communities of Sorex shrews in Finland. Annales Zoologici Fennici 26: 401–409.
Haukisalmi V (2009) A taxonomic revision of the genus *Anoplocephaloides* Baer, 1923 sensu Rausch (1976), with the description of four new genera (Cestoda: Anoplocephalidae). Zootaxa 2057: 1–31.
Haukisalmi V, Hardman LM, Fedorov VB, Hoberg EP, Henttonen H (in press) Molecular systematics and Holarctic phylogeography of cestodes of the genus *Anoplocephaloides* Baer, 1923 s. s. (Cyclophyllidea, Anoplocephalidae) in lemmings (*Lemmus, Synaptomys*). Zoologica Scripta.
Haukisalmi V, Hardman LM, Foronda P, Feliu C, Henttonen H (2010a) Systematic relationships of *Mosgovoyia* Spasskii, 1951 (Cestoda: Anoplocephalidae) and related genera inferred from mitochondrial and nuclear sequence data. Systematic Parasitology 77: 71–79. doi: 10.1007/s11230-010-9264-9
Haukisalmi V, Hardman LM, Foronda P, Feliu C, Laakkonen J, Niemimaa J, Lehtonen JT, Henttonen H (2010b) Systematic relationships of hymenolepidid cestodes of rodents and shrews inferred from sequences of 28S ribosomal RNA. Zoologica Scripta 39: 631–641. doi: 10.1111/j.1463-6409.2010.00444.x
Haukisalmi V, Hardman LM, Hardman M, Rausch RL, Henttonen H (2008) Molecular systematics of the Holarctic *Anoplocephaloides variabilis* (Douthitt, 1915) complex, with the proposal of *Microcephaloides* n. g. (Cestoda: Anoplocephalidae). Systematic Parasitology 70: 15–26. doi: 10.1007/s11230-008-9129-7
Haukisalmi V, Hardman LM, Henttonen H (2010c) Taxonomic review of cestodes of the genus *Catenotaenia* Janicki, 1904 in Eurasia and molecular phylogeny of the Catenotaeniidae (Cyclophyllidea). Zootaxa 2489: 1–33.
Haukisalmi V, Hardman LM, Henttonen H, Laakkonen J, Niemimaa J, Hardman M, Gubányi A (2009a) Molecular systematics and morphometrics of *Anoplocephaloides dentata* (Cestoda, Anoplocephalidae) and related species in voles and lemmings. Zoologica Scripta 38: 199–220. doi: 10.1111/j.1463-6409.2008.00363.x
Haukisalmi V, Hardman LM, Hoberg EP, Henttonen H (2014) Phylogenetic relationships and taxonomic revision of *Paranoplocephala* Lühe, 1910 sensu lato (Cestoda, Cyclophyllidea, Anoplocephalidae). Zootaxa 3873: 371–415. doi: 10.11646/zootaxa.3873.4.3
Haukisalmi V, Hardman LM, Niemimaa J, Henttonen H (2007) Taxonomy and genetic divergence of *Paranoplocephala kaielai* (Tenora, Haukisalmi & Henttonen, 1985) (Cestoda:
Anoplocephalidae) in the grey-sided vole Myodes rufocanus in northern Fennoscandia. Acta Parasitologica 52: 335–341. doi: 10.2478/s11686-007-0043-y
Haukisalmi V, Henttonen H (1993) Population dynamics of Taenia polyacantha metacestodes in the bank vole Clethrionomys glareolus. Annales Zoologici Fennici 30: 81–84.
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, Henttonen H (2001) Biogeography of helminth parasitism in Lemmus Link (Arvicolinae), with the description of Paranoplocephala fellmani n. sp. (Cestoda: Anoplocephalidae) from the Norwegian lemming L. lemmus (Linnaeus). Systematic Parasitology 49: 7–22. doi: 10.1023/A:1010778504559
Haukisalmi V, Henttonen H (2003) What is Paranoplocephala macrocephala (Douthitt, 1915) (Cestoda: Anoplocephalidae)? Systematic Parasitology 54: 53–69. doi: 10.1023/A:1022141809571
Haukisalmi V, Henttonen H, Hardman LM (2006) Taxonomy and diversity of Paranoplocephala spp. (Cestoda: Anoplocephalidae) in voles and lemmings of Beringia, with a description of three new species. Biological Journal of the Linnean Society 89: 277–299. doi: 10.1111/j.1095-8312.2006.00672.x
Haukisalmi V, Henttonen H, Hardman LM, Hardman M, Laakkonen J, Murueva G, Niemimaa J, Shulunov S, Vapalahti O (2009b) Review of tapeworms of rodents in the Republic of Buryatia, with emphasis on anoplocephalid cestodes. ZooKeys 8: 1–18. doi: 10.3897/zookeys.8.58
Haukisalmi V, Henttonen H, Pietiäinen H (1994) Helminth parasitism does not increase the vulnerability of the field vole Microtus agrestis to predation by the Ural owl Strix uralensis. Annales Zoologici Fennici 31: 263–269.
Haukisalmi V, Henttonen H, Tenora F (1987) Parasitism by helminths in the grey-sided vole (Clethrionomys rufocanus) in northern Finland: influence of density, habitat and sex of the host. Journal of Wildlife Diseases 23: 233–241. doi: 10.7589/0090-3558-23.2.233
Haukisalmi V, Lavikainen A, Laaksonen S, Meri S (2011) Taenia arctos n. sp. (Cestoda: Cyclophyllidea: Taeniidae) from its definitive (brown bear Ursus arctos Linnaeus) and intermediate (moose/elk Alces spp.) hosts. Systematic Parasitology 80: 217–230. doi: 10.1007/s11230-011-9324-9
Haukisalmi V, Tenora F (1993) Catenotaenia benttontenii sp. n. (Cestoda: Catenotaeniidae), a parasite of voles Clethrionomys glareolus and C. rutilus (Rodentia). Folia Parasitologica 40: 29–33.
Haukisalmi V, Wickström LM, Henttonen H, Hantula J, Gubányi A (2004) Molecular and morphological evidence for multiple species within Paranoplocephala omphalodes (Cestoda, Anoplocephalidae) in Microtus voles (Arvicolinae). Zoologica Scripta 33: 277–290. doi: 10.1111/j.0300-3256.2004.00148.x
Helminen M (1957) Piisamin rakkomadosta ja sen vaikutuksesta piisamikantaan. Turkis-Maailma 12: 11+18.
Henttonen H, Haukisalmi V (2000) Echinococcus multilocularis - ihmisen vaarallisin loinen Euroopassa: elämänkierto ja levinnesisyyden nykytilanne [Echinococcus multilocularis - lifecycle and an update of the current situation in Europe]. Suomen Riista 46: 48–56.
Hirvelä-Koski V, Haukisalmi V, Kilpelä S-S, Nylund M, Koski P (2003) Echinococcus granulosus in Finland. Veterinary Parasitology 111: 175–192. doi: 10.1016/S0304-4017(02)00381-3
Hoberg EP, Kutz SJ, Galbreath KE, Cook JA (2003) Arctic biodiversity: from discovery to faunal baselines - revealing the history of a dynamic ecosystem. Journal of Parasitology 89 (Suppl.): S84–S95.
Isomursu M, Helle P, Rätti O (2004) Metsäkanalintujen suolistoloismadot Suomessa [Intestinal helminths in Finnish grouse]. Suomen Riista 50: 90–100.
Jaarola M, Tegelström H (1995) Colonization history of north European field voles (Microtus agrestis) revealed by mitochondrial DNA. Molecular Ecology 4: 299–310. doi: 10.1111/j.1365-294X.1995.tb00223.x
Jaarola M, Tegelström H (1996) Mitochondrial DNA variation in the field vole (Microtus agrestis): regional population structure and colonization history. Evolution 50: 2073–2085. doi: 10.2307/2410764
Jaarola M, Tegelström H, Fredga K (1997) A contact zone with noncoincident clines for sex-specific markers in the field vole (Microtus agrestis). Evolution 51: 241–249. doi: 10.2307/2410977
Joyeux C, Baer JG (1936) Faune de France 30. Cestodes. Lechevalier, édit., 613 pp.
Jääskeläinen V (1910) Kalaloiset Laatokalta. Meddelanden af Societas pro Fauna et Flora Fennica 36: 55–56, 222–223.
Kapell CMO, Saeed I (2000) Echinococcus multilocularis - en ny zoonotisk parasit i Danmark. Dansk Veterinærtidsskrift 83: 14–16.
Karpenko SV (1999) Cestody roda Soricinia (Cyclophyllidae [sic], Hymenolepididae) ot zemleroek golarkiti [Cestodes of the genus Soricinia (Cyclophyllidae, Hymenolepididae) from Holarctic region shrews]. Zoologicheskii Zhurnal 78: 922–928.
Khalil LF, Jones A, Bray RA (1994) Keys to the cestode parasites of vertebrates. Commonwealth Agricultural Bureaux International, Wallingford, Oxfordshire, 751 pp.
Kirjušina M, Vismanis K (2007) Checklist of the parasites of fishes of Latvia. Food and Agriculture Organization of the United Nations, Rome, 106 pp.
Lahermaa G (1944) Koiran heisimato – jäniksen rakkulamato. Metsästys ja Kalastus 33: 83.
Lampio T (1946) Riistantaudit Suomessa vv. 1924–43 [Game diseases in Finland 1924–43]. Suomen Riista 1: 93–140.
Lampio T (1950) Rakkomadon esiintymisestä Suomessa 1900-luvulla. Metsästys ja Kalastus 39: 301–304.
Lavikainen A (2005) Ihmisen ekinokokkitauti Suomen, Ruotsin ja Norjan Lapissa. Suomen eläinlääkärilehti 111: 7–13.
Lavikainen A, Haukisalmi V, Deeks G, Holmala K, Lejeune M, Isomursu M, Jokelainen P, Närehko A, Laakkonen J, Hoberg E, Sukura A (2013) Molecular identification of Taeinia spp. in the Eurasian lynx (Lynx lynx) from Finland. Parasitology 140: 653–662. doi: 10.1017/S0031182012002120
Lavikainen A, Haukisalmi V, Lehtinen MJ, Henttonen H, Oksanen A, Meri S (2008) A phylogeny of members of the family Taeniidae based on the mitochondrial cox1 and nad1 gene data. Parasitology 135: 1457–1467. doi: 10.1017/S003118200800499X
Lavikainen A, Haukisalmi V, Lehtinen MJ, Laaksonen S, Holmström S, Isomursu M, Oksanen A, Meri S (2010) Mitochondrial DNA data reveal cryptic species within *Taenia krabbei*. Parasitology International 59: 290–293. doi: 10.1016/j.parint.2010.03.003

Lavikainen A, Laaksonen S, Beckmen K, Oksanen A, Isomursu M, Meri S (2011) Molecular identification of *Taenia* spp. in wolves (*Canis lupus*), brown bears (*Ursus arctos*) and cervids from North Europe and Alaska. Parasitology International 60: 289–295. doi: 10.1016/j.parint.2011.04.004

Lavikainen A, Lehtinen MJ, Laaksonen S, Ågren E, Oksanen A, Meri S (2006) Molecular characterization of *Echinococcus* isolates of cervid origin from Finland and Sweden. Parasitology 133: 565–570. doi: 10.1017/S0031182006000667

Lavikainen A, Lehtinen MJ, Meri T, Hirvelä-Koski V, Meri S (2003) Molecular genetic characterization of the Fennoscandian cervid strain, a new genotypic group (G10) of *Echinococcus granulosus*. Parasitology 127: 207–215. doi: 10.1017/S0031182003003780

Lemmetyinen R, Raitis T (1972) Occurrence of *Schistocephalus solidus* Creplin (Cestoidea; Dibothriocephalidae) in common and arctic terns in southern Finland. Annales Zoologici Fennici 9: 208–211.

Levander KM (1902) Iakttagelser om fiskars födoämnen och parasitmaskar i Kyrkslätt socken. B. Om förekomsten af parasitmaskar. Fiskeritidsskrift för Finland 11: 24–35.

Levander KM (1927a) Heisimatoja luotolaisen suoleessa. Metsästys ja Kalastus 16: 266.

Levander KM (1927b) Heisimatoja merimetsossa. Metsästys ja Kalastus 16: 453.

Levander KM (1927c) Rakkoka hauen maksassa. Kalastuslehti 34: 197–198.

Luther A (1908) Über *Triaenophorus robustus* Olsson und *Hemeguya zschokkei* Gurley als Parasiten von *Goregonus albula* aus dem See Sapsojärvi. Meddelanden af Societas pro Fauna et Flora Fennica 35: 58–59.

Macko JK, Ryšavý B, Hanzelová V, Králová I (1994) Synopsis of cestodes in Slovakia II. Cyclophyllidea: Mesocestoididae, Tetrabothriidae, Nematotaeniidae, Taeniidae. Helminthologia 31: 95–103.

Macko JK, Ryšavý B, Špakulová M, Králová I (1993) Synopsis of cestodes in Slovakia I. Cestodaria, Cestoidea: Caryophyllidea, Spathebothriidea, Pseudophyllidea, Proteocephalidea. Helminthologia 30: 85–91.

Makarikov A, Mel’nikova YA, Tkach VV (2015) Description and phylogenetic affinities of two new species of *Nomadolepis* (Eucestoda, Hymenolepididae) from Eastern Palearctic. Parasitology International 64: 453–463. doi: 10.1016/j.parint.2015.06.009

Matevosyan EM (1969) Paruterinoidei - lentochnye gel’minty domashnih i dikhikh ptic [Paruterinoidea - tapeworms of domesticated and wild birds]. Nauka, Moscow, 301 pp.

Merkusheva IV, Bobkova AF (1981) Gel’minty domashnih i dikhikh zhivotnyh Belarussii [Helminths of domesticated and wild animals in Belarus]. Nauka i Tehnika, Minsk, 120 pp.

Mozgovoj AA, Semenova MK, Mischenko RI, Cybatova SV (1966) K gel’mintofaune gryzunov i zajcev Karelii [On the helminthfauna of rodents and lagomorphs of Karelia]. Trudy Gel’mintologicheskoi Laboratorii, Akademiya Nauk SSSR 17: 95–103.

Myllymäki A, Christiansen E, Hansson I. (1977) Five-year surveillance of small mammal abundance in Scandinavia. EPPO Bulletin 7: 385–396. doi: 10.1111/j.1365-2338.1977.tb02737.x

Nakao M, Lavikainen A, Iwaki T, Haukisalmi V, Konyaev S, Oku Y, Okamoto M, Ito A (2013) Molecular phylogeny of the genus *Taenia* (Cestoda: Taeniidae): Proposals for the
resurrection of *Hydatigera* Lamarck, 1816 and the creation of a new genus *Versteria*. International Journal for Parasitology 43: 427–437. doi: 10.1016/j.ijpara.2012.11.014

Niemiaho A (1964) Teuraseläinten parasitooseista. Suomen eläinlääkkärilehti 70: 230–236.

Nygren K, Wallén M-L (2001) Hirvi tietosanakirja. Riista- ja kalatalouden tutkimuslaitos, 162 pp. Oksanen A, Lavikainen A (2015) *Echinococcus canadensis* transmission in the North. Veterinary Parasitology. doi: 10.1016/j.vetpar.2015.07.033

Oksanen HE (1972) Koiran endoparasiiteista. Suomen eläinlääkkärilehti 78: 457–463.

Osterman Lind E, Juremalm M, Christensson D, Widgren S, Hallgren G, Ågren EO, Uhlhorn H, Lindberg A, Cedersmyg M, Wahlström H (2011) First detection of *Echinococcus multilocularis* in Sweden, February to March 2011. Euro Surveillance 16: pii=19836. http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19836

Pippingsköld JAJ (1869) [Den första i Finland observerade *Taenia mediocanellata*]. Notisblad för Läkare och Pharmaceuter, 177–179.

Pojmańska T, Niewiadomska K, Okulewicz A (2007) Pasożytne helminty Polski. Gatunki żywiciele białe plamy. Polskie Towarzystwo Parazytologiczne, Warszawa, 360 pp.

Pulkkinen K, Valtonen ET (2012) Luokka heisimadot (Cestoda). In: Valtonen ET, Hakalahti-Sirén T, Karvonen A, Pulkkinen K (Eds) Suomen kalojen loiset. Gaudeamus Helsinki University Press, Helsinki, 540.

Pulkkinen M (1932) Lampaan heisimadon *Moniezia expansan* anatomiasta ja yleisimpien teuraseläin-cestodien esiintymisestä. MSc thesis, University of Helsinki, Helsinki, Finland.

Pullola T, Vierimaa J, Saari S, Virtala A-M, Nikander S, Sukura A (2006) Canine intestinal helminths in Finland: Prevalence, risk factors and endoparasite control practices. Veterinary Parasitology 140: 321–326. doi: 10.1016/j.vetpar.2006.04.009

Rahkio M, Korkela H (1989) Reindeer (*Rangifer tarandus*) meat inspection in Finland in 1980–1986. Suomen eläinlääkkärilehti 95: 13–20.

Raitis T (1968) Turun yliopiston eläintieteen laitoksen loiskokoelman pohjoismainen osa (Nordiska delen av den parasitsamling som ägs av zoologiska institutet vid Turun yliopisto). Tiedoksianto - Information (Suomen Tiedeseuran parasitologian laitos - Finska Vetenskaps-Societets parasitologiska institut) 8: 20–25.

Rausch RL (1976) The genera *Paranoplocephala* Lühe, 1910 and *Anoplocephaloides* Baer, 1923 (Cestoda: Anoplocephalidae), with particular reference to species in rodents. Annales de Parasitologie Humaine et Compérare 51: 513–562.

Reuter OM (1882) [*Taenia pectinata* lefvande fritt i harens peritonealhåla]. Meddelanden af Societas pro Fauna et Flora Fennica 9: 153–154, 164–165.

Saari S (1999) Koiraeisimato (*Dipylidium caninum*) – tuontikoirien tuliainen. Suomen eläinlääkkärilehti 99: 749–753.

Saari S, Nikander S (1992) *Anoplocephala perfoliata* – hevosellakin on heisimatoja. Suomen eläinlääkkärilehti 98: 604–608.

Saarma U, Jõgisalu I, Moks E, Varcasia A, Lavikainen A, Oksanen A, Simsek S, Andresiuk V, Denegri G, González LM, Ferrer E, Gárate T, Rinaldi L, Maravilla P (2009) A novel phylogeny for the genus *Echinococcus*, based on nuclear data, challenges relationships based on mitochondrial evidence. Parasitology 136: 317–328. doi: 10.1017/S0031182008005453

Saltzman F (1868) [no title]. Notisblad för Läkare och Pharmaceuter (Protokollden Finnschen Ärztegesellschraft vom 7/III. 1868)
Schneider G (1901) Ichtyologische Beiträge II. Fortsetzung der Notizen über die an der Südküste Finnlands vorkommenden Fische. Acta Societas pro Fauna et Flora Fennica 22(4): 1–58.
Schneider G (1902a) *Bothrimonus nylandicus* n. sp. Archiv für Naturgeschichte 68: 72–78, Table V.
Schneider G (1902b) *Caryophyllaeus fennicus* n. sp. Archiv für Naturgeschichte 68: 65–71, Table V.
Schneider G (1902c) Ichtyologische Beiträge III. Ueber in den Fischen des Finnischen Meerbusens vorkommenden Endoparasiten. Acta Societas pro Fauna et Flora Fennica 22(2): 1–88.
Schneider G (1904) Beiträge zur Kenntnis der Helminthenfauna des Finnischen Meerbusens. Acta Societas pro Fauna et Flora Fennica 26: 1–35.
Schneider G (1905) Die Ichthyotaenien des Finnischen Meerbusens. Festschrift für Palmén 8: 1–31.
Schneider G (1906) Darmparasiten des Luchses (*Felis lynx* L.). Meddelanden af Societas pro Fauna et Flora Fennica 31: 105–107.
Scholz T, Hanzelová V, Škeříková A, Shimazu T, Rolbiecki L (2007) An annotated list of species of the *Proteocephalus* Weinland, 1858 aggregate sensu de Chambrier et al. (2004) (Cestoda: Proteocephalidea), parasites of fishes in the Palaearctic Region, their phylogenetic relationships and a key to their identification. Systematic Parasitology 67: 139–156. doi: 10.1007/s11230-006-9089-8
Scholz T, Oros M, Bazsalovicsova E, Brabec J, Waeschenbach A, Xi BW, Aydogdu A, Besprozvannykh V, Shimazu T, Kralova-Hromadova I, Littlewood DT (2014) Molecular evidence of cryptic diversity in *Paracaryophyllaeus* (Cestoda: Caryophyllidea), parasites of loaches (Cyprinidae) in Eurasia, including description of *P. vladkae* n. sp. Parasitology International 63: 841–850. doi: 10.1016/j.parint.2014.07.015
Schulten A (1890) Ett fall af echinococcus. Protokoll fördat vid Finska Läkaresällskapets sammanträden den 29 mars 1890. Finska Läkaresällskapets Handlingar 32: 358.
Segerstråle SG (1954) The freshwater amphipods, *Gammarus pulex* (L.) and *Gammarus lacustris* G. O. Sars, in Denmark and Fennoscandia. A contribution to the late- and post-glacial immigration history of the aquatic fauna of northern Europe. Commentationes biologicae. Societas Scientiarum Fennica 15: 1–91.
Sievers R (1889) Om förekomsten av *Echinococcus*-sjukdomen i Finland. Finska Läkaresällskapets Handlingar 31: 937–941.
Sievers R (1903) Om förekomsten af *Taenia solium* (*Cysticercus cellulosae*) och andra plattmaskar i Finland. Finska Läkaresällskapets Handlingar 45: 595.
Sievers R (1905) Zur Kenntnis der Verbreitung von Darmparasiten des Menschen in Finnland. Festschrift für Palmén 10: 1–46.
Sinisalo T, Kunnasranta M, Valtonen ET (2003) Intestinal helminths of a landlocked ringed seal (*Phoca hispida saimensis*) population in eastern Finland. Parasitology Research 91: 40–45. doi: 10.1007/s00436-003-0893-7
Soveri T, Valtonen M (1983) Endoparasites of hares (*Lepus timidus* L. and *L. europaeus* Pallas) in Finland. Journal of Wildlife Diseases 19: 337–341. doi: 10.7589/0090-3558-19.4.337
Spasskaya LP (1966) Cestody ptic SSSR. Gimenolepididy [Cestodes of birds in the USSR. Hymenolepididae]. Nauka, Moscow, 698 pp.
Spasskaya LP, Spasskii AA (1977) Cestody ptic SSSR. Dilepididy suhoputnyh ptic [Cestodes of birds in the USSR. Dilepididae of terrestrial birds]. Nauka, Moscow, 300 pp.

Spasskaya LP, Spasskii AA (1978) Cestody ptic SSSR. Dilepididy limnofil’nyh ptic [Cestodes of birds in the USSR. Dilepididae of aquatic birds]. Nauka, Moscow, 313 pp.

Spasskii AA (1951) Anoplocephalate tapeworms of domestic and wild animals (English translation). The Academy of Sciences of the USSR, Moscow, 783 pp.

Spöring HD (1747) Berättelse om en qvinna, hos vilken ett stycke af binnikemasken kommit ut ur en bålde i liumsken. Kungliga Svenska Vetenskaps-Akademiens Handlingar 8: 103–112.

Tenora F, Haukisalmi V, Henttonen H (1985a) Andrya kalelai sp. n. and (?) Anoplocephaloides sp., Cestoda, Anoplocephalidae, parasites of Clethrionomys-rodents in Finland. Annales Zoologici Fennici 22: 411–416.

Tenora F, Haukisalmi V, Henttonen H (1986a) Cestodes of the genus Andrya Railliet, 1893 (Anoplocephalidae), parasites of rodents in Finland. Acta Universitatis Agriculturae, Brno 34: 219–227.

Tenora F, Haukisalmi V, Henttonen H (1986b) Cestodes of the genus Anoplocephaloides Baer, 1923 (Anoplocephalidae), parasites of rodents in Finland. Acta Universitatis Agriculturae, Brno 34: 213–217.

Valtonen ET (1986) Studies on hymenolepidid cestodes in tufted duck (Aythya fuligula) from the Hailuoto Island in the Bay of Bothnia. In: 28. International Symposium über die Erkrangungen der Zootiere, Rostock (Germany), April-May 1986. Akademie-Verlag, Berlin, 119–122.

Valtonen ET, Brglez J (1986) Studies on hymenolepidid cestodes in tufted duck (Aythya fuligula) from the Hailuoto Island in the Bay of Bothnia. In: 28. International Symposium über die Erkrangungen der Zootiere, Rostock (Germany), April-May 1986. Akademie-Verlag, Berlin, 119–122.

Valtonen ET, Brglez J (1988) A survey of the parasites of coregonids from three water bodies in Finland. Finnish Fisheries Research 9: 313–322.

Valtonen ET, Hakalahti-Sirén T, Karvonen A, Pulkkinnen K (Ed.) (2012) Suomen kalojen loiset [Parasites of fishes from Finland]. Gaudeamus Helsinki University Press, Helsinki, 540 pp.

Valtonen ET, Holmes JC, Koskivaara M (1997) Eutrophication, pollution and fragmentation: effects on the parasite communities in roach and perch in four lakes in central Finland. Canadian Journal of Fisheries and Aquatic Sciences 54: 572–585. doi: 10.1139/f96-306

Valtonen ET, Julkunen M (1995) Influence of the transmission of parasites from prey fishes on the composition of the parasite community of a predatory fish. Canadian Journal of Fisheries and Aquatic Sciences 52: 233–245. doi: 10.1139/f95-531
Valtonen ET, Pulkkinen K, Poulin R, Julkunen M (2001) The structure of parasite component communities in brackish water fishes of the northeastern Baltic Sea. Parasitology 122: 471–481. doi: 10.1017/S0031182001007491

Valtonen ET, Rintamäki P (1989) Occurrence of Proteocephalus percae and P. cernuae in the perch and ruff in northern Finland. Folia Parasitologica 36: 33–42.

Valtonen ET, Rintamäki P, Lappalainen M (1989) Trianenophorus nodulosus and T. crassus in fish from northern Finland. Folia Parasitologica 36.

Vaucher C (1971) Les Cestodes parasites des Soricidae d’Europe. Etude anatomique, révision taxonomique et biologie. Revue Suisse de Zoologie 78: 1–113. doi: 10.5962/bhl.part.97061

Wicht B, Ruggeri-Bernardi N, Yanagida T, Nakao M, Peduzzi R, Ito A (2010) Inter- and intra-specific characterization of tapeworms of the genus Diphyllobothrium (Cestoda: Diphyllobothriidea) from Switzerland, using nuclear and mitochondrial DNA targets. Parasitology International 59: 35–39. doi: 10.1016/j.parint.2009.09.002

Wickström LM, Haukisalmi V, Varis S, Hantula J, Henttonen H (2005) Molecular phylogeny and systematics of anoplocephaline cestodes in rodents and lagomorphs. Systematic Parasitology 62: 83–99. doi: 10.1007/s11230-005-5488-5

Wiger R, Lien L, Tenora F (1976) Studies of the helminth fauna of Norway XXXVIII: On helminths in rodents from Fennoscandia. Norwegian Journal of Zoology 24: 133–135.

Wikgren BJ (1964) Notes on the taxonomy and occurrence of plerocercoids of Diphyllobothrium dendriticum Nitzsch, 1824 and D. osmeri (v. Linstow, 1878). Commentationes biologicae. Societas Scientiarum Fennica 27(6): 1–26.

Wilson DE, Reeder DM (Eds) (2005) Mammal species of the world. A taxonomic and geographic reference (3rd ed), Johns Hopkins University Press, Baltimore, 2142 pp.

Yushkov VF (1995) Fauna evropejskogo severo-vostoka Rossii. Gel’minty mlekopitayuschih, Tom 3 [Fauna of the European North-West of Rossia. Helminths of Mammals, Volume 3]. Rossiiskaya Akademiya Nauk, Sankt Peterburg, 203 pp.

Appendix

Checklist of tapeworm species of vertebrates in Finland. Synonyms and misidentifications used in publications concerning the Finnish cestode fauna or in museum specimens have been indicated in brackets after the valid name. Abbreviations: MZH, Finnish Museum of Natural History, Helsinki. ZMUT, Zoological Museum of the University of Turku. *, record from the former Finnish territory (region specified in parentheses). (l), larval stage of tapeworm (metacestode). HH, collected and identified by Heikki Henttonen and Voitto Haukisalmi. EVIRA, collected by specialists of the Finnish Food Safety Authority Evira. BMNH, British Museum of Natural History, London. USNPC, United States National Parasite Collection (presently housed in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.). MSB, Museum of Southwestern Biology, University of New Mexico, Albuquerque. HNHM, Hungarian Natural History Museum, Budapest.
A. Tapeworm species and their hosts.

| Tapeworm taxa         | Host species              | References/source of specimens          | Depositories/collection numbers |
|-----------------------|---------------------------|-----------------------------------------|---------------------------------|
| **CARYOPHYLLIDEA**    |                           |                                         |                                 |
| *Caryophyllaeidae*    |                           |                                         |                                 |
|                       | *C. laticeps* (Pallas, 1781) [C. mutabilis Rudolphi, 1802] | *Alosa brama*                          | Schneider 1902c, Pulkkinen and Valtonen 2012 MZH |
|                       |                           | *Blicca bjorkna*                        | Levander 1902, Schneider 1902c MZH, ZMUT |
|                       |                           | *Leuciscus leuciscus*                   | Present study (MZH) MZH          |
|                       |                           | *Rutilus rutilus*                       | Valtonen et al. 1997 ZMUT       |
| **Lytocestidae**      |                           |                                         |                                 |
| *Caryophyllaeides*    |                           |                                         |                                 |
|                       | *C. fennica* (Schneider, 1902) [*Caryophyllaeus fennicus* Schneider, 1902] | *Alburnus alburnus*                  | Andersen and Valtonen 1990 -     |
|                       |                           | *Blicca bjorkna* (Karelia)              | Present study (MZH) MZH          |
|                       |                           | *Carassius carassius*                   | Pulkkinen and Valtonen 2012 -    |
|                       |                           | *Leuciscus idus*                       | Schneider 1902c MZH              |
|                       |                           | *Leuciscus leuciscus*                   | Andersen and Valtonen 1990 -     |
|                       |                           | *Rutilus rutilus*                       | Andersen and Valtonen 1990 ZMUT  |
|                       |                           | *Scardinius erythrophthalmus*           | Schneider 1902b, Schneider 1902c MZH 127097 (syntypes) |
|                       |                           |                                          |                                 |
| **SPATHEBOTHRIIDEA**  |                           |                                         |                                 |
| *Acrobothriidae*      |                           |                                         |                                 |
|                       | *C. truncatus* (Pallas, 1781) | *Coregonus lavaretus*                  | Jääskeläinen 1910, Pulkkinen and Valtonen 2012 - |
|                       |                           | *Salmo trutta*                          | Pulkkinen and Valtonen 2012 -    |
|                       |                           | *Thymallus thymallus* (Karelia)         | Jääskeläinen 1910 MZH           |
| Tapeworm taxa                      | Host species | References/source of specimens | Depositories/collection numbers |
|-----------------------------------|--------------|-------------------------------|--------------------------------|
| *Diplocotyle* Krabbe, 1874        |              |                               |                                |
| *D. olrikii* Krabbe, 1874 [Bothrimonus nylandicus Schneider, 1902, *Diplocotyle nylandica* (Schneider, 1902)] | Gadus morhua  | Schneider 1902a, Pulkkinen and Valtonen 2012 | -                              |
| *Platichthys flesus*              |              | Schneider 1902a               | MZH 127096 (holotype of *B. nylandicus*) |
| **DIPHYLLOBOTHRIIDEA**            |              |                               |                                |
| **Diphyllobothriidae**            |              |                               |                                |
| *Diphyllobothrium* Cobbold, 1878 |              |                               |                                |
| *D. dendriticum* (Nitzsch, 1824)  | Coregonus albula (l) | Wikgren 1964, Valtonen et al. 1988 | -                              |
|                                   | Coregonus lavaretus (l) | Wikgren 1964, Pulkkinen and Valtonen 2012 | -                              |
|                                   | Esox lucius (l) | Pulkkinen and Valtonen 2012 | -                              |
|                                   | Gasterosteus aculeatus (l) | Valtonen and Julkunen 1995 | -                              |
|                                   | Lota lota (l) | Valtonen and Julkunen 1995 | -                              |
|                                   | Triglopsis quadricornis (l) | Valtonen and Julkunen 1995 | -                              |
|                                   | Osmerus eperlanus (l) | Pulkkinen and Valtonen 2012 | -                              |
|                                   | Salmo salar (l) | Valtonen et al. 2001 | -                              |
|                                   | Salmo trutta (l) | Pulkkinen and Valtonen 2012 | -                              |
|                                   | Salvelinus alpinus (l) | Pulkkinen and Valtonen 2012 | -                              |
| *D. ditremum* (Creplin, 1825) [D. omeri (von Linstow, 1878), *Bothriocephalus ditremus* Creplin, 1825] | Gavia arctica | Raitis 1968 | ZMUT          |
|                                   | Larus argentatus | Raitis 1968 | ZMUT          |
|                                   | Mergus merganser | Present study (HH) | -                              |
|                                   | Pusa hispida saimensis | Sinisalo et al. 2003 | -                              |
|                                   | Coregonus albula (l) | Wikgren 1964, Valtonen et al. 1988 | -                              |
|                                   | Coregonus lavaretus (l) | Pulkkinen and Valtonen 2012 | -                              |
|                                   | Gasterosteus aculeatus (l) | Valtonen and Julkunen 1995 | -                              |
|                                   | Lota lota (l) | Valtonen and Julkunen 1995 | -                              |
|                                   | Osmerus eperlanus (l) | Wikgren 1964, Valtonen and Julkunen 1995 | -                              |
|                                   | Pungitius pungitius (l) | Pulkkinen and Valtonen 2012 | -                              |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|---------------|--------------|--------------------------------|---------------------------------|
| Salmo trutta (l) | Pulkkinen and Valtonen 2012 | - |
| Salvelinus alpinus (l) | Pulkkinen and Valtonen 2012 | - |
| *D. latum* (Linnaeus, 1758) [*Bothriocephalus latus* (Linnaeus, 1758), *Dibothriocephalus latus* (Linnaeus, 1758)] | Canis lupus familiaris | Oksanen 1972, Pullola et al. 2006 | MZH |
| Homo sapiens | Spöring 1747, Sievers 1905 | MZH 44684 |
| Vulpes vulpes | Freeman 1964b | - |
| Esox lucius (l) | Levander 1902, Pulkkinen and Valtonen 2012 | MZH |
| Gymnocephalus cernuus (l) | Levander 1902, Valtonen and Julkunen 1995 | - |
| Lota lota (l) | Valtonen and Julkunen 1995 | - |
| Perca fluviatilis (l) | Levander 1902, Valtonen et al. 1997 | MZH |
| *Ligula* Bloch, 1782 | | |
| *L. intestinalis* (Linnaeus, 1758) [*L. simplicissima* Rudolphi, 1802] | Gavia arctica | Raitis 1968 | MZH |
| | Larus argentatus | Present study (MZH) | MZH |
| | Larus fusces | Present study (MZH) | MZH |
| | Mergus merganser | Present study (MZH) | MZH |
| | Mergus serrator | Schneider 1902c | MZH |
| | Phalacrocorax carbo | Levander 1927b, Lampio 1946 | MZH |
| | Podiceps cristatus | Raitis 1968 | MZH |
| | Abramis brama (l) | Pulkkinen and Valtonen 2012 | MZH |
| | Alburnus alburnus (l) | Levander 1902, Pulkkinen and Valtonen 2012 | MZH |
| | Blicca bjöerkna | Present study (MZH) | MZH |
| | Leuciscus leuciscus (l) | Pulkkinen and Valtonen 2012 | MZH |
| | Perca fluviatilis (l) | Valtonen et al. 1997 | MZH |
| | Phoxinus phoxinus (l) | Present study (MZH) | MZH |
| | Rutilus rutilus (l) | Valtonen et al. 1997 | MZH |
| *Schistocephalus* Creplin, 1829 | | |
| *S. cotti* Chubb, Seppälä, Lüscher, Milinski & Valtonen, 2006 | Cottus gobio (l) | Chubb et al. 2006, Pulkkinen and Valtonen 2012 | BMNH 2006.1.5.1 (holotype), BMNH 2006.1.5.2–7 (paratypes) |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|---------------|--------------|--------------------------------|---------------------------------|
| *S. pungitii* Dubinina, 1959 [*S. dinophorus* Creplin, 1829, *S. gasterostei* (Fabricius, 1780), *S. solidus* (Müller, 1776)] | *Pungitius pungitius* (l) | Schneider 1902c, Valtonen et al. 2001 | MZH |
| *S. solidus* (Müller, 1776) [*S. gasterostei* (Fabricius, 1780)] | *Arenaria interpres* | Levander 1927a | - |
| | *Bucephalus clangula* | Raitis 1968 | ZMUT |
| | *Mergus serrator* | Schneider 1902c, Raitis 1968 | ZMUT |
| | *Sterna hirundo* | Lemmetyinen and Raitis 1972 | - |
| | *Sterna paradisaea* | Lemmetyinen and Raitis 1972 | - |
| | *Pusa hispida botnica* | Chubb et al. 1995 | - |
| | *Gasterosteus aculeatus* (l) | Schneider 1902c, Valtonen and Julkunen 1995 | MZH |
| *Spirometra* Faust, Campbell & Kellogg, 1929 | *Lynx lynx* | Schneider 1906, Lavikainen et al. 2013, R. Kuchta & A. Lavikainen, unpubl. | - |
| *Spirometra* sp. [*Bothriocephalus felis* Creplin, 1852, *B. decipiens* Railliet, 1866] | *Lynx lynx* | - | - |

**BOTHROCEPHALIDAE**

*Bothriocephalus* Rudolphi, 1808

| *B. claviceps* (Goeze, 1782) | *Anguilla anguilla* | Schneider 1902c | MZH |
| *B. scorpii* (Müller, 1776) [*B. punctatus* (Rudolphi, 1802)] | *Myxoecephalus scorpius* | Schneider 1902c | MZH |

**Triaenophoridae**

*Abothrium* van Beneden, 1871

| *A. gadi* van Beneden, 1871 | "*Gadus morhua* (Petsamo)" | Raitis 1968 | ZMUT |
| *Eubothrium* Nybelin, 1922 | *Clupea harengus membras* | Schneider 1902c | MZH |
| *E. crassum* (Bloch, 1779) [*Abothrium crassum* (Bloch, 1779), *Bothriotaenia proboscidea* (Batsch, 1786), *Bothriocephalus proboscis* (Batsch, 1786), *Dibothrium proboscis* (Batsch, 1786)] | *Coregonus lavaretus* | Valtonen et al. 1988 | - |
| | *Salmo salar* | Schneider 1902c, Andersen and Valtonen 1990 | MZH |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|---------------|--------------|-------------------------------|--------------------------------|
| *E. rubens* (Batsch, 1786) *Abothrium rugosum* (Batsch, 1786), *Bothriotaenia rugosa* (Batsch, 1786), *Dibothrium rugosum* (Batsch, 1786) | *Salmo trutta* | Andersen and Valtonen 1990 | MZH |
| *E. salvelini* (Schrank, 1790) | *Lota lota* | Schneider 1904, Andersen and Valtonen 1990 | MZH |
| *Triaenophorus* Rudolphi, 1793 | *Salmo trutta* | Pulkkinen and Valtonen 2012 | MZH |
| *T. crassus* Forel, 1868 *T. robustus* Olsson, 1893 | *Coregonus albula* (l) | Luther 1908, Valtonen et al. 1988 | MZH |
| | *Coregonus lavaretus* (l) | Valtonen et al. 1988 | MZH |
| | *Lampetra fluviatilis* (l) | Valtonen et al. 1989 | - |
| | *Oncorhynchus mykiss* (l) | Pulkkinen and Valtonen 2012 | - |
| | *Salvelinus alpinus* (l) | Pulkkinen and Valtonen 2012 | - |
| | *Thymallus taimen* (l) | Pulkkinen and Valtonen 2012 | - |
| *T. nodulosus* Sramek, 1901 | *Esox lucius* | Schneider 1901, Valtonen et al. 1989 | MZH |
| | *Esox lucius* (l) | Levander 1927c | MZH |
| | *Cottus gobio* (l) | Schneider 1904 | - |
| | *Gasterosteus aculeatus* (l) | Valtonen et al. 1989 | - |
| | *Gymnocephalus cernuus* (l) | Valtonen et al. 1989 | - |
| | *Lota lota* (l) | Valtonen et al. 1989 | MZH |
| | *Osmerus eperlanus* (l) | Valtonen et al. 1989 | MZH |
| | *Perca fluviatilis* (l) | Schneider 1902c, Valtonen et al. 1989 | MZH |
| | *Pungitius pungitius* (l) | Schneider 1902c, Valtonen et al. 1989 | MZH |
| | *Salmo salar* (l) | Pulkkinen and Valtonen 2012 | - |
| | *Salmo trutta* (l) | Pulkkinen and Valtonen 2012 | - |
| | *Zoarces viviparus* (l) | Schneider 1904, Pulkkinen and Valtonen 2012 | - |
| | *Pusa hispida satimensis* | Present study (MZH) | MZH |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|--------------|--------------|---------------------------------|---------------------------------|
| **PROTEOCEPHALIDEA** | | | |
| **Proteocephalidae** | | | |
| *Proteocephalus* Weinland, 1858 | | | |
| *P. ambiguus* (Dujardin, 1845) [*Ichthyotaenia ambiguа* (Dujardin, 1845)] | *Pungitius punctatus* | Schneider 1905, Andersen and Valtonen 1990 | - |
| *P. cernuae* (Gmelin, 1790) | *Gymnocephalus cernus* | Valtonen and Rintamäki 1989 | ZMUT |
| *P. filicollis* (Rudolphi, 1802) | *Gasterosteus aculeatus* | Schneider 1902c, Andersen and Valtonen 1990 | - |
| *P. gobiorum* Dogel & Bykhovskii, 1939 | *Myxoecephalus scorpius* | Pulkkinen and Valtonen 2012 | - |
| | | Valtonen et al. 2001 | MZH |
| | | Pulkkinen and Valtonen 2012 | ZMUT |
| *P. longicollis* (Zeder, 1800) [*Taenia longicollis* Zeder, 1800, *Ichthyotaenia longicollis* (Zeder, 1800), *Proteocephalus exigus* La Rue, 1911, *P. albulae* Freze & Kazakov, 1969] | *Coregonus albula* | Valtonen et al. 1988 | - |
| | | Pulkkinen and Valtonen 2012 | MZH |
| | | Valtonen et al. 1988 | MZH |
| | | Pulkkinen and Valtonen 2012 | - |
| | | *Salvelinus alpinus* | Pulkkinen and Valtonen 2012 | - |
| | | *Anguilla anguilla* | Schneider 1902c | MZH |
| *P. macrocephalus* (Creplin, 1825) [*Ichthyotaenia macrocephala* (Creplin, 1825)] | *P. percae* (Müller, 1780) [*Ichthyotaenia percae* (Müller, 1780), *I. ocellata* (Rudolphi, 1802), *I. filicollis* (Rudolphi, 1802)] | *Perca fluviatilis* | Schneider 1904, Valtonen and Rintamäki 1989 | MZH |
| *P. tetrastomus* (Rudolphi, 1810) [*P. longicollis* (Zeder, 1800)] | *Osmerus eperlanus* | Andersen and Valtonen 1990 | - |
| *P. thymalli* (Annenkova-Khlopina, 1923) | *Thymallus thymallus* | Present study (HH) | MZH |
| *P. torulosus* (Batsch, 1786) [*Taenia torulosa* Batsch, 1786, *Ichthyotaenia torulosa* (Batsch, 1786)] | *Ablamis ballerus* | Present study (MZH) | MZH |
| | | *Alburnus alburnus* | Present study (MZH) | MZH |
| | | *Leuciscus idus* | Schneider 1902c | MZH |
| | | *Leuciscus leuciscus* | Valtonen et al. 2001 | - |
| | | *Rutilus rutilus* | Valtonen et al. 1997 | - |
| Glanitaenia de Chambrier, Zehnder, Vaucher & Mariaux, 2004 | *Silurus glanis* (Karelia) | Present study (MZH) | MZH |
| *G. osculata* (Goeze, 1782) [*Ichthyotaenia osculata* (Goeze, 1782)] | | | |
| Tapeworm taxa           | Host species | References/source of specimens | Depositories/collection numbers |
|------------------------|--------------|--------------------------------|---------------------------------|
| TETRABOTHRIIDEA        |              |                                |                                 |
| Tetrabothriidae        |              |                                |                                 |
| Tetrabothriidae Rudolphi, 1819 |              |                                |                                 |
| \( T. \) macrocephalus (Rudolphi, 1810) [Bothriocephalus macrocephalus Rudolphi, 1810] | Cephalo cyprinoides | Raitis 1968 | ZMUT |
| Gavia stellata         | Present study (MZH, ZMUT) | MZH, ZMUT | |
| Podiceps cristatus     | Raitis 1968  | ZMUT                           |                                 |
| Uria aalge             | Present study (MZH) | MZH | |
| \( T. \) mawsoni Johnston, 1937 [T. cylindraceus (Rudolphi, 1819)] | Larus argentatus | Raitis 1968 | ZMUT |
| Podiceps cristatus     | Raitis 1968  | ZMUT                           |                                 |
| Gavia stellata         | Raitis 1968  | ZMUT                           |                                 |
| CYCLOPHYLLIDEA         |              |                                |                                 |
| Anoplocephalidae       |              |                                |                                 |
| Anoplocephala Blanchard, 1848 |              |                                |                                 |
| A. perfoliata (Goeze, 1782) [Taeinia perfoliata Goeze, 1782] | Equus caballus | Saari and Nikander 1992 | MZH |
| Anoplocephaloides Baer, 1923 |              |                                |                                 |
| A. cf. dentata (Galli-Valerio, 1905) | Arvicola amphibius | Present study (HH) | MZH |
| Lemmus lemmus          | Present study (HH) | MZH | |
| Microtus agrestis      | Tenora et al. 1986b, Haukisalmi et al. 2009a | USNPC 95648, 97613–97615, MZH | |
| Microtus oeconomus     | Tenora et al. 1986b, Haukisalmi et al. 2009a | USNPC 97612, 97616, 107977–107979, 107999, MZH | |
| Myodes rufocanus       | Tenora et al. 1986b, Haukisalmi et al. 1987 | MZH | |
| Eurotaenia Haukisalmi, Hardman, Hoberg & Henttonen, 2014 |              |                                |                                 |
| E. gracilis (Tenora & Murai, 1980) [Paranoplocephala gracilis Tenora & Murai, 1980] | Arvicola amphibius | Present study (HH) | MZH |
| Lemmus lemmus          | Present study (HH) | MZH | |
| Tapeworm taxa                        | Host species                     | References/source of specimens | Depositories/collection numbers |
|-------------------------------------|----------------------------------|--------------------------------|----------------------------------|
|                                     | *Microtus agrestis*              | Tenora et al. 1986a, Wickström et al. 2005 | MZH                              |
|                                     | *Microtus oeconomicus*           | Present study (HH)              | MZH                              |
|                                     | *Myodes glareolus*              | Present study (HH)              | MZH                              |
|                                     | *Myodes rufocanus*              | Tenora et al. 1986a             | MZH                              |
|                                     | *Myodes rutilus*                | Present study (HH)              | MZH                              |
| *Lemminia* Haukisalmi, Hardman, Hoberg & Henttonen, 2014 | *L. fellmani* (Haukisalmi & Henttonen, 2001) [*Paranoplocephala fellmani* Haukisalmi & Henttonen, 2001] | *Lemmus lemmus* Haukisalmi and Henttonen 2001, Wickström et al. 2005 | MZH 8406 (paratype) |
|                                     | *Microcephaloidees* Haukisalmi, Hardman, Hardman, Rausch & Henttonen, 2008 | *M. cf. variabilis* (Douthitt, 1915) [*Anoplocephaloides cf. variabilis* Douthitt, 1915] | *Microtus agrestis* Tenora et al. 1986b, Haukisalmi et al. 2008 | MSB Endo 74, MZH |
|                                     | *Microtus oeconomicus*           | Haukisalmi et al. 2008          | MSB Endo 72, 75, MZH              |
|                                     | *Myodes rufocanus*              | Present study (HH)              | MZH                              |
| *Microticola* Haukisalmi, Hardman, Hoberg & Henttonen, 2014 | *M. blanchardi* (Moniez, 1891) [*Anoplocephaloidees cf. blanchardi* Moniez, 1891] | *Microtus agrestis* Tenora et al. 1986b, Wickström et al. 2005 | MZH |
|                                     | *Microtus oeconomicus*           | Tenora et al. 1986b             | MZH                              |
|                                     | *Moniezia* Blanchard, 1891       |                                 |                                  |
|                                     | *M. expansa* (Rudolphi, 1810)   | *Alces alces* Nygrén and Wällén 2001 | MZH                              |
|                                     | *M. benedeni* (Moniez, 1879)    | *Ovis aries* (Karelia) Pulkkiienen 1932 | +                                |
|                                     | *M. cf. benedeni* (Moniez, 1879), as *Moniezia* sp. | *Bos taurus* Present study       | MZH                              |
| *Mosgovoyia* Spasskii, 1951         | *M. pectinata* (Goeze, 1782)    | *Lepus europaeus* Soveri and Valttonen 1983 | MZH                              |
|                                     | *Lepus timidus*                 | Reuter 1882, Lampio 1946, Haukisalmi et al. 2010a | MZH                              |
| *Neoctenotaenia* Tenora, 1976       |                                 |                                 |                                  |
|                                     | *N. ctenoides* (Railliet, 1890) | *Oryctolagus cuniculus* Haukisalmi et al. 2010a | MZH                              |
| *Paranoplocephala* Lühe, 1910       |                                 |                                 |                                  |
| Tapeworm taxa                                                                 | Host species        | References/source of specimens                                      | Depositories/collection numbers |
|------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------|---------------------------------|
| *P. omphalodes* (Hermann, 1783) *Taenia omphalodes* Hermann, 1783, *Andrya*  | *Arvicola amphibius*| Tenora et al. 1986a                                                | MZH                             |
| *omphalodes* (Hermann, 1783), *A. microti* Hansen, 1947)                     |                     |                                                                     |                                 |
|                                                                              | *Microtus agrestis*  | Haukisalmi et al. 1994, 2004                                       | USNPC 92584, MZH                 |
|                                                                              | *Microtus levis*     | Present study (HH)                                                 | MZH                             |
|                                                                              | *Myodes glareolus*   | Present study (HH)                                                 | MZH                             |
| *P. jarrelli* Haukisalmi, Henttonen & Hardman, 2006 *Andrya microti* Hansen, | *Microtus oeconomus*| Haukisalmi et al. 2006, 2009b                                       | USNPC 95640 (holotype), 95641    |
| 1947)                                                                         |                     |                                                                     | (paratype), 108003, HNHM 67468,  |
|                                                                              |                     |                                                                     | MZH                             |
|                                                                              | *P. kalelai* (Tenora, | Tenora et al. 1985a, Haukisalmi et al. 2007                       | USNPC 108001, 108002, MZH        |
| Haukisalmi & Henttonen, 1985) *Andrya kalelai* Tenora, Haukisalmi & Henttonen, | *Myodes glareolus*  |                                                                     |                                 |
| 1985)                                                                         |                     |                                                                     |                                 |
|                                                                              | *Myodes rufocanus*   | Tenora et al. 1985a, Haukisalmi et al. 2007                       | MZH 61034 (holotype), 61033,     |
|                                                                              |                     |                                                                     | 61035 (paratypes)               |
|                                                                              | *Myodes rutilus*     | Tenora et al. 1985a                                               | MZH                             |
| Catenotaeniidae                                                               |                     |                                                                     |                                 |
| Catenotaenia Janicki, 1904                                                    |                     |                                                                     |                                 |
| *C. henttoneni* Haukisalmi & Tenora, 1993 *Catenotaenia cricetorum* Kirshenblat, 1949 | *Myodes glareolus*  | Haukisalmi and Tenora 1993, Haukisalmi et al. 2010c                 | MZH 63142 (holotype), 63141      |
| 1949)                                                                         |                     |                                                                     | (paratype), USNPC 94886, 102583,|
|                                                                              |                     |                                                                     | 102585, 102582                  |
|                                                                              | *Myodes rutilus*     | Wiger et al. 1976, Haukisalmi and Tenora 1993, Haukisalmi et al. 2010c | USNPC 102584, 102586–102588,    |
|                                                                              |                     |                                                                     | 107981, 107997, 107998, MZH      |
| *C. dendritica* (Goeze, 1782)                                                | *Sciurus vulgaris*   | Haukisalmi et al. 2010c                                            | USNPC 102581, MZH                |
|                                                                              |                     |                                                                     |                                 |
| *C. pusilla* (Goeze, 1782)                                                   | *Mus musculus*       | Present study (HH)                                                | -                               |
| Skrjabinotaenia Ahumyan, 1946                                                 |                     |                                                                     |                                 |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|---------------|--------------|--------------------------------|---------------------------------|
| *S. lobata* (Baer, 1925) | *Apodemus flavicollis* | Present study (HH) | MZH |
| **Davaineidae** | | | |
| *Ophryocotyle* Friis, 1870 | *Limosa lapponica* (Petsamo) | Raitis 1968 | ZMUT |
| *O. proteus*Friis, 1870 | | | |
| Parorniella Fuhrmann, 1920 | | | |
| *P. urogalli* (Modeer, 1790) [*Taenia urogalli* Modeer, 1790, *Davainea urogalli* (Modeer, 1790)] | *Lagopus lagopus* | Isomursu et al. 2004 | MZH |
| | *Lynx tetrix* | Lampio 1946, Isomursu et al. 2004 | MZH |
| | *Perdix perdix* | Present study (MZH) | MZH |
| | *Tetrarctus urogalli* | Isomursu et al. 2004 | MZH |
| | *Tetrastes bonasia* | Isomursu et al. 2004 | MZH |
| Raillietina Fuhrmann, 1920 | | | |
| *R. frontina* (Dujardin, 1845) [*Davainea frontina* (Dujardin, 1845)] | *Dryocopus martius* | Raitis 1968 | MZH, ZMUT |
| Skrjabinia Fuhrmann, 1920 | | | |
| *S. cesticillus* (Molin, 1858) | *Lagopus lagopus* | Isomursu et al. 2004 | MZH |
| | *Lynx tetrix* | Lampio 1946, Isomursu et al. 2004 | MZH |
| | *Tetrarctus urogalli* | Isomursu et al. 2004 | MZH |
| | *Tetrastes bonasia* | Isomursu et al. 2004 | MZH |
| **Dilepididae** | | | |
| Alcataenia Spasskaya, 1971 | | | |
| *A. campiuluntha* (Krabbe, 1869) [*Anomotaenia campiuluntha* (Krabbe, 1869), *Choanotaenia campiuluntha* (Krabbe, 1869)] | *Cepphus grylle* (Petsamo) | Raitis 1968 | MZH, ZMUT |
| | | | |
| *A. larina* (Krabbe, 1869) [*Anomotaenia larina* (Krabbe, 1869)] | *Larus canus* | Raitis 1968 | ZMUT |
| Angularella Strand, 1928 | | | |
| Angularella sp. | *Riparia riparia* | Raitis 1968 | ZMUT |
| Anomotaenia Cohn, 1900 | | | |
| *A. arionis* (von Siebold, 1850) [*Choanotaenia arionis* (von Siebold, 1850)] | *Actitis hypoleucus* (Petsamo) | Raitis 1968 | MZH |
| *A. globulus* (Wedl, 1855) | *Scolopax rusticola* | Raitis 1968 | ZMUT |
| *A. microrhyncha* (Krabbe, 1869) | *Chlidonias hiaticula* (Petsamo) | Raitis 1968 | ZMUT |
### Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates

| Tapeworm taxa                     | Host species            | References/source of specimens | Depositories/collection numbers |
|-----------------------------------|-------------------------|--------------------------------|---------------------------------|
| *Philomachus pugnax* (Petsamo)    |                         | Raitis 1968                    | ZMUT                            |
| Dictyometra Clark, 1952           |                         |                                |                                 |
| *Philometra lobata* (Petsamo)     |                         |                                |                                 |
| Numenius arquata                  |                         | Present study (ZMUT)           | ZMUT                            |
| Dilepis Weinland, 1858            |                         |                                |                                 |
| *Philometra lobata* (Petsamo)     |                         |                                |                                 |
| D. laevigata (Rudolphi, 1819)     |                         |                                |                                 |
| *Philometra lobata* (Petsamo)     |                         |                                |                                 |
| Numenius arquata                  |                         | Present study (ZMUT)           | ZMUT                            |
| Dilepis Weinland, 1858            |                         |                                |                                 |
| D. undula (Schrank, 1788) [Taenia undulata Rudolphi, 1810] | Columba palumbus | Raitis 1968                    | ZMUT                            |
| Corvus corone                     |                         | Raitis 1968                    | MZH, ZMUT                        |
| Pica pica                         |                         | Present study (MZH)            | MZH                             |
| Tursus iliacus                    |                         | Raitis 1968                    | ZMUT                            |
| Tursus philomelos                 |                         | Present study (MZH)            | MZH                             |
| Tursus pilaris                    |                         | Raitis 1968                    | MZH, ZMUT                        |
| Tursus viscivorus                 |                         | Present study (MZH)            | MZH                             |
| Fuhrmannolepis Spaskii & Spaskaya, 1965 | Fuhrmannolepis sp. | Present study (ZMUT)           | ZMUT                            |
| Hepatocestus Bona, 1994           |                         |                                |                                 |
| *H. hepaticus* (Baer, 1932) [Choanotaenia hepatic (Baer, 1932) | *Sorex annulus* | Vaucher, 1971, Haukisalmi 1989 | -                               |
| Hirundincola Birova-Voloshinova, 1969 | *H. parvirostris* | Krabbe, 1869                    |                                 |
| *Delichon urbica* (Petsamo)       |                         | Raitis 1968                    | ZMUT                            |
| Hirundo rustica                   |                         | Raitis 1968                    | ZMUT                            |
| Kowalewskiella Baczynska, 1914    | *Actitis hypoleucus* (Petsamo) | Raitis 1968                    | ZMUT                            |
| L. crateriformis (Goeze, 1782) [Choanotaenia crateriformis (Goeze, 1782), Monopylidium crateriformis (Goeze, 1782)] | *Actitis hypoleucus* (Petsamo) | Raitis 1968                    | ZMUT                            |
| Dendrocopos leucotos              |                         | Raitis 1968                    | MZH, ZMUT                        |
| Picus canus                       |                         | Raitis 1968                    | MZH, ZMUT                        |
| Monocercus Villot, 1882            |                         |                                |                                 |
| Tapeworm taxa                                                                 | Host species           | References/source of specimens                                                                 | Depositories/collection numbers |
|------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------|----------------------------------|
| *M. arionis* (von Siebold, 1850) [*Choanotaenia crassisolex* (von Linstow, 1890), *Molluscochaeta crassisolex* (von Linstow, 1890)] | *Sorex araneus*        | Vaucher, 1971, Haukisalmi 1989, Haukisalmi and Henttonen 1994                                 | MZH                              |
|                                                                               | *Sorex caecutiens*     | Haukisalmi and Henttonen 1994                                                                 | -                                |
|                                                                               | *Sorex isodon*         | Bugmyrin et al. 2003                                                                            | -                                |
|                                                                               | *Sorex minutus*        | Haukisalmi 1989                                                                                | -                                |
| Monosertum Bona, 1994                                                        |                        |                                                                                                 |                                  |
| *M. parinum* (Dujardin, 1845) [*Choanotaenia parina* (Dujardin, 1845)]      | *Fringilla montifringilla* | Raitis 1968                                                                                   | ZMUT                             |
| Neodiga Singh, 1952                                                          |                        |                                                                                                 |                                  |
| *N. deprea* (von Siebold, 1836)                                              | *Apus apus*            | Present study (MZH)                                                                            | MZH                              |
| Neovalipora Baer, 1962                                                        |                        |                                                                                                 |                                  |
| *N. parvispine* (Linton, 1927)                                               | *Gavia stellata*       | Present study (MZH)                                                                            | MZH                              |
| Nototaenia Jones & Williams, 1967                                            |                        |                                                                                                 |                                  |
| *N. brevis* (von Linstow, 1884) [*Amoeobaena brevis* (von Linstow, 1884)]  | *Pluvialis apricaria*  | Raitis 1968                                                                                   | ZMUT                             |
| Polycercus Villot, 1883                                                       |                        |                                                                                                 |                                  |
| *Polycercus sp.*                                                             | *Neomys fodiens*       | Present study (HH)                                                                             | -                                |
|                                                                               | *Nyctereutes procyonoides* | Present study (EVIRA)                                                                       | -                                |
| Rallitaenia Spasskii & Spasskaya, 1975                                        |                        |                                                                                                 |                                  |
| *R. pyriformis* (Wedl, 1855)                                                 | *Crex crex*            | Present study (MZH)                                                                            | MZH                              |
| Secciuterina Matevosyan, 1963                                                 |                        |                                                                                                 |                                  |
| *S. panudosa* (Rudolphi, 1802)                                               | *Balidris alpina* (Petsamo) | Raitis 1968                                                                                   | ZMUT                             |
|                                                                               | *Scolopax rusticola*    | Present study (ZMUT)                                                                           | ZMUT                             |
| Sobolevitaenia Spasskaya & Makarenko, 1965                                   |                        |                                                                                                 |                                  |
| *S. borealis* (Krabbe, 1869)                                                 | *Motacilla alba* (Petsamo) | Raitis 1968                                                                                   | ZMUT                             |
| Spiniglans Yamaguti, 1959                                                     |                        |                                                                                                 |                                  |
| *S. constricta* (Molin, 1858) [*Taenia constricta* Molin, 1858, *Amoebotaenia constricta* (Molin, 1858), *Monopylidium constricta* (Molin, 1858)] | *Corvus corone*       | Raitis 1968                                                                                   | MZH, ZMUT                         |
|                                                                               | *Pica pica*            | Present study (MZH)                                                                            | MZH                              |
| Trichocephaloidis Sinitzin, 1896                                              | *Tringa glareola*      | Raitis 1968                                                                                   | ZMUT                             |

*Calidris alpina* (Petsamo)
| Tapeworm taxa        | Host species                | References/source of specimens          | Depositories/collection numbers |
|----------------------|----------------------------|----------------------------------------|----------------------------------|
| **Dipylididae**      |                            |                                        |                                  |
| *Dipylidium* Leuckart, 1863 |                            |                                        |                                  |
| *D. caninum* (Linnaeus, 1758) [ *Taenia cucumerina* Bloch, 1782] | *Canis lupus familiaris* | Oksanen 1972, Saari 1999                |                                  |
| **Hymenolepididae**  |                            |                                        |                                  |
| *Aploparaksis* Clerc, 1903 |                            |                                        |                                  |
| *A. crassirostris* (Krabbe, 1869) | *Calidris alpina* | Raitis 1968                            | ZMUT                             |
| *A. filum* (Goeze, 1782) s.l. | *Lumina falcinella* | Present study (MZH)            | MZH                              |
| *A. furigera* (Nitzsch in Rudolphi, 1819) [ *Taenia rhomboidea* Dujardin, 1845, *A. rhomboidea* (Dujardin, 1845)] | *Numenius arquata* | Raitis 1968                            | MZH, ZMUT                         |
| *A. furigera* (Nitzsch in Rudolphi, 1819) | *Scolopax rusticola* | Raitis 1968                            | MZH, ZMUT                         |
| *B. biglandriatru* Spasskaya, 1961 |                            |                                        |                                  |
| *B. biglandriatru* Spasskaya, 1961 | *Gavia antica* | Present study (MZH)           | MZH                              |
| *Confluaria* Ablasov in Spasskaya, 1966 | *Podiceps crista* | Present study (MZH)          | MZH                              |
| *C. furicera* (Krabbe, 1869) | *Podiceps cristatus* | Present study (MZH)          | MZH                              |
| *C. multistriata* (Rudolphi, 1810)? [ *Taenia multistriata* Rudolphi, 1810] | *Mergus merganser* | Present study (MZH)         | MZH                              |
| *C. pseudofuricera* Vasileva, Georgiev & Genov, 2000 [ *Hymenolepis furicera* (Krabbe, 1869)] | *Podiceps cristatus* | Present study (MZH)         | MZH                              |
| *Dieranotaenia* Railliet, 1892 | *Anas crecca* | Brglez and Valtonen 1986         | -                                |
| *D. coronula* (Dujardin, 1845) [ *Hymenolepis coronula* (Dujardin, 1845)] | *Anas penelope* | Brglez and Valtonen 1986         | -                                |
| *D. coronula* (Dujardin, 1845) | *Anas platyrhychos* | Brglez and Valtonen 1986         | MZH                              |
| *D. coronula* (Dujardin, 1845) | *Aythya fuligula* | Valtonen and Brglez 1986         | -                                |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|---------------|--------------|--------------------------------|---------------------------------|
| *Dicrochis* Clerc, 1903 | *Bucephala clangula* | Raitis 1968 | ZMUT |
| *D. elisae* (Skrjabin, 1914) | *Melanitta fusca* | Raitis 1968 | MZH, ZMUT |
| *D. inflata* (Rudolphi, 1819) | *Anas crecca* | Brglez and Valtonen 1986 | - |
| *D. stefanskii* Czapinski, 1956 | *Anas acuta* | Brglez and Valtonen 1986 | - |
| *D. asiatica* Spasskii, 1963 | *Anas penelope* | Brglez and Valtonen 1986 | - |
| *D. ransomi* Schultz, 1940 | *Anas crecca* | Brglez and Valtonen 1986 | - |
| *Diploposthe* Jacobi, 1896 | *Aythya fuligula* | Valtonen and Brglez 1986 | - |
| *D. laevis* (Bloch, 1782) | *D. laevis* (Bloch, 1782) | Present study (MZH) | MZH |
| *Ditetolepis* Sohys, 1952 | *Sorex annuus* | Vaucher 1971, Haukisalmi 1989 | MZH |
| *Sorex carolinensis* | Vaucher 1971, Haukisalmi 1989 | - |
| *Sorex isodon* | Bugmyrin et al. 2003 | - |
| *Sorex minutus* | Haukisalmi 1989 | - |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|---------------|--------------|--------------------------------|--------------------------------|
| *Drepanidolepis* López-Neyra, 1942 | *Anas acuta* | Brglez and Valtonen 1986 | - |
|  | *Anas crecca* | Brglez and Valtonen 1986 | - |
|  | *Anas penelope* | Brglez and Valtonen 1986 | - |
|  | *Anas platyrhynchos* | Raitis 1968, Brglez and Valtonen 1986 | ZMUT |
| *D. spinulosa* (Dubinina, 1953) | *Anas acuta* | Brglez and Valtonen 1986 | - |
|  | *Anas crecca* | Brglez and Valtonen 1986 | - |
|  | *Anas penelope* | Brglez and Valtonen 1986 | - |
|  | *Anas platyrhynchos* | Brglez and Valtonen 1986 | - |
| *Drepanidolepis* sp. 1 | *Melanitta fusca* | Present study (MZH) | MZH |
| *Drepanidolepis* sp. 2 | *Melanitta fusca* | Present study (MZH) | MZH |
| *Dubininolepis* Spasskii & Spasskaya, 1954 | *Anas penelope* | Brglez and Valtonen 1986 | - |
|  | *Anas querquedula* | Brglez and Valtonen 1986 | - |
| *Dubininolepis* rostellata (Abildgaard, 1790) [Hymenolepis rostellata (Abildgaard, 1790), *Hymenolepis capitellata* Railliet, 1899] | *Gavia arctica* | Raitis 1968 | MZH, ZMUT |
|  | *Gavia stellata* | Present study (ZMUT) | ZMUT |
| *Fimbriaria* Frölich, 1802 | *Anas acuta* | Brglez and Valtonen 1986 | - |
|  | *Anas clipeata* | Brglez and Valtonen 1986 | - |
|  | *Anas crecca* | Brglez and Valtonen 1986 | - |
|  | *Anas platyrhynchos* | Brglez and Valtonen 1986 | MZH |
|  | *Anas querquedula* | Brglez and Valtonen 1986 | - |
|  | *Aythya fuligula* | Valtonen and Brglez 1986 | - |
|  | *Mergus merganser* | Present study (MZH) | MZH |
|  | *Mergus serrator* (Petsamo) | Raitis 1968 | ZMUT |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|--------------|-------------|--------------------------------|---------------------------------|
| *Somateria mollissima* (Petsamo) | *Selenastrum mollissima* Raitis 1968 | ZMUT |
| Golyveilepis Kornienko & Binkienė, 2014 | | |
| G. tripartita (Żarnowski, 1955) [Hymenolepis tripartita (Żarnowski, 1955), Ditectolepis tripartita (Żarnowski, 1955)] | *Sorex annuus* | Vaucher 1971, Haukisalmi 1989, Haukisalmi et al. 2010b | MZH |
| | *Sorex caecutiens* | Haukisalmi 1989 | |
| Hymenolepis Weinland, 1858 | | |
| *H. cf. diminuta* (Rudolphi, 1819) | *Apodemus flavicollis* | Raitis 1968 | ZMUT |
| Hymenolepis (s.l.) asymmetrica Janicki, 1904 [Rodentolepis asymmetrica (Janicki, 1904)] | *Microtus agrestis* | Haukisalmi et al. 1994 | MZH |
| Hymenolepis (s.l.) sp. | *Lagopus lagopus* | Isomursu et al. 2004 | |
| | *Lyrurus tetrix* | Isomursu et al. 2004 | |
| | *Tetrao urogallus* | Isomursu et al. 2004 | |
| | *Tetrao urogallus* | Isomursu et al. 2004 | |
| Lyrurus Scapulii, 1959 | | |
| *L. scutigera* (Dujardin, 1845) [Hymenolepis scutigera (Dujardin, 1845)] | *Sorex annuus* | Vaucher 1971, Haukisalmi 1989, Haukisalmi et al. 2010b | MZH |
| | *Sorex caecutiens* | Haukisalmi 1989 | |
| Microsomacanthus Lopez-Neyra, 1942 | | |
| *M. abortiva* (von Linstow, 1904) | *Anas acuta* | Brglez and Valtonen 1986 | |
| | *Anas acuta* | Brglez and Valtonen 1986 | |
| | *Anas eryngia* | Brglez and Valtonen 1986 | |
| | *Anas crecca* | Brglez and Valtonen 1986 | |
| | *Aythya fuligula* | Valtonen and Brglez 1986 | |
| M. collaris (Batsch, 1786) [Hymenolepis collaris (Batsch, 1786), Myxolepis collaris (Batsch, 1786), Taenia sinuosa Zeder, 1803, Hymenolepis sinuosa Rallct, 1899] | *Anas acuta* | Brglez and Valtonen 1986 | |
| | *Anas acuta* | Brglez and Valtonen 1986 | |
| | *Anas crecca* | Raitis 1968, Brglez and Valtonen 1986 | MZH, ZMUT |
| | *Anas platyrhynchos* | Raitis 1968, Brglez and Valtonen 1986 | ZMUT |
### checklist of tapeworms of vertebrates:

| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|---------------|--------------|---------------------------------|---------------------------------|
| *M. compressa* (Linton, 1892) | *Aythya ferina* | Raitis 1968                      | ZMUT                            |
| *M. diorchis* (Fuhrmann, 1913) | *Somateria mollissima* | Present study (MZH)              | MZH                            |
| *M. microsoma* (Creplin, 1829) | *Aythya fuligula* | Valtonen and Brglez 1986         | -                              |
| *M. microsoma* (Creplin, 1829) | *Aythya marila* | Present study (ZMUT)             | ZMUT                            |
| *M. paramicrosoma* (Gasowska, 1931) | *Somateria mollissima* | Present study (MZH)              | MZH                            |
| *N. merkshevae* Kornienko & Binkiené, 2008 | *Sorex annueus* | Present study (S. Kornienko & L. Kontrimavichus, unpubl.) | - |
| *N. schaldybini* Spaskii, 1947 | *Sorex annueus* | Vaucher 1971, Haukisalmi 1989, Haukisalmi et al. 2010b | MZH                            |
| *N. singularis* (Cholodkovsky, 1912) | *Sorex minutus* | Haukisalmi 1989                  | -                              |
| *Nomadolepis* Makarirov, Gulyaev & Krivopalov, 2010 | *Micromys minutus* | Haukisalmi et al. 2010b, Makarirov et al. 2015 | - |

*Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates...*
| Tapeworm taxa                          | Host species     | References/source of specimens                          | Depositories/collection numbers |
|---------------------------------------|------------------|--------------------------------------------------------|--------------------------------|
| *P. crenata* (Goeze, 1782) \[*Hymenolepis serpentulus* (Schrank, 1788)] | *Corvus corone*  | Raitis 1968                                           | ZMUT                           |
|                                       | *Tumulus iliacus*| Present study (MZH)                                   | MZH                            |
|                                       | *Tumulus pilaris*| Present study (MZH)                                   | MZH                            |
|                                       | *Tumulus viscivorus*| Present study (MZH)                               | MZH                            |
| *P. parina* (Fuhrmann, 1907)         | *Parus major*    | Present study (EVIRA)                                 | MZH                            |
| *P. stylosa* (Rudolphi, 1809) \[*Taenia stylosa* Rudolphi, 1809] | *Pica pica*    | Present study (MZH)                                   | MZH                            |
| *Pseudobotrialepis* Schaldybin, 1957 | *Sorex minutus* | Haukisalmi 1989, Haukisalmi and Henttonen 2010b       | MZH                            |
|                                       | *Sorex caecutiens*| Haukisalmi and Henttonen 1994                      | -                              |
| *P. globosoides* (Soltyš, 1954) \[*Hymenolepis globosoides* (Soltyš, 1954), *Dicrocotaenia globosoides* Soltyš, 1954] | *Sorex araneus* | Vaucher 1971, Haukisalmi 1989, Haukisalmi and Henttonen 1994 | -                              |
|                                       | *Sorex caecutiens*| Haukisalmi and Henttonen 1994                      | -                              |
|                                       | *Sorex minutus* | Haukisalmi 1989, Haukisalmi and Henttonen 2010b       | MZH                            |
| *Retinometra* Spaskii, 1955           | *Anas acuta*     | Brglez and Valtonen 1986                              | -                              |
| *R. macracanthos* (von Linstow, 1877)| *Anas penelope*  | Brglez and Valtonen 1986                              | -                              |
|                                       | *Anas platyrhynchos*| Brglez and Valtonen 1986                      | -                              |
|                                       | *Aythya marila*  | Present study (ZMUT)                                 | ZMUT                           |
| *Rodentolepis* Spaskii, 1954          | *Apodemus flavicollis*| Present study (HH)                               | -                              |
| *R. fraterna* (Stiles, 1906)         | *Anas acuta*     | Brglez and Valtonen 1986                              | -                              |
| *Sobolevicanthus* Spaskii & Spasskaya, 1954 | *Anas crecca* | Brglez and Valtonen 1986                              | -                              |
| *S. daflae* Polk, 1942                | *Aythya fuligula*| Valtonen and Brglez 1986                              | -                              |
|                                       | *Anas crecca*    | Brglez and Valtonen 1986                              | -                              |
| *S. octacanthus* (Krabbe, 1869)       | *Anas crecca*    | Brglez and Valtonen 1986                              | -                              |
|                                       | *Anas platyrhynchos*| Brglez and Valtonen 1986                      | -                              |
|                                       | *Anas querquedula*| Brglez and Valtonen 1986                           | -                              |
|                                       | *Aythya fuligula*| Valtonen and Brglez 1986                              | -                              |
| *S. guncilis* (Zeder, 1803) \[*Hymenolepis guncilis* (Zeder, 1803)] | *Anas clypeata* | Brglez and Valtonen 1986                              | -                              |
|                                       | *Anas crecca*    | Raitis 1968, Brglez and Valtonen 1986                 | ZMUT                           |
|                                       | *Anas platyrhynchos*| Brglez and Valtonen 1986                      | -                              |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/ collection numbers |
|--------------|--------------|-------------------------------|---------------------------------|
| *Aybya fuligula* | *Aybya fuligula* | Valtonen and Brglez 1986 | - |
| *Mergus serrator* (Petsamo) | *Mergus serrator* (Petsamo) | Raitis 1968 | ZMUT |
| *S. krabbeella* (Hughes, 1940) | *Anas crecca* | Brglez and Valtonen 1986 | - |
| *Aybya fuligula* | *Aybya fuligula* | Valtonen and Brglez 1986 | - |
| Soricinia Spaskii & Spasskaya, 1954 | *S. infirma* (Żarnowski, 1955) [Hymenolepis infirma (Żarnowski, 1955), Insectivorolepis infirma Żarnowski, 1955] | Sorex araneus | Vaucher 1971, Haukisalmi 1989, Haukisalmi et al. 2010b |
| Spasckylepis Schaldybin, 1964 | Sorex araneus | Vaucher 1971, Haukisalmi 1989, Haukisalmi et al. 2010b |
| S. ovalateri Schaldybin, 1964 | Sorex caecutiens | Haukisalmi 2010b | MZH |
| Staphylocystis Villot,1877 | Sorex caecutiens | Haukisalmi 1989 | MZH |
| S. furcata (Stieda, 1862) [Hymenolepis furcata (Stieda, 1862)] | Sorex araneus | Vaucher 1971, Haukisalmi 1989, Haukisalmi and Henttonen 1994, Haukisalmi et al. 2010b |
| Staphylocystoides Yamaguti, 1959 | Sorex araneus | Vaucher 1971, Haukisalmi 1989, Haukisalmi and Henttonen 1994, Haukisalmi et al. 2010b |
| S. stefanskii (Żarnowski, 1954) | Sorex araneus | Vaucher 1971, Haukisalmi 1989, Haukisalmi and Henttonen 1994, Haukisalmi et al. 2010b |
| Sorex minutus | Sorex minutus | Haukisalmi et al. 2010b | MZH |
| Sorex sp. | Sorex sp. | Vaucher, 1971 | - |
| Tschertkovilepis Spasky & Spasskaya, 1954 | T. tenuirostris (Rudolphi, 1819) [Taenia tenuirostris Rudolphi, 1819] | *Mergus merganser* | Present study (MZH) |
| Urocytis Villot, 1880 | *U. prolifer* Villot, 1880 [Hymenolepis prolifer (Villot, 1880)] | Sorex araneus | Haukisalmi 1989, Haukisalmi et al. 2010b |
| Vampirolepis Spaskii, 1954 | Vampirolepis sp. | Haukisalmi et al. 2010b | MZH |
| *V. nilssonii* (Vilius) | *V. nilssonii* (Vilius) | Haukisalmi et al. 2010b | - |
| **V. variolosa** (Goeze, 1782) [Hymenolepis fasicinosa (Goeze, 1782)] | **V. variolosa** (Goeze, 1782) | Sturnus vulgaris | Present study (MZH) |
| **Vigiolepis Matevosyan, 1945** | **Vigiolepis Matevosyan, 1945** | Sturnus vulgaris | Present study (MZH) |
| Tapeworm taxa | Host species       | References/source of specimens                          | Depositories/collection numbers |
|---------------|-------------------|--------------------------------------------------------|---------------------------------|
| *V. spinulosa* (Cholodkovsky, 1906) [*Hymenolepis spinulosa* Cholodkovsky, 1906] | *Sorex araneus* | Vaucher, 1971, Haukisalmi 1989, Haukisalmi et al. 2010b | MZH                             |
|               | *Sorex caecutiens* | Haukisalmi 1989                                        | -                               |
|               | *Sorex isodon*     | Present study (HH)                                     | -                               |
|               | *Sorex minutus*    | Haukisalmi 1989                                        | -                               |
|               | *Neomys fodiens*   | Present study (HH)                                     | -                               |
| *Wardium* Mayhew, 1925 |                 |                                                        |                                 |
| *W. creplini* (Krabbe, 1869) [*Hymenolepis creplini* (Krabbe, 1869)] | *Anser fabalis* | Raitus 1968                                             | ZMUT                            |
| *Wardloides* Spasskii, 1963 |                 |                                                        |                                 |
| *W. nyrocae* (Yamaguti, 1935) |             |                                                        |                                 |
| **Linstowiidae** |                 |                                                        |                                 |
| *Atriotaenia* Sandground, 1926 |             |                                                        |                                 |
| *A. incisa* (Railliet, 1899) | *Meles meles*    | Present study (MZH)                                    | MZH                             |
| **Mesocestoididae** |                 |                                                        |                                 |
| *Mesocestoides* Vaillant, 1863 |              |                                                        |                                 |
| *M. lineatus* (Goeze, 1782) | *Canis lupus*    | Present study (MZH)                                    | MZH                             |
|               | *Martes martes*    | Present study (A. Lavikainen, unpubl.)                 | -                               |
|               | *Meles meles*      | Present study (EVIRA)                                  | MZH                             |
| *M. litteratus* (Batsch, 1786) | *Vulpes vulpes*  | Freeman 1964a                                           | -                               |
| *Mesocestoides* sp. | *Apodemus flavicollis* (l) | Present study (HH)                                    | -                               |
|               | *Microtus agrestis* (l) |                                                        | -                               |
|               | *Myodes glareolus* (l) | Present study (HH)                                    | -                               |
|               | *Myodes Rufocanus* (l) | Present study (HH)                                    | -                               |
|               | *Myodes rutilus* (l) | Present study (HH)                                    | -                               |
|               | *Sorex araneus* (l) | Present study (HH)                                    | -                               |
| **Paruterinidae** |                 |                                                        |                                 |
| *Anonchotaenia* Cohn, 1900 |              |                                                        |                                 |
| *A. globata* (von Linstow, 1879) | *Anthus trivialis* | Present study (MZH)                                    | MZH                             |
| Tapeworm taxa          | Host species | References/source of specimens                  | Depositories/collection numbers |
|------------------------|--------------|-------------------------------------------------|---------------------------------|
| Biuterina Fuhrmann, 1902 |              |                                                 |                                 |
| *Biuterina* sp.         | *Lanius collurio* | Present study (MZH)                            | MZH                             |
| Cladotaenia Cohn, 1901 |              |                                                 |                                 |
| *C. globifera* (Batsch, 1786) [*Taenia cylindracea* Bloch, 1782, *C. cylindracea* (Bloch, 1782)] | *Buteo buteo* | Present study (MZH)                            | MZH                             |
|                        | *Buteo lagopus* | Raitis 1968                                     | ZMUT                            |
|                        | *Myodes glareolus* (l) | Tenota et al. 1983 | -                                    |
| Notopentorchis Burt, 1938 |              |                                                 |                                 |
| *N. cyathiformis* (Frölich, 1791) [*Taenia cyathiformis* Frölich, 1791] | *Apus apus* | Present study (MZH)                            | MZH                             |
| Orthoskryabinia Spasskii, 1947 | *Picoides triactylus* | Present study (MZH)                            | MZH                             |
| Paruterina Fuhrmann, 1906 |              |                                                 |                                 |
| *P. candelabrina* (Goeze, 1782) | *Aegolius funereus* | Present study (MZH)                            | MZH                             |
|                        | *Strix uralensis* | Present study (EVIRA)                          | MZH                             |
|                        | *Lanius collurio* | Raitis 1968                                     | ZMUT                            |
| Taeniidae              |              |                                                 |                                 |
| *Taenia* Linnaeus, 1758 |              |                                                 |                                 |
| *T. arctos* Haukisalmi, Lavikainen, Laaksonen & Meri, 2011 | *Ursus arctos* | Lavikainen et al. 2011, Haukisalmi et al. 2011 | USNPC 104371 (holotype), 104372 (paratype), 104373–104375, MZH |
|                        | *Alces alces* (l) | Lavikainen et al. 2010                          | -                               |
| *T. hydatigena* Pallas, 1766 [*Cysticercus tenuicollis* Rudolphi, 1810] | *Canis lupus* | Lavikainen et al. 2011                          | MZH                             |
|                        | *Alces alces* (l) | Lampio 1946                                     | MZH                             |
|                        | *Ovis aries* (l) | Raitis 1968, Lavikainen et al. 2008             | ZMUT                            |
|                        | *Rangifer tarandus* (l) | Lavikainen et al. 2008                        | -                               |
|                        | *Sus scrofa, domestic* (l) | Present study (MZH)                          | MZH                             |
| *T. krabbei* Moniez, 1879 [*Cysticercus tarandi* Villot, 1883] | *Canis lupus* | Lavikainen et al. 2011                          | MZH                             |
|                        | *Rangifer tarandus* (l) | Rahkio and Korkeala 1989                      | -                               |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|---------------|--------------|---------------------------------|-------------------------------|
| *T. laticollis* Rudolphi, 1819 | Lynx lynx | Lampio 1946, Lavikainen et al. 2013, Deksne et al. 2013 | MZH |
| *T. martis* (Zeder, 1803) | Myodes glareola (l) | Present study (MZH) | MZH |
| *T. martis* (Zeder, 1803) | Myodes rutilus (l) | Wiger et al. 1976 | - |
| *T. pisiformis* (Bloch, 1780) [*T. serrata* Goeze, 1782, *Cysticercus pisiformis* Zeder, 1803] | Canis lupus familiaris | Lahemaa 1944, Lampio 1950 | - |
| *T. pisiformis* (Bloch, 1780) [*T. serrata* Goeze, 1782, *Cysticercus pisiformis* Zeder, 1803] | Lepus europaeus (l) | Lampio 1946 | - |
| *T. pisiformis* (Bloch, 1780) [*T. serrata* Goeze, 1782, *Cysticercus pisiformis* Zeder, 1803] | Lepus timidus (l) | Lahemaa 1944, Lampio 1946 | MZH |
| *T. polyacantha* Leuckart, 1856 | Vulpes vulpes | Freeman 1964a, Lavikainen et al. 2008 | - |
| *T. polyacantha* Leuckart, 1856 | Microtus levis (l) | Present study (HH) | - |
| *T. polyacantha* Leuckart, 1856 | Microtus oeconomus (l) | Lavikainen et al. 2008 | - |
| *T. polyacantha* Leuckart, 1856 | Myodes glareolus (l) | Haukisalmi and Henttonen 1993, Lavikainen et al. 2008 | USNPC 94887, 108005 |
| *T. polyacantha* Leuckart, 1856 | Myodes rutilus (l) | Wiger et al. 1976 | - |
| *T. saginata* Goeze, 1782 [*Cysticercus bovis* Cobbold, 1866, *Cysticercus inermis*, *Taenia mediocanellata* Küchenmeister, 1852] | Homo sapiens | Pippingsköld 1869, Sievers 1905 | MZH |
| *T. saginata* Goeze, 1782 [*Cysticercus bovis* Cobbold, 1866, *Cysticercus inermis*, *Taenia mediocanellata* Küchenmeister, 1852] | Bos taurus (l) | Niemiaho 1964 | MZH |
| *T. solium* Linnaeus, 1758 [*Cysticercus cellulosae* (Gmelin, 1790)] | Homo sapiens | Sievers 1903, 1905 | MZH |
| *T. solium* Linnaeus, 1758 [*Cysticercus cellulosae* (Gmelin, 1790)] | Homo sapiens (l) | Saltzman 1868, Sievers 1905 | - |
| *Taenia* sp. | Lynx lynx | Lavikainen et al. 2013 | MZH |
| *Taenia* sp. | Alces alces (l) | Present study (EVIRA) | MZH |
| *Taenia* sp. | Capreolus capreolus (l) | Present study (EVIRA) | MZH |
| *Hydatigera* Lamarck, 1816 | *H. taeniaeformis* (Batsch, 1786) s.l. [*Taenia taeniaeformis* Batsch, 1786, *Taenia coccicollis* Rudolphi, 1810, *Cysticercus fasciolaris* Rudolphi, 1808] | Felis silvestris catus | Lavikainen et al. 2008 | MZH |
| *Hydatigera* Lamarck, 1816 | Lynx lynx | Lavikainen et al. 2013 | MZH |
| *Hydatigera* Lamarck, 1816 | Apodemus flavicollis (l) | Tenora et al. 1983 | - |
| *Hydatigera* Lamarck, 1816 | Microtus agrestis (l) | Tenora et al. 1983, Haukisalmi et al. 1994 | - |
| *Hydatigera* Lamarck, 1816 | Myodes rutilus (l) | Wiger et al. 1976 | - |
| *Hydatigera* Lamarck, 1816 | Ondatra zibethicus (l) | Helminen 1957, Tenora et al. 1985b | MZH |
| Tapeworm taxa | Host species | References/source of specimens | Depositories/collection numbers |
|--------------|--------------|--------------------------------|---------------------------------|
| *Veraseria* Nakao, Lavikainen, Iwaki, Haukisalmi, Konyaev, Oku, Okamoto & Ito, 2013 | *Rattus norvegicus* (l) | Present study (MZH) | MZH |
| *V. mustelae* (Gmelin, 1790) [*Taenia mustelae* Gmelin, 1790, *Taenia tenuicollis* Rudolphi, 1819] | *Lutra lutra* (l) | Present study (EVIRA) | - |
| *Microtus agrestis* (l) | Tenora et al. 1983 | - | - |
| *Microtus oeconomus* (l) | Tenora et al. 1983 | - | - |
| *Myodes glareolus* (l) | Tenora et al. 1983, Lavikainen et al. 2008 | USNPC 108061, 108070, 108076, 108080, 108085, 108092, 108104, 108111 |
| *Myodes rufocanus* (l) | Tenora et al. 1983, Lavikainen et al. 2008 | - | - |
| *Myodes rutilus* (l) | Tenora et al. 1983, Lavikainen et al. 2008 | - | - |
| *Echinococcus* Rudolphi, 1801 | *Canis lupus* | Hirvelä-Koski et al. 2003 | - |
| *E. canadensis* (Cameron, 1960) [*E. granulosus* (Batsch, 1786)] | *Alces alces* | Lavikainen et al. 2003 | - |
| | *Rangifer tarandus* (l) | Lavikainen et al. 2003 | - |
| | *Homo sapiens* (l) | Oksanen and Lavikainen in press, Hämäläinen et al., unpubl. | - |
| *E. equinus* Williams & Sweatman, 1963 | *Equus caballus* (l) | Saarna et al. 2009 | - |
| *E. granulosus* (Batsch, 1786) s.l. | *Homo sapiens* (l) | Sievers 1889, 1905, Fagerlund 1890, Schulten 1890, Faltin 1914, MZH |
| *E. granulosus* (Batsch, 1786) s.s. | *Homo sapiens* (l) | Lavikainen 2005 | - |
| *E. multilocularis* Leuckart, 1863 | *Homo sapiens* (l) | Present study (A. Lavikainen, unpubl.) | - |
B. Host species and their tapeworms

**CYCLOSTOMATA** (jawless fishes, ympyräsuiset)

*Petromyzontidae* (northern lampreys, nahkiaiset)
- *Lampetra fluviatilis* (lamprey, nahkiainen)
- *Triaenophorus crassus* (l)

**ACTINOPTERYGII** (ray-finned fishes, viuhkaeväiset kalat)

*Siluridae* (catfishes, monnit)
- *Silurus glanis* (wels catfish, monni)
- *Glinitaenia osculata*

*Percidae* (percids, ahvenet)
- *Gymnocephalus cernua* (ruffe, kiiski)
- *Diphyllobothrium latum* (l)
- *Triaenophorus nodulosus* (l)
- *Proteocephalus cernuae*
- *Perca fluviatilis* (European perch, ahven)
- *Diphyllobothrium latum* (l)
- *Ligula intestinalis* (l)
- *Triaenophorus nodulosus* (l)
- *Proteocephalus percae*

*Zoarcidae* (eelpouts, kivinilkat)
- *Zoarces viviparus* (viviparous eelpout, kivinilkka)
- *Triaenophorus nodulosus* (l)

*Gobiidae* (gobies, tokot)
- *Pomatoschistus minutus* (sand goby, hietatokko)
- *Proteocephalus gobiorum*

*Anguillidae* (freshwater eels, ankeriaat)
- *Anguilla anguilla* (European eel, ankerias)
- *Bothriocephalus claviceps*
- *Proteocephalus macrocephalus*

*Esocidae* (pikes, hauet)
- *Esox lucius* (northern pike, hauki)
- *Diphyllobothrium dendriticum* (l)
- *Diphyllobothrium latum* (l)
- *Triaenophorus crassus*
- *Triaenophorus nodulosus* (l)
- *Triaenophorus nodulosus/T. nodulosus* (l)

*Pleuronectidae* (flounders, oikeasilmäkampelat)
- *Platichthys flesus* (European flounder, kampela)
- *Diplocotyle olrikii*

*Scophthalmidae* (turbots, piikkikampelat)
- *Scophthalmus maximus* (turbot, piikkikampela)
- *Bothriocephalus scorpii*

*Cyprinidae* (cyprinids, särkikalat)
- *Abramis brama* (bream, lahna)
- *Caryophyllaeus laticeps*
- *Ligula intestinalis* (l)
- *Abramis ballerus* (blue bream, sulkava)
- *Proteocephalus torulosus*
| Common Name                  | Scientific Name                  |
|-----------------------------|----------------------------------|
| Alburnus alburnus (common bleak, salakka) | Caryophyllaeides fennica |
| Ligula intestinalis (l)     | Proteocephalus torulosus        |
| Blicca bjoerkna (silver bream, pasuri) | Caryophyllaeides fennica |
| Caryophyllaeus laticeps     | Ligula intestinalis (l)          |
| Carassius carassius (crucian carp, ruutana) | Caryophyllaeides fennica |
| Khawia rossittensis        |                                  |
| Leuciscus idus (ide, säyne) | Caryophyllaeides fennica |
| Proteocephalus torulosus    |                                  |
| Leuciscus leuciscus (common dace, seipi) | Caryophyllaeus laticeps |
| Caryophyllaeides fennica    | Ligula intestinalis (l)          |
| Proteocephalus torulosus    |                                  |
| Phoxinus phoxinus (Eurasian minnow, mutu) | Ligula intestinalis (l)          |
| Rutilus rutilus (common roach, särki) | Caryophyllaeus laticeps |
| Caryophyllaeides fennica    | Ligula intestinalis (l)          |
| Proteocephalus torulosus    |                                  |
| Scardinius erythrophthalmus (common rudd, sorva) | Caryophyllaeides fennica |
| Omeridae (smelts, kuoreet)  |                                  |
| Omerus eperlanus (European smelt, kuore) | Diphyllobothrium dendriticum (l) |
| Diphyllobothrium ditremum (l) | Triaenophorus nodulosus (l)     |
| Proteocephalus tetratominus |                                  |
| Salmonidae (salmonids, lohet) |                                  |
| Coregonus lavaretus (European whitefish, siika) | Cyathocephalus truncatus |
| Diphyllobothrium dendriticum (l) | Diphyllobothrium ditremum (l) |
| Eubothrium crassum          | Triaenophorus crassus (l)       |
| Proteocephalus longicollis  |                                  |
| Coregonus albula (vendace, muikku) | Diphyllobothrium dendriticum (l) |
| Diphyllobothrium ditremum (l) | Triaenophorus crassus (l)       |
| Proteocephalus longicollis  |                                  |
| Fish Species   | Tissue Affected |
|---------------|-----------------|
| *Salmo salar* (Atlantic salmon, lohi) | Diphyllobothrium dendriticum (l)  |
|               | Eubothrium crassum |
|               | Triaenophorus nodulosus (l) |
| *Salmo trutta* (brown trout, taimen) | Cyathocephalus truncatus |
|               | Diphyllobothrium dendriticum (l) |
|               | Diphyllobothrium ditremum (l) |
|               | Eubothrium crassum |
|               | Eubothrium salvelini |
|               | Triaenophorus nodulosus (l) |
| *Salvelinus alpinus* (Arctic char, nieriä) | Diphyllobothrium dendriticum (l) |
|               | Diphyllobothrium ditremum (l) |
|               | Eubothrium salvelini |
|               | Triaenophorus crassus (l) |
|               | Proteocephalus longicollis |
| *Oncorhynchus mykiss* (rainbow trout, kirjolohi) | Triaenophorus crassus (l) |
|               | *Cyathocephalus truncatus |
|               | Triaenophorus crassus (l) |
|               | Proteocephalus thymalli |
| **Clupeidae** (clupeids, sillit) | **Clupea harengus membras** (Baltic herring, silakka) |
|               | Eubothrium crassum |
| **Gasterosteidae** (sticklebacks, piikkikalat) | **Gasterosteus aculeatus** (three-spined stickleback, kolmipiikki) |
|               | Diphyllobothrium dendriticum (l) |
|               | Diphyllobothrium ditremum (l) |
|               | Schistocephalus solidus (l) |
|               | Triaenophorus nodulosus (l) |
|               | Proteocephalus filicollis |
|               | Pungitius pungitius (ninespine stickleback, kymmenpiikki) |
|               | Diphyllobothrium ditremum (l) |
|               | Schistocephalus pungitii (l) |
|               | Triaenophorus nodulosus (l) |
|               | Proteocephalus ambiguus |
| **Cottidae** (cottids, simput) | **Cottus gobio** (bullhead, kivisimppu) |
|               | Schistocephalus cotti (l) |
|               | Triaenophorus nodulosus (l) |
|               | Myxocephalus scorpius (shorthorn sculpin, isosimppu) |
|               | Bothriocephalus scorpii |
|               | Proteocephalus gobiorum |
|               | Triglopsis quadricornis (fourhorn sculpin, härkäsimplppu) |
|               | Diphyllobothrium dendriticum (l) |
| **Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates...** |
|---|
| **Bothriocephalus scorpii** |
| **Proteocephalus gobiorum** |
| **Taurulus bubalis** *(long-spined bullhead, piikkisimppu)* |
| **Bothriocephalus scorpii** |
| **Lotidae (lings, mateet)** |
| **Lota lota** *(burbot, made)* |
| **Diphyllobothrium dendriticum** *(l)* |
| **Diphyllobothrium ditremum** *(l)* |
| **Diphyllobothrium latum** *(l)* |
| **Eubothrium rugosum** |
| **Triaenophorus nodulosus** *(l)* |
| **Gadidae (cods, turskakalat)** |
| **Gadus morhua** *(Atlantic cod, turska)* |
| **Diplocotyle olrikii** |
| **Abothrium gadi** |
| **AVES (birds, linnut)** |
| **Anseriformes (waterfowl, sorsalinnut)** |
| **Anas acuta** *(northern pintail, jouhisorsa)* |
| **Drepanidolepis spinulosa** |
| **Diorchis inflata** |
| **Diorchis stefanskii** |
| **Drepanidolepis anatina** |
| **Fimbriaria fasciolaris** |
| **Microsomacanthus abortiva** |
| **Microsomacanthus arcuata** |
| **Microsomacanthus collaris** |
| **Microsomacanthus paracompresa** |
| **Retinometra macracanthos** |
| **Sobolevicanthus dafilae** |
| **Anas clypeata** *(northern shoveler, lapasorsa)* |
| **Diorchis ransomi** |
| **Fimbriaria fasciolaris** |
| **Microsomacanthus arcuata** |
| **Microsomacanthus collaris** |
| **Microsomacanthus compresa** |
| **Sobolevicanthus gracili** |
| **Anas crecca** *(common teal, tavi)* |
| **Drepanidolepis spinulosa** |
| **Aploparaksis furcigera** |
| **Dicranotaenia coronula** |
| **Diorchis elisae** |
| **Diorchis stefanskii** |
| **Diorchis ransomi** |
| **Drepanidolepis anatina** |
| **Fimbriaria fasciolaris** |
| **Microsomacanthus arcuata** |
Microsomacanthus collaris
Microsomacanthus compressa
Microsomacanthus paracompressa
Sobolevicanthus dafileae
Sobolevicanthus octacanthus
Sobolevicanthus gracilis
Sobolevicanthus krabbeella

Anas penelope (Eurasian wigeon, haapana)

Drepanidelepis spinulosa
Aploparaksis furcigera
Dicranotaenia coronula
Diorchis stefanskii
Diorchis asiatica
Diploposthe laevis
Drepanidelepis anatina
Drepanidotaenia lanceolata
Microsomacanthus compressa
Retinometra macracanthos

Anas platyrhynchos (mallard, sinisorsa)

Drepanidelepis spinulosa
Aploparaksis furcigera
Dicranotaenia coronula
Diorchis elisae
Diorchis inflata
Diorchis stefanskii
Diorchis ransomi
Drepanidelepis anatina
Fimbriaria fasciolaris
Microsomacanthus collaris
Microsomacanthus paracompressa
Retinometra macracanthos
Sobolevicanthus octacanthus
Sobolevicanthus gracilis

Anas querquedula (garganey, heinätavi)

Aploparaksis furcigera
Diorchis elisae
Diorchis stefanskii
Drepanidotaenia lanceolata
Fimbriaria fasciolaris
Sobolevicanthus octacanthus

Anser fabalis (bean goose, metsähansi)

Wardium creplini

Aythya ferina (common pochard, punasotka)

Diploposthe laevis
Microsomacanthus collaris

Aythya fuligula (tufted duck, tulkasotka)

Drepanidelepis spinulosa
| Tapeworms (Platyhelminthes, Cestoda) of vertebrates |
|---------------------------------------------------|
| Aploparaksis furcigera                             |
| Dicranotaenia coronula                             |
| Diorchis elisa                                     |
| Fimbriaria fasciolaris                             |
| Microsomacanthus arcuata                           |
| Microsomacanthus compressa                         |
| Microsomacanthus paracompressa                     |
| Sobolevicanthus dafileae                           |
| Sobolevicanthus octacanthus                        |
| Sobolevicanthus gracilis                          |
| Sobolevicanthus krabbeella                         |
| Aythya marila (greater scaup, lapasotka)           |
| Microsomacanthus compressa                         |
| Retinometra macracanthos                           |
| Bucephala clangula (common goldeneye, telkkä)      |
| Schistocephalus solidus                            |
| Aploparaksis furcigera                             |
| Dicranotaenia coronula                             |
| Cygnus cygnus (whooper swan, laulujoutsen)         |
| Wardooides nyrocae                                 |
| Melanitta fusca (velvet scoter, pilkkasiipi)        |
| Drepanidolepis sp. 1                               |
| Drepanidolepis sp. 2                               |
| Dicranotaenia coronula                             |
| Mergus mergans (common merganser, isokoskelo)      |
| Diphyllolothrium ditremum                          |
| Confluaria multistriata?                           |
| Fimbriaria fasciolaris                             |
| Ligula intestinalis                                |
| Tschertkovilepis tenuirostris                     |
| Mergus serrator (red-breasted merganser, tukkakoskelo) |
| Ligula intestinalis                                |
| Schistocephalus solidus                            |
| Fimbriaria fasciolaris                             |
| *Sobolevicanthus gracilis                         |
| Somateria mollissima (common eider, haahka)        |
| *Fimbriaria fasciolaris                            |
| Microsomacanthus diorchis                          |
| Microsomacanthus microsoma                         |
| Microsomacanthus paramicrosoma                     |
| Galliformes (gamebirds, kanalinnut)                |
| Lagopus lagopus (willow ptarmigan, rieko)          |
| Paroniella urogalli                                |
| Skrabjinia cesticillus                             |
| Hymenolepis (s.l.) sp.                             |
| Lyrurus tetrix (black grouse, teeri)               |
| Paroniella urogalli                                |
Skrjabinia cesticillus
Hymenolepis (s.l.) sp.

Perdix perdix (grey partridge, peltoppy)
Paroniella urogalli

Tetrao urogallus (western capercaillie, metso)
Paroniella urogalli
Skrjabinia cesticillus
Hymenolepis (s.l.) sp.

Tetrastes bonasia (hazel grouse, pyy)
Paroniella urogalli
Skrjabinia cesticillus
Hymenolepis (s.l.) sp.

Gaviiformes (loons/divers, kuikkalinnut)

Gavia arctica (black-throated loon/diver, kuikka)
Diphyllobothrium ditremum
Ligula intestinalis
Biglandatrium biglandatrium
Dubininolepis rostellata

Gavia stellata (red-throated loon/diver, kaakkuri)
Dubininolepis rostellata
Neovalipora parvispine
Tetrabothrius macrocephalus
Tetrabothrius mawsoni

Podicipediformes (grebes, uikkulinnut)

Podiceps cristatus (great crested grebe, silkkiuikku)
Ligula intestinalis
Tetrabothrius macrocephalus
Tetrabothrius mawsoni
Confluaria pseudofurcifera

Podiceps grisegena (red-necked grebe, härkälintu)
Confluaria furcifera

Pelecaniformes (pelicans, cormorants etc., pelikaanilinnut)

Phalacrocorax carbo (great cormorant, merimetso)
Ligula intestinalis

Accipitriformes (hawks and eagles, päiväpetolinnut)

Buteo buteo (common buzzard, hiirihaukka)
Cladotaenia globifera

Buteo lagopus (rough-legged buzzard, piekana)
Cladotaenia globifera

Charadriiformes (shorebirds, rantalinnut)

Actitis hypoleucus (common sandpiper, rantasipi)
*Anomotaenia arionis
*Kowalewskiella cingulifera
Arenaria interpres (ruddy turnstone, karikukko)
Schistocephalus solidus
Calidris alpina (dunlin, suosirri)
*Sacciuterina paradoxa
### Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates...

| Common Name                              | Scientific Name                      |
|------------------------------------------|--------------------------------------|
| Aploparaksis crassirostris               |                                      |
| Cepphus grylle (black guillemot, riskiälä) |                                      |
| *Alcataenia campylacantha                |                                      |
| *Tetraphyllium macrocephalus             |                                      |
| Charadrius hiaticula (common ringed plover, tylli) |          |
| *Anomoatenia microrhyncha                |                                      |
| Larus argentatus (European herring gull, harmaalokki) |            |
| Diphyllobothrium ditremum                |                                      |
| Ligula intestinalis                      |                                      |
| *Tetraphyllium mawsoni                   |                                      |
| Larus canus (common gull, kalalokki)     |                                      |
| Alcataenia larina                        |                                      |
| Larus fuscus (lesser black-backed gull, selkälokki) |   |
| Ligula intestinalis                      |                                      |
| Limicola falcinella (broad-billed sandpiper, jänkäsirriäinen) | |
| Aploparaksis crassirostris               |                                      |
| Limosa lapponica (bar-tailed godwit, punakuuri) |                     |
| Ophryoceolype proteus                    |                                      |
| Numenius arquata (Eurasian curlew, kuovi) |                                      |
| Aploparaksis filum s.l.                  |                                      |
| Dictymetra laevigata                     |                                      |
| Phalaropus lobatus (red-necked phalarope, vesipääsky) |   |
| *Dictymetra laevigata                    |                                      |
| Philomachus pugnax (ruff, suokukko)      |                                      |
| *Anomoatenia microrhyncha                |                                      |
| Pluvialis apricaria (European golden plover, kapustarinta) | |
| Nototaenia brevis                        |                                      |
| Riparia riparia (sand martin, törmäpääsky) |                                      |
| Angularella sp.                          |                                      |
| Scolopax rusticola (Eurasian woodcock, lehtokurppa) | |
| *Anomoatenia globulus                    |                                      |
| Aploparaksis filum s.l.                  |                                      |
| Fuhrmannolepis sp.                       |                                      |
| Sacciuterina paradoxa                    |                                      |
| Tringa glareola (wood sandpiper, liro)   |                                      |
| Trichocephaloidis sp.                    |                                      |
| Aploparaksis crassirostris               |                                      |
| Aploparaksis filum s.l.                  |                                      |
| Sterna hirundo (common tern, kalatiira)  |                                      |
| Schistocephalus solidus                  |                                      |
| Sterna paradisaea (Arctic tern, lapintiira) |                                 |
| Schistocephalus solidus                  |                                      |
| Uria aalge (common murre/guilllemot, etelärinkiisla) |             |
| *Tetraphyllium macrocephalus             |                                      |
| Columbiformes (pigeons and doves, kyyhkylinnut) |    |
| *Columba palumbus (common wood pigeon, sepelkyyhky) | |
| Dilepis undula                           |                                      |
### Strigiformes (owls, pöllölinnut)
- *Strix uralensis* (Ural owl, viirupöllö)
- *Paruterina candelabra*ria
- *Aegolius funereus* (Tengmalm’s owl, helmipöllö)
- *Paruterina candelabra*ria

### Apodiformes (swifts and hummingbirds, kirskulinnut)
- *Apus apus* (common swift, tervapääsky)
- *Neoliga depressa*
- *Notopentorchis cyathifor*mis

### Piciformes (woodpeckers, tikkalinnut)
- *Dendrocopos leucotos* (white-backed woodpecker, valkoselkätikka)
- *Liga crateriformis*
- *Dendrocopos major* (great spotted woodpecker, käpytikka)
- *Liga crateriformis*
- *Dryocopus martius* (black woodpecker, palokärki)
- *Rasilletina frontina*
- *Picoides tridactylus* (Eurasian three-toed woodpecker, pohjantikka)
- *Orthoskrjabinia sp.*
- *Picus canus* (grey-headed woodpecker, harmaapäätikka)
- *Liga crateriformis*

### Passeriformes (passerines, varpuslinnut)
- *Anthus trivialis* (tree pipit, metsäkirvinen)
- *Anonchotaenia globata*
- *Corvus corone* (carrion crow, varis)
- *Dilepis undula*
- *Spiniglans constricta*
- *Passerilepis crenata*
- *Delichon urbica* (common house martin, räystäspääsky)
- *Hirundinicola parvirostris*
- *Fringilla montifringilla* (brambling, järripeippo)
- *Monosertum parinum*
- *Hirundo rustica* (barn swallow, haarapääsky)
- *Hirundinicola parvirostris*
- *Lanius collurio* (red-backed shrike, pikkulepinkäinen)
- *Biuterina sp.*
- *Paruterina parallelepipeda*
- *Motacilla alba* (white wagtail, västäräkki)
- *Sobolevitaenia borealis*
- *Parus major* (great tit, talittiainen)
- *Passerilepis parina*
- *Pica pica* (magpie, harakka)
- *Dilepis undula*
- *Passerilepis stylosa*
- *Spiniglans sharpiloi*
- *Sturnus vulgaris* (common starling, kottarainen)
- *Wardium farciminosa*
- *Turdus iliacus* (redwing, punakylkirastas)
Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates...

Dilepis undula
Geruilepis crenata

*Turdus philomelos* (song thrush, laulurastas)
Dilepis undula

*Turdus pilaris* (fieldfare, rääkätirastas)
Dilepis undula
Geruilepis crenata

*Turdus viscivorus* (mistle thrush, kulorastas)
Dilepis undula
Geruilepis crenata

**MAMMALIA** (mammals, nisäkkäät)

**Soricidae** (shrews, päästäiset)

*Sorex araneus* (common/Eurasian shrew, metsäpäästäinen)
Dilepis undula
Hepatocestus hepaticus
Monocercus arionis
Ditestolepis diaphana
Gulyaevilepis tripartita
Lineolepis scutigera
Neoskrjabinolepis merkushevae
Neoskrjabinolepis schaldybini
Neoskrjabinolepis singularis
Pseudobotrialepis globosoides
Soricinia infirma
Spaskylepis ovaluteri
Staphylocystis furcata
Staphylocystoides stevenskii
Urocystis prolifer
Vigisolepis spinulosa
Mesocestoides lineatus (l)

*Sorex caecutiens* (Laxmann's shrew, idänpäästäinen)
Monocercus arionis
Ditestolepis diaphana
Gulyaevilepis tripartita
Lineolepis scutigera
Neoskrjabinolepis merkushevae
Neoskrjabinolepis schaldybini
Neoskrjabinolepis singularis
Pseudobotrialepis globosoides
Soricinia infirma
Spaskylepis ovaluteri
Staphylocystis furcata
Vigisolepis spinulosa

*Sorex minutus* (Eurasian pygmy shrew, vaivaispäästäinen)
Monocercus arionis
Ditestolepis diaphana
Neoskrjabinolepis schaldybini
Pseudobotrialepis globosoides
Staphylocystoides stefanski
Vigisolepis spinulosa
*Sorex isodon* (taiga shrew, mustapäästäinen)
Monocercus arionis
Ditestolepis diaphana
Ditestolepis sp.
Neokrjabinolepis schaldybini
Vigisolepis spinulosa
*Neomys fodiens* (Eurasian water shrew, vesipäästäinen)
*Polycercus* sp.
Vigisolepis spinulosa

**Vespertilionidae (vesper bats, siipat)**
*Eptesicus nilsoni* (northern bat, pohjanlepakko)
*Vampirolepis* sp.

**Leporidae (rabbits and hares, jänikset)**
*Lepus europaeus* (European hare, rusakko)
*Mosovoyia pectinata*
*Taenia pisiformis* (l)
*Lepus timidus* (mountain hare, metsäjänis)
*Mosovoyia pectinata*
*Taenia pisiformis* (l)
*Oryctolagus cuniculus* (European rabbit, kani)
*Neoctenotaenia ctenoides*

**Muridae (Old World rats and mice, rottaeläimet)**
*Apodemus flavicollis* (yellow-necked mouse, metsähiiri)
*Hymenolepis cf. diminuta*
*Rodentolepis fraterna*
*Skriabinaotaenia lobata*
*Mesocestoides lineatus* (l)
*Hydatigera taeniaeformis* s.l. (l)
*Micromys minutus* (harvest mouse, vaivaishiiri)
*Nomadolepis* sp.
*Mus musculus* (house mouse, kotihiiri)
*Catenotaenia pusilla*
*Rattus norvegicus* (brown rat, isorotta)
*Hydatigera taeniaeformis* s.l. (l)

**Cricetidae (cricetids, hamsterit ja myyrät)**
*Arvicola amphibius* (European water vole, vesimyyrä)
*Anoplocephaloides cf. dentata*
*Eurotaenia gracilis*
*Paranoplocephala omphalodes*
*Lemmus lemmus* (Norwegian lemming, tunturisopuli)
*Anoplocephaloides cf. dentata*
*Eurotaenia gracilis*
*Lemminia fellmani*
*Microtus agrestis* (field vole, peltomyyrä)
| Species                                      |
|----------------------------------------------|
| Anoplocephaloides cf. dentata                |
| Eurotaenia gracilis                         |
| Microcephaloides cf. variabilis              |
| Microticola blanchardi                      |
| Paranoplocephala omphalodes                 |
| Hymenolepis (s.l.) asymmetrica               |
| Mesocestoides lineatus (l)                   |
| Hydatigera taeniaeformis s.l. (l)            |
| Versteria mustelae (l)                       |
| *Microtus levis* (East European vole, idánkenttämyyrä) |
| Paranoplocephala omphalodes                 |
| Taenia polyacantha (l)                       |
| *Microtus oeconomus* (root vole/tundra vole, lapinmyyrä) |
| Anoplocephaloides cf. dentata               |
| Eurotaenia gracilis                         |
| Microcephaloides cf. variabilis              |
| Microticola blanchardi                      |
| Paranoplocephala jarrelli                  |
| Taenia polyacantha (l)                      |
| Versteria mustelae (l)                       |
| *Myodes glareolus* (bank vole, metsämyyrä)  |
| Eurotaenia gracilis                         |
| Paranoplocephala omphalodes                 |
| Paranoplocephala kalelai                   |
| Catenotaenia benttoneni                     |
| Cladotaenia globifera (l)                   |
| Mesocestoides lineatus (l)                   |
| Taenia martii (l)                           |
| Taenia polyacantha (l)                      |
| Hydatigera taeniaeformis s.l. (l)            |
| Versteria mustelae (l)                       |
| *Myodes rufocanus* (grey-sided vole, harmaakuvemyyrä) |
| Anoplocephaloides cf. dentata               |
| Eurotaenia gracilis                         |
| Microcephaloides cf. variabilis              |
| Paranoplocephala kalelai                   |
| Mesocestoides lineatus (l)                   |
| Versteria mustelae (l)                       |
| *Myodes rutilus* (red vole/northern red-backed vole, punamyyrä) |
| Eurotaenia gracilis                         |
| Paranoplocephala kalelai                   |
| Catenotaenia benttoneni                     |
| Mesocestoides lineatus (l)                   |
| Taenia martii (l)                           |
| Taenia polyacantha (l)                      |
| Hydatigera taeniaeformis s.l. (l)            |
| Versteria mustelae (l)                       |
Ondatra zibethicus (musk rat, piisami)

Hydatigera taeniaeformis s.l. (l)

Sciuridae (squirrels, oravat)

Sciurus vulgaris (Eurasian red squirrel, orava)

Catenotaenia dendritica

Felidae (cats, kissaeläimet)

Felis catus (domestic cat, kissa)

Hydatigera taeniaeformis s.l.

Lynx lynx (Eurasian lynx, ilves)

Spirometra sp.

Taenia laticollis

Taenia sp.

Hydatigera taeniaeformis s.l.

Mustelidae (mustelids, näätäeläimet)

Lutra lutra (otter, saukko)

Versteria mustelae (l)

Martes martes (European pine marten, näätä)

Mesocestoides lineatus

Meles meles (European badger, mäyrä)

Atriotaenia incisa

Mesocestoides lineatus

Canidae (canids, koiraeläimet)

Canis lupus (wolf, susi)

Mesocestoides lineatus

Taenia hydatigena

Taenia krabbei

Echinococcus canadensis

Canis lupus familiaris (dog, koira)

Diphyllobothrium latum

Dipylidium caninum

Taenia pisiformis

Nyctereutes procyonoides (raccoon dog, supikoira)

Polycercus sp.

Vulpes vulpes (red fox, kettu)

Diphyllobothrium latum

Mesocestoides litteratus

Taenia polycantha

Ursidae (bears, karhut)

Ursus arctos (brown bear, karhu)

Taenia arctos

Phocidae (true seals, hylkeet)

Pusa hispida saimensis (Saimaa ringed seal, saimaannorppa)

Diphyllobothrium ditremum

Triaenophorus nodulosus

Pusa hispida bottnica (Baltic ringed seal, itämerennorppa)

Schistocephalus solidus
### Checklist of tapeworms (Platyhelminthes, Cestoda) of vertebrates

**Equidae (horses, hevoset)**
- *Equus caballus* (horse, hevonen)
  - *Anoplocephala perfoliata*
  - *Echinococcus equinus* (l)

**Cervidae (deer, hirvieläimet)**
- *Alces alces* (Eurasian elk/moose, hirvi)
  - *Moniezia expansa*
  - *Taenia arctos* (l)
  - *Taenia hydatigena* (l)
  - *Taenia sp.* (l)
  - *Echinococcus canadensis* (l)

**Capreolus capreolus** (European roe deer, metsäkauris)
- *Taenia sp.* (l)

**Rangifer tarandus** (reindeer, poro/peura)
- *Moniezia cf. benedeni*
  - *Taenia krabbei* (l)
  - *Echinococcus canadensis* (l)

**Bovidae (cloven-hoofed mammals, onttosarviset)**
- *Ovis aries* (sheep, lammas)
  - *Moniezia expansa*
  - *Taenia hydatigena* (l)

**Bos taurus** (cowl/cattle, lehmä/nauta)
- *Moniezia benedeni*
  - *Taenia saginata* (l)

**Sus scrofa** (domestic pig, sika)
- *Taenia hydatigena* (l)

**Hominidae (great apes, isot ihmisapinat)**
- *Homo sapiens* (man, ihminen)
  - *Diphyllobothrium latum*
  - *Taenia saginata*
  - *Taenia solium* / *T. solium* (l)
  - *Echinococcus granulosus* (l)
  - *Echinococcus multilocularis* (l)