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Checklist of digeneans (Platyhelminthes, Trematoda, Digenea) of Georgia

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Abstract

Background

In the present study, we aim to provide an inventory of digenetic trematodes (Platyhelminthes, Trematoda, Digenea) from Georgia including possibly all records available from the freshwater, marine and terrestrial realms. The checklist is based on a critical review of data from 109 papers, 11 monographs and four Ph.D. theses published between 1935 and 2019 and our new records. The checklist includes information on synonymy, the host species, site of infection, geographical distribution, and bibliographical references. The present data will serve as a baseline for further studies on trematodes from Georgia focused on integrative taxonomy, life-cycle elucidation, parasite ecology and epidemiology.

New information

We compiled data on the digenean trematode fauna of Georgia, which is represented by 186 species (out of these 173 identified to species level) belonging to 108 genera and 48 families. This is the first checklist of the digeneans of Georgia. The majority of digenean species were recorded as adults (160 species), only a small part was found as cercariae (33 species) or metacercariae (24 species), in their first or second intermediate hosts, respectively. Predominantly records of trematodes (62 species) from birds were found, followed by those parasitizing fish (50 species, i.e 32 species as adults and 18 as metacercariae), mammals (33 species) and amphibians (25 species, i.e 23 species as adults and 2 as metacercariae), with the least number of species reported from reptiles (12 species, i.e 9 species as adults and 3 as metacercariae). Adult digeneans recorded together with another life-cycle stage (metacercariae and/or cercariae) comprised 28 species, i.e. for 15% of the total trematode species number a part of their life-cycle is known.

Keywords

Biodiversity, catalogue, Caucasus, helminths, host, parasite

Introduction

Digeneans (Platyhelminthes, Trematoda, Digenea) have complex life-cycles with several hosts involved (Cribb et al. 2003). They are parasites of all vertebrate groups and of a vast variety of invertebrates (Ditrich et al. 1997, Dvořák et al. 1999, Esteban et al. 1997, Faltýnková et al. 2009, Faltýnková et al. 2016, Manga-González and Ferreras 2019). Some groups of trematodes can be detrimental to human health and cause considerable loss to livestock (Beesley et al. 2017, Esteban et al. 2019, Ginetsinskaya 1968, Keiser and Utzinger 2009, Mas-Coma et al. 2019, Rizwan et al. 2022). However, trematodes are mainly important players in the functioning of ecosystems and they are an inherent part of food webs constituting a substantial part of biomass, and because of their sequencial use of intermediate and definitive hosts, they reflect the biodiversity of free-living host animals (Hechinger and Lafferty 2005).

Therefore, knowledge of trematode diversity and distribution, their life-cycles and transmission pathways is crucial not only for understanding the epidemiology and application of preventative measures, but also for biodiversity conservation (Dobson et al. 2008, Han et al. 2016, Selbach et al. 2020). Since Georgia is situated in the centre of the Caucasus biodiversity hotspot and in an area with a high degree of endemism for both vertebrate and invertebrate faunas (Myers et al. 2000, Mumladze et al. 2019), it is of vital importance to assess the species spectrum of the parasites which occur in this region.

In Georgia, the first studies on trematodes were conducted in the 1930s and early 1940s (Kamalov 1935, Burdjanadze 1937a, Burdjanadze 1937b, Chulkova 1939, Gamtsemlidze 1941, Kirshenblat 1941, Kurashvili 1941). Concerning digeneans of medical and veterinary importance, data on the distribution and prevalence of fascioliasis and dicrocoeliasis were published by Kurashvili and Rodonaia (1954). Since the 1950s, authors mainly focused their studies on the helminth fauna of specific host groups, i.e. fish (Kurashvili et al. 1951, Kurashvili et al. 1973, Kurashvili et al. 1975, Kurashvili et al. 1990, Qoiava 1966, Petriashvili 1971, Gogebashvili and Petriashvili 2002), amphibians and reptiles (Petriashvili 1964, Petriashvili 1966, Jankarashvili 1978, Jankarashvili 1985, Petriashvili et al. 1985), birds (Kurashvili 1953a, Kurashvili 1957, Kurashvili 1961b, Kurashvili et al. 1966, Kurashvili et al. 1976) and mammals (Rodonaia 1951, Rodonaia 1966a, Rodonaia 1966b, Rodonaia 1971, Matsaberidze 1961, Matsaberidze 1966b, Matsaberidze 1966a, Matsabaridze 1976). Fragmentary records of trematodes in freshwater and terrestrial molluscs serving as intermediate hosts were provided by several authors (Natsvlishvili 1968, Chiaberashvili and Javelidze 1968, Chiaberashvili and Javelidze 1977, Chiaberashvili 1971a, Chiaberashvili 1971b, Tkachenko 1988, Tkachenko 1990). The occurrence of human fascioliasis was studied by Gigitashvili (1965), Gigitashvili (1969), Zenaishvili et al. (2004), Zenaishvil et al.

(2004), and Semyenova et al. (2006), who studied the genetic differentiation of European and Asian populations of *Fasciola hepatica* revealing that the Georgian one belonged to the European population, and providing the only DNA sequences of trematodes from Georgia. In recent years, a few annotated checklists of helminths from different host taxa have been published by Murvanidze et al. (2008a), Murvanidze et al. (2008b), Murvanidze et al. (2018).

Despite all the above mentioned, a summarizing review providing detailed information on the diversity of trematodes in Georgia has not been published so far. Only Kurashvili (1961a) reviewed the occurrence of some of the trematode species of medical and veterinary importance; and Kurashvili et al. (1980) published a monograph with a survey of parasites of fishes from the river Mtkvari (Kura), with digeneans included, however, there are only few records which can be regarded as truly from the Georgian territory.

Thus, the aim of the present study was to compose a critically revised checklist of the digenetic trematodes recorded from Georgia. These data will serve as a baseline for future studies on biodiversity, taxonomy, life-cycles, ecological and epidemiological aspects of trematodes in Georgia.

Materials and methods

For records of digeneans from Georgia, we searched the following databases: Google Scholar, Science Direct, Scopus, and the Host-parasite database of the Natural History Museum London, using relevant keywords ('(trematoda or digenea) and Georgia'; excluding records from Georgia, USA). Further, we searched for literary data in relevant papers and monographs. Data from monographs were checked with caution, because in many cases the information on geographical distribution was vague providing only general locations, e.g. the rivers or mountain ranges expanding over more countries. The present checklist is based on 109 primary papers, 11 monographs, and 4 Ph.D. theses published predominantly in Georgian or Russian language between 1935 and 2019, and our unpublished data.

We provide a parasite-host list with the parasites arranged in alphabetical order by family; within each family, species are also listed alphabetically. The host species of each parasite are listed in alphabetical order by family and species. Each parasite taxon contains information on synonyms (listed only when appearing in Georgian literature), host species, site of infection within hosts, geographical distribution, and bibliographical references associated with the parasite and its hosts in Georgia. Global geographical distribution are mainly compiled from monographs of Dubois (1968), Dubois (1970), Yamaguti (1971), Skryabin (1947), Gibson et al. (2002), Niewiadomska (2003), Jones et al. (2005), Sitko et al. (2006), Bray et al. (2008) and Fauna Europea (de Jong et al. 2014), GBIF (GBIF.org 2022), WoRMS (WoRMS 2022). Life-cycle stages other than the sexual adults are indicated in parentheses following the host category, i.e. intramolluscan stages in first intermediate mollusc hosts comprising sporocysts, rediae, and cercariae (the latter are

asexual free-living stages emerging from the snail first intermediate hosts); and metacercariae encysted or unencysted in tissue of second intermediate or paratenic hosts.

Species names were checked for their current state, and for the nomenclature of all taxa we refer to the Catalogue of Life (Gibson et al. 2023), GBIF (GBIF.org 2022), Fauna Europea (de Jong et al. 2014), Molluscabase (2023) and WoRMS (2022); for the classification of trematodes at family level we follow the “Keys to the Trematoda” (Gibson et al. 2002, Jones et al. 2005, Bray et al. 2008).

Trematodes not identified to species level were included in the checklist as well. However, we did not include taxa of doubtful identity, but we listed them in the Discussion with an explanation of their status and history; the names of these taxa are provided exactly as they occur in the literature. Records of cercarial names, which are regarded as provisional, because they do not conform to the taxonomy of adult digeneans, were not included in the checklist either. However, to have a complete view on the potential biodiversity state of trematodes in Georgia, they are included in the Discussion provided with remarks on their occurrence.

The geographical localities, indicating the distribution of trematodes in Georgia, are listed in alphabetical order. Georgia is geographically divided by the Surami (Likhi) Range into two parts, Western Georgia (WG) and Eastern Georgia (EG); and the abbreviations (WG and EG) are used throughout the text to reflect this division. These regions have different climatic conditions – humid and mild climate in the Western and dry continental in the Eastern part of the country (Maruashvili 1964, Murvanidze and Mumladze 2016).

Previously unpublished trematode specimens included in the checklist are deposited in the collections of the Institute of Zoology, Ilia State University.

Annotated checklist of Digenea of Georgia

Phylum Platyhelminthes Minot, 1876

Class Trematoda Rudolphi, 1808

Subclass Digenea Carus, 1863

Order Diplostomida Olson, Cribb, Tkach, Bray & Littlewood, 2003

Family Brachylaimidae Joyeux & Foley, 1930

Genus *Brachylaima* Dujardin, 1843

Brachylaima fulvum Dujardin, 1843

Nomenclature:

Synonym: *Panopistus europaeus* Soltys, 1952

Parasite of: mammals - *Sorex araneus*, *S. raddei.*

Site of infection: small intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: Borjomi; WG: Batumi, Gagra, Oni, Tskaltubo reported by Matsaberidze (1966a), Matsaberidze (1966b), Matsaberidze (1967), Matsabaridze (1976), Rodonaia (1971), Kurashvili (1984b).

Brachylaima fuscata (Rudolphi, 1819) Joyeux, Baer & Timon-David, 1932

Nomenclature:

Synonym: *Brachylaemus fuscatus* (Rudolphi, 1819)

Parasite of: birds - *Columba livia*, *Meleagris gallopavo*, *Mergellus albellus*, *Phasianus colchicus colchicus*, *Turdus merula.*

Site of infection: caecum, esophagus, small intestine.

Distribution: Occurring in the Holarctic Region; **in Georgia**: EG: Marneuli, Martkhopi; WG: Samtredia reported by Gushanskaia (1952), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b), Kurashvili et al. (1966), Kurashvili et al. (1976), Kurashvili et al. (1977), Japaridze and Savateeva (1967).

Brachylaima recurva (Dujardin, 1845) Joyeux & Foley, 1930

Parasite of: mammals - *Apodemus sylvaticus*, *Dryomys nitedula*, *Erinaceus europaeus* .

Site of infection: small intestine.

Distribution: Occurring in Europe, Asia; **in Georgia:** EG: Borjomi, Khashuri, Tbilisi; WG: Abasha, Ambrolauri, Aphkhazeti, Kharagauli, Samtredia, Tskaltubo reported by Kirshenblat (1948), Matsaberidze (1966a), Matsaberidze (1966b), Matsaberidze (1967) , Matsabaridze (1976), Rodonaia (1966a), Kurashvili (1984b).

Brachylaima sp.

Nomenclature:

Synonym: *Brachylaemus* sp.

Parasite of: reptiles - *Lacerta strigata*.

Site of infection: intestine.

Distribution: in Georgia: EG: Khashuri reported by Sharpilo (1962), Murvanidze et al. (2008b)

,,fam. Brachylaimidae" gen. sp.

Parasite of: molluscs (intramolluscan stage) - *Helix lucorum.*

Site of infection: hepatopancreas.

Distribution: in Georgia: EG: Qvemo Qartli, Tbilisi; WG: Adjara, Imereti reported by Murvanidze et al. (2010), Arabuli et al. (2019).

Genus *Ityogonimus* Lühe, 1899

Ityogonimus talpae (Goeze, 1782)

Parasite of: mammals - *Talpa europea*, *T. caucasica*, *T. orientalis*.

Site of infection: small intestine, stomach.

Distribution: Occurring in Europe; **in Georgia**: EG: Borjomi; WG: Abasha, Qobuleti, Samtredia, Sokhumi reported by Matsaberidze (1966b), Matsaberidze (1967), Matsabaridze (1976), Rodonaia (1966a), Rodonaia (1971), Kurashvili (1984b).

Genus *Postharmostomum* Witenberg, 1923

Postharmostomum commutatum (Diesing, 1858) Skrjabin, 1923

Parasite of: birds - *Meleagris gallopavo*, *Tetraogallus caucasicus*.

Site of infection: caecum, small intestine.

Distribution: Cosmopolitan distribution; **in Georgia**: EG: Kazbegi; WG: Samtredia reported by Dinnik (1938), Gushanskaia (1952), Kurashvili (1961a), Japaridze and Savateeva (1967), Kurashvili et al. (1976).

Postharmostomum ularicum Kurashvilli, 1956

Nomenclature:

Synonym: *Brachylaima ularicum* Kurashvili, 1956

Parasite of: birds - *Tetraogallus caucasicus*.

Site of infection: intestine.

Distribution: Recorded only in Georgia, in Yamaguti (1971) listed as in Russia; **in Georgia**: EG: Lagodekhi, Mtatusheti, Tianeti reported by Kurashvili (1956), Kurashvili (1957), Khrustalev and Moskvin (2021).

Family Clinostomidae Lühe, 1901

Genus *Clinostomum* Leidy, 1856

Clinostomum complanatum (Rudolphi, 1814) Braun, 1899

Parasite of: birds - *Ardea cinerea*, *Egretta alba*.

fishes (metacercariae) - *Alburnus chalcoides, Barbus cyri, Esox lucius, Leuciscus aspius, Perca fluviatilis*, *Rutilus rutilus* , *Sander lucioperca*, *Scardinius erythrophthalmus, Silurus glanis, Squalius cephalus, Tinca tinca, Vimba vimba.*

Site of infection: esophagus, oral cavity, pharynx.

Distribution: With Cosmopolitan distribution; **in Georgia:** EG: Bazaleti Lake, Gardabani – Jandari (Karaiazi) Lake, River Mtkvari; WG: Ozurgeti, Lakes: Bebesiri, Paliastomi; River Rioni reported by Kurashvili (1953a), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b), Chiaberashvili (1955), Chiaberashvili (1957), Chiaberashvili (1962b), Chernova (1977), Kurashvili and Petriashvili (1977), Kurashvili et al. (1980), Murvanidze et al. (2018).

Clinostomum piscidium Southwell & Prashad, 1918

Parasite of: fishes (metacercariae) - *Alosa immaculata*, *Liza saliens*, *L. aurata*, *Perca fluviatilis*.

Site of infection: esophagus, oral cavity.

Distribution: Cosmopolitan distribution; **in Georgia**: WG: Batumi, Black Sea coast, Sokhumi, surroundings of Poti; Lakes: Japana, Paliastomi reported by Kurashvili and Tabidze (1947), Kurashvili et al. (1951), Kurashvili (1961a), Kurashvili and Petriashvili (1977), Murvanidze et al. (2018).

Genus *Euclinostomum* Travassos, 1928

Euclinostomum heterostomum (Rudolphi, 1809) Travassos, 1928

Nomenclature:

Synonym: *Euclinostomum skrjabini* Kurashvili, 1948

Parasite of: birds - *Ardea cinerea*, *A. purpurea*.

Site of infection: esophagus.

Distribution: In the Holarctic Region, India, Southeast Asia, Africa; **in Georgia**: EG: Dusheti – Bazaleti Lake, Tbilisi – Digomi, Tsalka reported by Kurashvili (1948), Kurashvili (1950), Kurashvili (1953a), Kurashvili (1957), Kurashvili (1961a).

Family Cyathocotylidae Mühling, 1898

Genus *Mesostephanus* Lutz, 1933

Mesostephanus appendiculatus (Ciurea, 1916) Lutz, 1935

Parasite of: mammals - *Felis chaus*.

molluscs (intramolluscan stage) - *Melanopsis praemorsa.*

Site of infection: intestine.

Distribution: Occurring in the Holarctic Region; **in Georgia**: EG: Gardabani; WG: Lanchkhuti, Rivers: Pichori, Rioni reported by Rodonaia (1971), Galaktionov et al. (1980), Ataev and Dobrovolskiy (1992).

Genus *Paracoenogonimus* Katsurada, 1914

Paracoenogonimus ovatus Katsurada, 1914

Parasite of: fishes (metacercariae) - *Abramis brama*, *Alosa tanaica*, *A. immaculata*, *Barbus capito*, *Cyprinus carpio*, *Esox lucius*, *Perca fluviatilis*, *Rutilus rutilus*, *Sander lucioperca*, *Scardinius erythrophthalmus*, *Vimba vimba*.

Site of infection: musculature, fins.

Distribution: Occurring in Europe; **in Georgia**: WG: Lakes: Didi Narionali, Paliastomi reported by Chernova (1973), Murvanidze et al. (2018).

Genus *Szidatia* Dubois, 1938

Szidatia joyeuxi (Hughes, 1929) Dubois, 1938

Parasite of: reptiles - *Natrix natrix*.

Site of infection: intestine.

Distribution: Occurring in Africa; **in Georgia**: WG: Khobi, Zugdidi – Anaklia reported by Jankarashvili (1985), Jankarashvili and Sharpilo (1985), Murvanidze et al. (2018).

Family Diplostomidae Poirier, 1886

Genus *Alaria* Schrank, 1788

Alaria alata (Goeze, 1782) Krause,1914

Parasite of: mammals - *Canis aureus*, *C. lupus*, *C. lupus familiaris*, *Martes foina*, *Vulpes vulpes*.

reptiles (metacercariae) - *Natrix tessellata*.

Site of infection: intestine.

Distribution: Occurring in Eurasia, North and South America, Australia; **in Georgia**: EG: Adigeni, Akhalqalaqi, Borjomi, Dedoflistskaro, Gardabani, Marneuli, Sagarejo, Signagi, surroundings of Tbilisi, Tetritskaro. WG: Gali, Mtskheta, Zugdidi reported by Kamalov (1935), Gamtsemlidze (1941), Burjanadze (1943), Rodonaia (1951), Rodonaia (1966a), Rodonaia (1966b), Rodonaia (1971), Sharpilo (1962), Kurashvili (1984b), Murvanidze et al. (2008b).

Genus *Bolbophorus Dubois, 1935*

Bolbophorus confusus (Krause, 1914) Dubois, 1935

Parasite of: fishes (metacercariae) - *Barbus barbus, Squalius cephalus.*

Site of infection: muscle.

Distribution: Occurring in the Holarctic, Ethiopian Regions, India, Australia; **in Georgia**: River Mtkvari reported by Kurashvili et al. (1980).

Genus *Codonocephalus* Diesing, 1850

Codonocephalus urniger (Rudolphi, 1819) Lühe, 1909

Parasite of: amphibians (metacercariae) - *Pelophylax ridibundus*.

Site of infection: kidneys, mouth cavity, muscle.

Distribution: Palaearctic distribution; **in Georgia**: EG: Tbilisi – Samgori; WG: Bebesiri Lake, Ozurgeti, Samtredia reported by Chiaberashvili and Mchedlidze (1961), Petriashvili et al. (1985), Murvanidze et al. (2008a).

Genus *Diplostomum* von Nordmann, 1832

Diplostomum commutatum (Diesing, 1850) Dubois, 1937

Parasite of: fishes (metacercariae) - *Rutilus rutilus*.

Site of infection: no data available.

Distribution: Holarctic distribution; **in Georgia**: WG: Narionali Lake reported by Chernova (1973), Murvanidze et al. (2018).

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Parasite of: birds - *Larus canus*, *L. minutus, Chroicocephalus ridibundus*.

fishes (metacercariae) - *Abramis brama*, *Acanthobrama microlepis*, *Alburnus alburnus*, *A. fasciatus*, *A. hohenackeri, Ballerus sapa*, *Barbus barbus*, *Capoeta sevangi, Carassius carassius*, *Chondrostoma cyri*, *Ctenopharyngodon idella*, *Cyprinus carpio*, *Esox lucius, Gobio gobio, Leuciscus leuciscus*, *Luciobarbus capito, L. mursa*, *Ponticola constructor, Rutilus rutilus, R. rutilus kurensis*, *Sander lucioperca*, *Scardinius erythrophthalmus*, *Squalius cephalus,* Tinca tinca, *Varicorhinus* sp., *Vimba vimba*.

molluscs (intramolluscan stage) - *Lymnaea stagnalis*; *Peregriana peregra*.

Site of infection: eye (fishes), small intestine (birds).

Distribution: With Holarctic distribution; **in Georgia**: EG: Rivers: Alazani, Aragvi basin, Mtkvari (Borjomi gorge); Lakes: Bazaleti, Jandari, Kumisi, Khrami; Samgori, Tbilisi Reservoir; WG: Batumi, Madatapa Lake, River Mtkvari, Sokhumi reported by Kurashvili (1953a), Kurashvili (1957), Kurashvili (1961b), Kurashvili (1984a), Kurashvili (1984b), Kurashvili (1988), Chiaberashvili (1962a), Chiaberashvili (1968), Qoiava (1966), Petriashvili (1971), Kurashvili et al. (1973), Kurashvili et al. (1980), Kurashvili et al. (1991), Burtikashvili et al. (1978), Nikolaishvili et al. (1990), Gogebashvili and Petriashvili (2002), Arabuli et al. (2015), Japoshvili et al. (2017), Murvanidze et al. (2018).

Diplostomum sp.

Parasite of: fishes (metacercariae) - *Abramis brama, Alburnus alburnus, Capoeta capoeta, C. sevangi, Cyprinus carpio, Esox lucius, Perca fluviatilis, Rutilus rutilus kurensis, Scardinius erythrophthalmus, Tinca tinca, Vimba vimba.*

Site of infection: eye.

Distribution: in Georgia: River Mtkvari reported by Kurashvili et al. (1980).

Genus *Neodiplostomum* Railliet, 1919

Neodiplostomum minor (Dubois, 1936) Pearson, 1961

Parasite of: reptiles (metacercariae) - *Natrix natrix*, *N. tessellata*.

Site of infection: viscera.

Distribution: Cosmopolitan distribution; **in Georgia**: EG: Bazaleti Lake, Jinvali, Kazbegi, surroundings of Tbilisi; WG: Khobi, Zugdidi, surroundings of Batumi reported by Petriashvili (1966), Jankarashvili (1985).

Genus *Posthodiplostomum* Dubois, 1936

Posthodiplostomum brevicaudatum (von Nordmann, 1832) Wisniewski, 1958

Nomenclature:

Synonym: *Neascus brevicaudatus* (von Nordmann, 1832) Hughes, 1928

Parasite of: fishes (metacercariae) - *Esox lucius*.

Site of infection: musculature, skin.

Distribution: With Holarctic distribution; **in Georgia**: EG: Bazaleti Lake, Rivers: Alazani, Iori, Mtkvari; WG: Paliastomi Lake reported by Chiaberashvili (1968), Chernova (1973), Murvanidze et al. (2018).

Posthodiplostomum cuticola (von Nordmann, 1832) Dubois, 1936

Parasite of: fishes (metacercariae) - *Abramis brama, Alburnus chalcoides, Ballerus sapa, Chondrostoma cyri, Cyprinus carpio, Leuciscus aspius, Luciobarbus capito, Scardinius erythrophthalmus, Tinca tinca, Vimba vimba*.

Site of infection: fins, gills, skin.

Distribution: Occurring in Europe and Asia; **in Georgia**: EG: River Mtkvari, Sagarejo reported by Kurashvili and Petriashvili (1977), Kurashvili et al. (1980), Kurashvili et al. (1983a), Kurashvili et al. (1990), Gogebashvili and Petriashvili (2002), Murvanidze et al. (2018).

Posthodiplostomum sp.

Parasite of: birds - *Aegialitis alexandrinus*.

Site of infection: intestine.

Distribution: in Georgia: EG: Bazaleti Lake reported by Kurashvili (1950), Kurashvili (1957).

Genus *Tylodelphys* Diesing, 1850

Tylodelphys clavata (von Nordmann, 1832) Diesing, 1850

Nomenclature:

Synonym: *Diplostomum clavatum* Nordmann, 1832

Parasite of: fishes (metacercariae) - *Abramis brama*, *Alburnoides eichwaldi*, *Alburnus alburnus*, *A. chalcoides, A.derjugini*, *Ballerus sapa, Barbus tauricus rionica, Blicca bjoerkna, Capoeta capoeta, C. sevangi, Chondrostoma colchicum*, *Cyprinus carpio*, *Esox lucius*, *Leuciscus leuciscus*, *L. cephalus orientalis*, *Luciobarbus capito*, *Perca fluviatilis*, *Rhodeus sericeus*, *Rutilus rutilus*, *Sander lucioperca, Scardinius erythrophthalmus*, *Tinca tinca, Varicorhinus* sp., *Vimba vimba*.

Site of infection: eye.

Distribution: With Holarctic distribution; **in Georgia**: EG: Rivers: Alazani, Aragvi basin, Iori, Mtkvari; Lakes: Bazaleti, Jandari; Khrami Reservoir; WG: Rivers: Bebesiri, Kaparchina, Rioni, Shavi; Lakes: Japana, Paliastomi reported by Chiaberashvili (1955), Chiaberashvili (1957), Chiaberashvili (1959), Chiaberashvili (1962b), Chiaberashvili (1968), Qoiava (1966), Petriashvili (1971), Chernova (1973), Burtikashvili et al. (1978), Murvanidze et al. (2018).

Tylodelphys sp.

Parasite of: molluscs (intramolluscan stage) - *Radix euphratica*.

Site of infection: body cavity, hepatopancreas.

Distribution: in Georgia: EG: Lisi Lake reported by Arabuli, unpublished data 2021.

Family Panopistidae Yamaguti, 1958

Genus *Pseudoleucochloridium* Pojmanska, 1959

Pseudoleucochloridium soricis (Soltys, 1952) Pojmanska, 1959

Nomenclature:

Synonym: *Leucochloridium soricis* Soltys, 1952

Parasite of: mammals - *Sorex araneus*, *S. minutus*, *S. raddei*.

Site of infection: small intestine.

Distribution: Occurring in Europe and Asia; **in Georgia**: EG: Borjomi; WG: Samtredia, Sokhuni, Qutaisi reported by Matsaberidze (1967), Matsabaridze (1976), Rodonaia (1971), Kurashvili (1984b).

Family Schistosomatidae Stiles & Hassall, 1898

Genus *Bilharziella* Looss, 1899

Bilharziella polonica (Kowalewski, 1895) Looss, 1899

Parasite of: birds - *Anas crecca*, *A. penelope*, *A. plathyrynchos* f. *domestica*.

Site of infection: abdominal cavity, blood vessels of liver.

Distribution: Holarctic distribution; **in Georgia**: EG: Dusheti – Bazaleti Lake, Gardabani – Tbilisi Sea, Kumisi Lake, Tsalka; WG: Mestia – Lenjeri, Zugdidi reported by Kurashvili et al. (1976), Kurashvili (1984b).

Genus *Dendritobilharzia* Skrjabin & Zakharov, 1920

Dendritobilharzia pulverulenta (Braun, 1901) Skrjabin, 1924

Parasite of: birds - *Anas crecca*, *A. penelope*, *A. plathyrynchos* f. *domestica*, *Anser anser* f. *domestica*.

Site of infection: blood vessels – large veins.

Distribution: Holarctic distribution; **in Georgia**: EG: Gardabani – Tbilisi Sea, Lagodekhi, Lisi Lake; WG: Surroundings of Poti reported by Kurashvili et al. (1976).

Family Strigeidae Railliet, 1919

Genus *Apatemon* Szidat, 1928

Apatemon gracilis (Rudolphi, 1819) Szidat, 1928

Parasite of: birds - *Anas plathyrynchos*, *A. platyrhynchos* f. *domestica*, *Anser albifrons*, *A. anser* f. *domestica*, *Aythya ferina*, *Bucephala clangula*, *Mellanita fusca*, *Mergellus albellus.*

Site of infection: small intestine.

Distribution: Holarctic distribution; **in Georgia**: EG: Dusheti – Bazaleti Lake, Gardabani – surroundings of Tbilisi Reservoir, Jandari (Karaiazi) Lake, Marneuli, Tsalka – Khrami Reservoir; WG: Abasha, Chkhorotsku, Khobi, Lanchkhuti – Mamati, Martvili, Poti, Tsalenjikha, Zugdidi reported by Kurashvili (1953a), Kurashvili (1957), Kurashvili (1984b), Japaridze and Savateeva (1967), Kurashvili et al. (1976).

Genus *Apharyngostrigea* Ciurea, 1927

Apharyngostrigea cornu (Zeder, 1800) Ciurea, 1927

Parasite of: birds - *Egretta garzetta*, *Nycticorax nycticorax*, *Tringa ochropus*.

fishes (metacercariae) - *Rutilus rutilus, Scardinius erythrophthalmus, Tinca tinca.*

Site of infection: abdominal cavity, muscle (fishes); small intestine (birds).

Distribution: Occurring in the Holarctic, India, Madagascar; **in Georgia:** EG: Dusheti – Bazaleti Lake, Gardabani – Jandari Lake, River Mtkvari; WG: Poti – Chaladidi, River Mtkvari reported by Kurashvili (1953a), Kurashvili (1957), Kurashvili (1984b), Kurashvili et al. (1980).

Apharyngostrigea garciai Tubangui, 1933

Parasite of: birds - *Egretta garzetta*.

Site of infection: small intestine.

Distribution: Occurring in Southeast Asia; **in Georgia:** EG: Dusheti **–** Bazaleti Lake, Gardabani – Jandari Lake reported by Kurashvili (1953a), Kurashvili (1957).

Genus *Cotylurus* Szidat, 1928

Cotylurus cornutus (Rudolphi, 1809) Szidat, 1928

Parasite of: birds - *Anser albifrons*, *A. anser* f. *domestica*, *Anas platyrhynchos* f. *domestica*, *Aythya ferina*, *A. marila*, *Columba livia*, *Mergus merganser*, *Vanelus vanellus*.

Site of infection: intestine, small intestine.

Distribution: Cosmopolitan distribution; **in Georgia**: EG: Dedoplistskaro – Eldari, Dusheti – Bazaleti Lake, Gardabani, Kumisi Lake, Marneuli, Qareli – Zguderi, Tianeti; WG: Abasha, Lanchkhuti – Mamati, Khobi, Lentekhi, Martvili, Paliastomi Lake, Poti, Samtredia, Tsalenjikha, Zugdidi – Axali kakhati reported by Kurashvili (1953a), Kurashvili (1957), Kurashvili (1984b), Japaridze and Savateeva (1967), Kurashvili et al. (1973), Kurashvili et al. (1976).

Cotylurus hebraicus Dubois, 1934

Parasite of: birds - *Anas plathyrynchos* f. *domestica*.

Site of infection: intestine.

Distribution: Occurring in the Holarctic Region and Brazil; **in Georgia:** WG: Samtredia – Ilori, Tsalenjikha reported by Japaridze and Savateeva (1967), Kurashvili et al. (1976) .

Genus *Ophiosoma* Szidat, 1928

Ophiosoma patagiatum (Creplin, 1846) Dubois, 1937

Parasite of: birds - *Botaurus stellaris, Chroicocephalus ridibundus.*

Site of infection: intestine, small intestine.

Distribution: Occurring in Europe, Asia, Africa; **in Georgia:** EG: Kumisi Lake, Mtskheta – Natakhtari reported by Kurashvili (1953a), Kurashvili (1957), Kurashvili et al. (1973).

Genus *Strigea* Abildgaard, 1790

Strigea falconis Szidat, 1928

Parasite of: birds - *Accipiter gentilis caucasicus*, *Aquila clanga*, *Anser anser f. domestica, Circus, Gallus gallus f. domestica, Meleagris gallopavo.*

birds (metacercariae) - *Anas platyrhynchos* f. *domestica, Anser anser f. domesticus, Gallus gallus f. domesticus, Meleagris gallopavo.*

Site of infection: intestine (adults); subcutaneous tissue of chest, neck and thighs (metacercariae).

Distribution: In the Holarctic Region, North Africa; **in Georgia:** EG: Borjomi, Gardabani, Kumisi Lake; WG: Gudauta reported by Kurashvili (1957), Kurashvili (1984b), Japaridze and Savateeva (1967), Kurashvili et al. (1973), Kurashvili et al. (1976).

Strigea strigis (Schrank, 1788) Abildgaard, 1790

Parasite of: birds - *Buteo buteo*, *Circus aeruginosus*, *Milvus* sp.

reptiles (metacercariae) - *Natrix natrix*, *N. tesselata.*

amphinbians: (metacercariae) - *Pelophylax ridibundus.*

Site of infection: intestine.

Distribution: Occurring in the Palaearctic Region, Africa; **in Georgia**: EG: Bazaleti Lake, Jinvali, Khazbegi, surroundings of Tbilisi; WG: Khobi, surroundings of Batumi, Zugdidi reported by Petriashvili (1966), Jankarashvili (1985).

Order Plagiorchiida La Rue, 1957

Family Allocreadiidae Looss, 1902

Genus *Allocreadium* Looss, 1900

Allocreadium dogieli Koval, 1950

Parasite of: fishes - *Luciobarbus mursa*.

Site of infection: intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: River Alazani reported by Chiaberashvili (1968), Murvanidze et al. (2018).

Allocreadium isoporum (Looss, 1894) Looss, 1902

Parasite of: fishes - *Abramis brama, Alburnus chalcoides, Capoeta, Barbus barbus*, *B. cyri, B. lacerta*, *Leuciscus leuciscus*, *Luciobarbus mursa*, *Romanogobio persus*, *Rutilus rutilus, Varicorhinus* sp..

Site of infection: intestine.

Distribution: Occurring in Europe, Asia, North America; **in Georgia**: EG: Paravani Lake; rivers: Alazani, Aragvi, Iori, Mtkvari; Khrami Reservoir; WG: River Mtkvari reported by Kurashvili et al. (1951), Kurashvili et al. (1980), Kurashvili (1961a), Chiaberashvili (1962a), Chiaberashvili (1968), Kurashvili and Petriashvili (1977), Burtikashvili et al. (1978).

Allocreadium markewitschi Koval, 1949

Parasite of: fishes - *Alburnoides, Chondrostoma cyri*.

Site of infection: intestine.

Distribution: Occurring in Europe; **in Georgia** : River Mtkvari; EG: River Alazani reported by Chiaberashvili (1968), Kurashvili et al. (1980), Murvanidze et al. (2018).

Allocreadium transversale (Rudolphi, 1802) Odhner, 1901

Parasite of: fishes - *Alburnus filippii, Leuciscus leuciscus*, *Rutilus rutilus.*

Site of infection: intestine.

Distribution: Occurring in Europe, Asia; **in Georgia**: EG: Rivers: Iori, Mtkvari (surroundings of Borjomi, Mtskheta, Tbilisi, Khashuri); WG: River Rioni reported by Chiaberashvili (1962b), Chiaberashvili (1968), Kurashvili et al. (1980), Kurashvili et al. (1991), Murvanidze et al. (2018).

Genus *Bunodera* Railliet, 1896

Bunodera luciopercae (Müller, 1776) Lühe, 1909

Parasite of: fishes - *Esox lucius, Sander lucioperca, Silurus glanis.*

Site of infection: intestine.

Distribution: Occurring in the Holarctic region; **in Georgia**: River Mtkvari reported by Kurashvili et al. (1980).

Genus *Crepidostomum* Braun, 1900

Crepidostomum farionis (Müller, 1780) Lühe, 1909

Parasite of: fishes - *Barbus barbus*, *B. lacerta*, *Luciobarbus mursa*, *Salmo trutta fario*.

mollusc (intramolluscan stages) - *Euglesa casertana.*

Site of infection: gall bladder, intestine.

Distribution: Occurring in the Holarctic; **in Georgia**: EG: Khrami Reservoir, Rivers: Alazani, Iori, Mtkvari (Borjomi gorge), Ortachala, Khashuri; WG: Abkhazian coast of Black Sea, River Rioni reported by Kurashvili et al. (1951), Kurashvili (1961a), Chiaberashvili (1968), Chiaberashvili (1971a), Kurashvili et al. (1991), Murvanidze et al. (2018).

Crepidostomum metoecus (Braun, 1900) Braun, 1900

Parasite of: molluscs (intramolluscan stage) - *Pisidium* sp.

Site of infection: no data.

Distribution: Occurring in the Holarctic; **in Georgia**: WG: River Shavtskali reported by Chiaberashvili (1964).

Family Azygiidae Lühe, 1909

Genus *Azygia* Looss, 1899

Azygia lucii (Müller, 1776) Lühe, 1909

Parasite of: fishes - *Esox lucius*, *Salmo trutta labrax*, *Sander lucioperca*, *Silurus glanis*.

Site of infection: esophagus.

Distribution: Occurring in the Holarctic; **in Georgia**: WG: Japana Lake, Poti reported by Kurashvili and Tabidze (1947), Chernova (1973), Murvanidze et al. (2018).

Family Brachycoeliidae Looss, 1899

Genus *Brachycoelium* Dujardin, 1845

Brachycoelium salamandrae (Frölich, 1789) Lühe, 1909

Parasite of: reptiles - *Mertensiella caucasica*.

Site of infection: small intestine.

Distribution: Occuring in Europe, North America, North Africa; **in Georgia**: EG: Bakuriani reported by Petriashvili et al. (1985), Murvanidze et al. (2008b).

Family Bucephalidae Poche, 1907

Genus *Bucephalus* von Baer, 1827

Bucephalus polymorphus von Baer, 1827

Parasite of: fishes - *Abramis brama, Alburnus chalcoides, A. derjugini*, *Ballerus sapa, Esox lucius*, *Perca fluviatilis*, *Phoxinus colchicus*, *Rutilus rutilus*, *Sander lucioperca*, *Silurus glanis, Scardinius erythrophthalmus*.

Site of infection: fins, gills, intestine.

Distribution: Occurring in the Holarctic Region; **in Georgia**: EG: River Mtkvari; WG: Rivers: Rioni, Shavi, river Shavi's Fish-Factory; Bebesiri Lake reported by

Chiaberashvili (1955), Chiaberashvili (1957), Chiaberashvili (1959), Chiaberashvili (1962b), Kurashvili et al. (1980), Murvanidze et al. (2018).

Genus *Rhipidocotyle* Diesing, 1858

Rhipidocotyle campanula (Dujardin, 1845) Dollfus, 1968

Nomenclature:

Synonym: *Rhipidocotyle illense* (Ziegler, 1883) Dyk, 1954

Parasite of: fishes - *Abramis brama*, *Blicca bjoerkna, Esox lucius, Gobius, Rhodeus, Sander lucioperca, Silurus glanis*.

Site of infection: fins, gills, intestine.

Distribution: Occurring in Europe, Asia; **in Georgia**: River Mtkvari; WG: Lakes: Didi Narionali, Paliastomi reported by Chernova (1973), Kurashvili et al. (1980), Murvanidze et al. (2018).

Family Cephalogonimidae Looss, 1899

Genus *Cephalogonimus* Poirier, 1886

Cephalogonimus europaeus Blaizot, 1910

Parasite of: amphibians - *Pelophylax ridibundus*.

molluscs (intramolluscan stages) - *Galba truncatula.*

Site of infection: gallbladder, hepatopancreas, intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: Samgori, Sartichala; WG: Ozurgeti reported by Chiaberashvili and Mchedlidze (1961), Chiaberashvili (1971a), Kurashvili (1984b).

Cephalogonimus retusus (Dujardin, 1845) Odhner, 1910

Parasite of: amphibians - *Pelophylax ridibundus*.

Site of infection: small intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: Aragvi River Basin, Bazaleti Lake, Tbilisi – Samgori; WG: Samtredia, Tkibuli Reservoir reported by Chiaberashvili and Mchedlidze (1961), Petriashvili (1964), Burtikashvili and Getzadze (1981), Kurashvili (1984b), Giorgadze (1985), Petriashvili et al. (1985), Murvanidze et al. (2008a).

Cephalogonimus sp.

Parasite of: amphibians - *Pelophylax ridibundus*.

mollusc (intramolluscan stage) - *Lymnaea stagnalis*.

Site of infection: body cavity, liver, lymph sac, small intestine.

Distribution: in Georgia: EG: River Iori, Sartichala, Tabatskuri Lake reported by Javelidze and Chiaberashvili (1985), Murvanidze et al. (2008a).

Family Cyclocoelidae Stossich, 1903

Genus *Harrahium* Witenberg, 1926

Harrahium halli (Harrah, 1922) Witenberg, 1926

Nomenclature:

Synonym: *Cyclocoelum halli* Harrah, 1922

Parasite of: birds - *Anas querquedula*.

Site of infection: abdominal cavity, air sacs of lungs.

Distribution: Occurring in North America; **in Georgia:** EG: Mtkvari River, Mtskheta reported by Kurashvili (1957), Kurashvili (1961a).

Genus *Hyptiasmus* Kossack, 1911

Hyptiasmus magniproles Witenberg, 1928

Parasite of: birds - *Mergellus albellus.*

Site of infection: infraorbital cavity, nasal cavity.

Distribution: Occurring in Asia; **in Georgia:** EG: Marneuli reported by Kurashvili (1957).

Genus *Morishitium* Witenberg, 1928

Morishitium bivesiculatum (Prudhoe, 1944) Yamaguti, 1958

Nomenclature:

Synonym: *Cyclocoelum* (*Pseudhyptiasmus*) *bivesiculatum* Prudhoe, 1944

Parasite of: birds - *Turdus merula aterrimus*.

Site of infection: abdominal cavity.

Distribution: Occurring in Asia; **in Georgia:** EG: Lagodekhi National Park reported by Kurashvili (1957), Kurashvili (1961a).

Genus *Selfcoelum* Dronen, Gardner & Jiménez, 2006

Selfcoelum orientale (Skrjabin, 1913) Dronen & Blend, 2015

Nomenclature:

Synonym: *Cyclocoelum orientale* Skrjabin, 1913

Parasite of: birds - *Tringa glareola*, *Turdus philomelos*, *T. merula aterrimus*.

Site of infection: abdominal cavity, air sacs of lungs.

Distribution: Recorded in Turkestan; **in Georgia:** EG: Borjomi reported by Bayer (1941), Kurashvili (1957), Kurashvili (1961a).

Genus *Skrjabinocoelum* Kurashvili, 1953

Skrjabinocoelum petrowi Kurashvili, 1953

Parasite of: birds - *Lymnocryptes minimus*.

Site of infection: abdominal cavity, body cavity.

Distribution: Occurring in the Caucasus Region - Georgia and Azerbaijan; **in Georgia:** EG: Bolnisi reported by Kurashvili (1953a), Kurashvili (1953b), Kurashvili (1957), Kurashvili (1961a).

Family Cryptogonimidae Ward, 1917

Genus *Timoniella* Rebecq, 1960

Timoniella imbutiformis (Molin, 1859) Brooks, 1980

Parasite of: fishes - *Alosa tanaica*.

Site of infection: no data.

Distribution: Occurring in the Mediterranean Region, Caspian Sea, Black Sea, northeast Atlantic; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1977), Murvanidze et al. (2018).

Family Deropristidae Cable & Hunninen, 1942

Genus *Skrjabinopsolus* Ivanov in Ivanov & Murygin, 1937

Skrjabinopsolus semiarmatus (Molin, 1858) Ivanov in Ivanov & Murygin, 1937

Nomenclature:

Synonyms: *Skrjabinopsolus acipenseris* Ivanov & Murygin, 1937

Skrjabinopsolus minor Bychowskaya-Pavlovskaya & Mikailov, 1969

Parasite of: fishes - *Acipenser persicus*, *A. stellatus*, *Huso huso*.

Site of infection: esophagus, intestine, stomach.

Distribution: Occurring in the Holarctic; **in Georgia**: River Mtkvari; WG: River Rioni (Orpiri village), surroundings of Batumi reported by Chulkova (1939), Kurashvili et al. (1980), Murvanidze et al. (2018).

Family Dicrocoeliidae Looss, 1899

Genus *Brachylecithum* Shtrom, 1940

Brachylecithum attenuatum (Dujardin, 1845) Shtrom, 1940

Parasite of: birds - *Carduelis carduelis*, *Turdus merula*, *T. merula atterimus*.

Site of infection: gallbladder.

Distribution: Occurring in Europe, Asia; **in Georgia:** EG: Lagodekhi National Park, Martkopi; WG: Sokhumi, surroundings of Samtredia reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b).

Genus *Corrigia* Shtrom, 1940

Corrigia viktori Gushanskaya, 1952

Parasite of: birds - *Coturnix coturnix*.

Site of infection: small intestine.

Distribution: Recorded in Georgia only; **in Georgia:** WG: surroundings of Samtredia reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b).

Corrigia vitta (Dujardin, 1845) Shtrom, 1940

Parasite of: mammals - *Apodemus sylvaticus*.

Site of infection: pancreas.

Distribution: Occurring in Europe; **in Georgia:** EG: Borjomi reported by Matsaberidze (1966a), Matsaberidze (1966b), Matsabaridze (1976).

Genus *Dicrocoelium* Dujardin, 1845

Dicrocoelium dendriticum (Rudolphi, 1819) Looss, 1899

Nomenclature:

Synonym: *Dicrocoelium lanceatum* Stiles & Hassall, 1898

Parasite of: mammals - Bovidae, Cervidae, Leporidae, Suidae, Ursidae; *Bos taurus*, *Capra hircus, Capreolus capreolus*, *Cervus*, *Chionomys*, *Lepus*, *Ovis aries*, *Sus scrofa, Ursus arctos*.

molluscs (intramolluscan stage) - *Georginapaeus hohenackeri*, *Harmozica ravergiensis* , *Xeropicta derbentina*.

Site of infection: gallbladder, hepatic ducts, liver.

Distribution: Cosmopolitan distribution; **in Georgia** : EG: Akhmeta, Borjomi, Dedoflistskaro, Dusheti, Kazbegi, Lagodekhi, Tianeti, Highland regions of southern and northern Georgia; WG: Akhalqalaqi, Akhaltsikhe, Batumi, Khobi, Lentekhi, Samtredia, Tsalenjikha, Zugdidi reported by Burdjanadze (1937b), Gamtsemlidze (1941), Kurashvili and Rodonaia (1954), Qoiava (1956a), Qoiava (1961), Kurashvili (1961a), Rodonaia (1962), Rodonaia (1966a), Rodonaia (1966b), Rodonaia (1971), Natsvlishvili (1968), Matsabaridze (1976).

Dicrocoelium macrostomum Odhner, 1910

Parasite of: birds - *Coturnix coturnix*, *Numida meleagris*.

Site of infection: hepatic ducts, liver.

Distribution: Occurring in Africa; **in Georgia:** WG: Samtredia reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b).

Dicrocoelium sp.

Parasite of: molluscs (intramolluscan stage) - *Oxychilus mingrelicus*.

Site of infection: hepatopancreas.

Distribution: in Georgia: **WG:** Samegrelo reported by Arabuli (2018).

Genus *Eurytrema* Looss, 1907

Eurytrema pancreaticum (Janson, 1889) Looss, 1907

Parasite of: mammals - cattle, *Bos taurus*

Site of infection: liver.

Distribution: Occurring in Europe, Madagascar, Asia, and South America; **in Georgia:** WG: lowland of Kolkheti reported by Burjanadze (1943), Kurashvili (1984b).

Genus *Lyperosomum* Looss, 1899

Lyperosomum petiolatum (Railliet, 1900)

Nomenclature:

Synonyms:

Skrjabinus popovi Kassimov, 1952

Zonorchis petiolatum (Railliet, 1900)

Parasite of: birds - *Tetraogallus caucasicus.*

Site of infection: gallbladder, liver.

Distribution: Occurring in Europe; **in Georgia:** EG: Lagodekhi National Park reported by Kurashvili (1957).

Genus *Platynosomum* Looss, 1907

Platynosomum fallax Heidegger & Mendheim, 1938

Parasite of: birds - *Picus viridis karelini*.

Site of infection: gallbladder, liver.

Distribution: Occurring in Asia; **in Georgia:** EG: Lagodekhi National Park, Telavi – Alazani river; WG: surroundings of Samtredia reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b).

Family Diplodiscidae Cohn, 1904

Genus *Diplodiscus* Diesing, 1836

Diplodiscus mehrai Pande, 1937

Parasite of: amphibians - *Pelophylax ridibundus.*

Site of infection: large intestine, rectum.

Distribution: Occurring in Europe and India; **in Georgia**: EG: Aragvi River Basin, Bazaleti Lake, Tbilisi – Samgori reported by Chiaberashvili and Mchedlidze (1961), Petriashvili (1964), Burtikashvili and Getzadze (1981), Petriashvili et al. (1985), Sey (2001), Murvanidze et al. (2008a).

Diplodiscus subclavatus (Pallas, 1760) Diesing, 1836

Parasite of: reptiles - *Natrix natrix*.

amphibians - *Bufotes viridis*, *Pelophylax ridibundus*, *Rana macrocnemis*.

mollusc (intramolluscan stage) - *Planorbis planorbis.*

Site of infection: large and small intestine, rectum.

Distribution: Occurring in Europe, Asia, Africa; **in Georgia:** EG: Aragvi River Basin, Bazaleti Lake, Borjomi, Jinvali, Kazbegi, Kodjori, Samgori, Sartichala – River Iori, surroundings of Tbilisi; WG: Gali, Khobi, Ozurgeti, Senaki, surroundings of Batumi, Tkibuli Reservoir, Zugdidi reported by Chiaberashvili and Mchedlidze (1961), Petriashvili (1964), Petriashvili (1966), Chiaberashvili (1971a), Burtikashvili and Getzadze (1981), Giorgadze (1985), Jankarashvili (1985), Petriashvili et al. (1985), Sey (2001), Murvanidze et al. (2008a), Murvanidze et al. (2008b).

Family Echinochasmidae Odhner, 1910

Genus *Echinochasmus* Dietz, 1909

Echinochasmus dietzevi Issaitschikov, 1927

Parasite of: birds - *Aythya nyroca*, *Colymbus caspicus, Podiceps cristatus*.

Site of infection: small intestine.

Distribution: Palaerctic distribution; **in Georgia:** EG: Samgori; WG: Batumi, Poti – Rioni Valley reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1961b), Kurashvili (1984b).

Echinochasmus mathevossianae Schakhtakhtinskaya in Kurashvili, 1957

Parasite of: birds - *Aythya fuligula*, *Netta rufina*.

Site of infection: bursa Fabricii, intestine.

Distribution: Occurrence recorded only in Georgia; **in Georgia:** EG: Tsalka (Khrami) Reservoir; WG: Sokhumi reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b).

Echinochasmus perfoliatus (Ratz, 1908) Gedoelst, 1911

Parasite of: mammals - *Canis lupus familiaris*.

fishes (metacercariae) - *Alburnus alburnus, Alburnus filippii.*

Site of infection: gills, small intestine.

Distribution: Occurring in the Holarctic region; **in Georgia:** EG: Tbilisi; WG: Batumi reported by Burdjanadze (1937a), Burjanadze (1943), Gamtsemlidze (1941), Kurashvili (1961a), Kurashvili (1984b), Kurashvili et al. (1980).

Echinochasmus sp.

Parasite of: fishes(metacercariae) - *Luciobarbus escherichii*, *Squalius cephalus*.

mollusc (intramolluscan stages) - *Melanopsis praemorsa.*

Site of infection: gills.

Distribution: in Georgia: WG: Rivers: Pichori, Rioni reported by Chiaberashvili (1962b), Olenev and Dobrovolsky (1975), Kurashvili (1984a), Manafov (2011).

Genus *Stephanoprora* Odhner, 1902

Stephanoprora pseudoechinata (Olsson, 1876) Yamaguti, 1958

Nomenclature:

Synonym: *Mesorchis pseudoechinatus* (Olsson, 1876) Dietz, 1909

Parasite of: birds - *Aythya nyroca*, *Hydrocoloeus minutus, Larus canus*.

Site of infection: small intestine.

Distribution: Occurring in the Holarctic, Africa; **in Georgia:** EG: Kumisi Lake, Lagodekhi, Marneuli; WG: River Kaparchina, Rioni Valley – Poti, Sokhumi reported by Kurashvili (1950), Kurashvili (1953a), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b).

Family Echinostomatidae Looss, 1899

Genus *Chaunocephalus* Dietz, 1909

Chaunocephalus ferox subsp. orientalis Baschkirova, 1941

Parasite of: birds - *Ciconia ciconia*, *Ciconia* spp.

Site of infection: small intestine.

Distribution: Occurring in Eurasia, Australia; **in Georgia:** EG: Sagarejo, surroundings of Tbilisi; WG: surroundings of Samtredia reported by Kurashvili (1941), Kurashvili (1957), Kurashvili (1984b).

Genus *Echinoparyphium* Dietz, 1909

Echinoparyphium colchicum Javelidze, 1958

Parasite of: molluscs (intramolluscan stage) - *Viviparus viviparus.*

Site of infection: reproductive organs and ducts.

Distribution: Recorded only in Georgia; **in Georgia:** WG: freshwaters reported by Javelidze (1958).

Echinoparyphium mordwilkoi Skrjabin, 1915

Parasite of: birds - *Scolopax rusticola*, *Tringa ochropus*.

Site of infection: intestine.

Distribution: Occurring in Asia; **in Georgia:** WG: Poti – Chaladidi reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b), Kurashvili et al. (1976).

Echinoparyphium recurvatum (von Linstow, 1873) Lühe, 1909

Parasite of: birds - *Anas acuta*, *A. crecca*, *A. platyrhynchos*, *A. platyrhynchos* f. *domestica*, *Anser anser*, *Botaurus stellaris*, *Gallus gallus* f. *domestica*, *Marmaronetta angustirostris*.

molluscs (intramolluscan stage) - *Ancylus fluviatilis*, *Planorbis planorbis*.

Site of infection: caecum, small intestine.

Distribution: Cosmopolitan distribution; **in Georgia:** EG: Dusheti – Bazaleti Lake, Gardabani, Marneuli, Sartichala, Tsalka; WG: Abasha, Khobi, Lanchkhuti – Mamati, Poti – river Kaparchina, Samtredia, Senaki, Tsageri, Tsalenjikha reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b), Japaridze and Savateeva (1967), Chiaberashvili (1971a), Kurashvili et al. (1976).

Genus *Echinostoma* Rudolphi, 1809

Echinostoma miyagawai Ishii, 1932

Nomenclature:

Synonym: *Echinostoma robustum* Yamaguti, 1935

Parasite of: birds - *Anas platyrhynchos*, *A. platyrhynchos* f. *domestica*, *Anser anser* f. *domestica*, *Gallus gallus* f. *domestica*, *Meleagris gallopavo*, *Netta rufina, Spilopelia chinensis*, *Streptopelia turtur*.

molluscs (intramolluscan stage) - *Ampullaceana lagotis*.

Site of infection: hepatopancreas, intestine.

Distribution: Occurring in Europe, Asia; **in Georgia:** EG: Dedoflistskaro – Qvemo qedi, Dusheti – Bazaleti Lake, Gardabani – Jandari Lake, Marneuli, Mtskheta, Sartichala, Tbilisi – Samgori, Lisi Lake, Shuakhevi, Tetriwkaro – Koda, Tsalka; WG: Paliastomi Lake, Qareli, Rioni valley, Samtredia, Sokhumi, Terjola, Zugdidi reported by Kurashvili (1941), Kurashvili (1953a), Kurashvili (1961a), Kurashvili (1984b), Chiaberashvili (1954), Chiaberashvili (1957), Chiaberashvili (1971a), Japaridze (1962), Japaridze and Savateeva (1967), Kurashvili et al. (1976).

Echinostoma paraulum Dietz, 1909

Parasite of: birds - *Anas clypeata*, *A. platyrhynchos*, *A. platyrhynchos* f. *domestica*, *Anser anser* f. *domestica*, *Aythya ferina*, *Columba livia*, *Cygnus cygnus*, *Netta rufina*.

molluscs (intramolluscan stage) - *Ampullaceana balthica.*

Site of infection: hepatopancreas, intestine.

Distribution: Occurring in Europe, Asia; **in Georgia:** EG: Gardabani, Sartichala, Tskhinvali; WG: Lanchkhuti, lowland of Rioni, Samtredia, surroundings of Poti, Tetritskaro, Zugdidi reported by Kurashvili (1950), Kurashvili (1953a), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b), Chiaberashvili (1954), Chiaberashvili (1971a), Japaridze and Savateeva (1967), Kurashvili et al. (1976).

Echinostoma revolutum (Fröhlich, 1802) Looss, 1899

Parasite of: birds - *Anas clypeata*, *A. platyrhynchos*, *A. platyrhynchos f. domestica, Anser anser* f. *domestica*, *Ardea cinerea, Gallus gallus* f. *domestica*, *Mergellus albellus, Mergus merganser. M. serrator.*

molluscs (intramolluscan stage) - *Ampullaceana balthica*, *A. lagotis*, *Peregriana peregra*, *Galba truncatula, Planorbis planorbis*.

Site of infection: intestine.

Distribution: Occurring in the Holarctic Region; **in Georgia:** EG: Bazaleti Lake, Sarthichala, Tbilisi – Samgori, River Iori; WG: Batumi, Lentekhi, Mestia, Paliastomi Lake, Samtredia reported by Kirshenblat (1941), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b), Burjanadze (1943), Chiaberashvili (1954), Chiaberashvili (1971a), Japaridze (1962), Japaridze and Savateeva (1967), Kurashvili et al. (1973), Kurashvili et al. (1983b).

Echinostoma stantschinskii Semenov, 1927

Parasite of: birds - *Gallinago gallinago*.

Site of infection: large intestine.

Distribution: Occurring in Asia; **in Georgia:** WG: Poti – valley of Rioni reported by Kurashvili (1953a), Kurashvili (1957), Kurashvili (1961a), Kurashvili et al. (1976).

Genus *Hypoderaeum* Dietz, 1909

Hypoderaeum conoideum (Bloch, 1782) Dietz, 1909

Parasite of: birds- *Anas acuta*, *A. platyrhynchos*, *A. platyrhynchos* f. *domestica*, *Anser anser*, *A. anser* f. *domestica*, *Meleagris gallopavo* f. *domestica*, *Mergus merganser, Scopolax rusticola*, *Tringa ochropus*.

Site of infection: small intestine.

Distribution: Holarctic distribution; **in Georgia:** EG: Dmanisi, Dusheti – Bazaleti Lake, Gardabani, Lisi Lake, Samgori; WG: Batumi, Khobi, Ozurgeti, Poti, Samtredia reported by Kurashvili (1941), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b), Japaridze and Savateeva (1967), Kurashvili et al. (1976).

Hypoderaeum gnedini Baschkirova, 1941

Parasite of: birds - *Anas platyrhynchos*, *A. platyrhynchos* f. *domestica*, *Fulica atra*, *Netta rufina, Podiceps cristatus cristatus*.

Site of infection: intestine.

Distribution: Occurring in Asia (Azerbaijan); **in Georgia:** EG: Lagodekhi – Alazani valley; WG: Lachkhuti, Poti – Rioni valley, Samtredia reported by Kurashvili (1957), Kurashvili (1961a), Japaridze and Savateeva (1967), Kurashvili et al. (1976).

Hypoderaeum vigi Baschkirova, 1941

Parasite of: birds - *Anas platyrhynchos*, *A. platyrhynchos* f. *domestica*.

Site of infection: intestine.

Distribution: Occurring in Asia (Kazakhstan); **in Georgia**: WG: Samtredia reported by Japaridze and Savateeva (1967), Kurashvili et al. (1976), Kurashvili (1984b).

Genus *Moliniella* Hübner, 1939

Moliniella anceps (Molin, 1859) Hübner, 1939

Parasite of: molluscs (intramolluscan stage) - *Lymnaea stagnalis*.

Site of infection: hepatopancreas.

Distribution: Occurring in Europe; **in Georgia**: WG: Madatapa Lake reported by Arabuli et al. (2015).

Genus *Neopetasiger* Baschkirova, 1941

Neopetasiger megacanthus (Kotlán, 1922) Tkach, Kudlai & Kostadinova, 2016

Nomenclature:

Synonym: *Petasiger megacanthus* (Kotlán, 1922) Pande, 1939

Parasite of: birds - *Aythya nyroca*, *Podiceps cristatus*.

Site of infection: caecum, small intestine.

Distribution: Occurring in the Palaearctic; **in Georgia:** WG: Batumi, Gudauta, Poti, Rioni lowland, River Kaparchina reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1961b), Kurashvili (1984b).

Genus *Patagifer* Dietz, 1909

Patagifer bilobus (Rudolphi, 1819) Dietz, 1909

Parasite of: birds - *Plegadis falcinellus*.

Site of infection: intestine, stomach.

Distribution: Cosmopolitan distribution; **in Georgia:** EG: Bazaleti Lake, Gardabani; WG: Paliastomi Lake reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b).

Patagifer sp.

Parasite of: birds - *Platalea leucorodia*.

Site of infection: small intestine.

Distribution: in Georgia: EG: Lisi Lake reported by Kurashvili (1957).

Genus *Pegosomum* Ratz, 1903

Pegosomum petrowi Kurashvili, 1949

Parasite of: birds - *Egretta alba*.

Site of infection: gallbladder.

Distribution: Records exist only from Georgia; **in Georgia:** EG: Kumisi Lake, Lagodekhi, Marneuli reported by Kurashvili (1949), Kurashvili (1950), Kurashvili (1953a), Kurashvili (1957), Kurashvili (1961a).

Pegosomum skrjabini Shakhtakhtinskaya, 1949

Parasite of: birds - *Ardea cinerea cinerea*, *Egretta alba*.

Site of infection: gallbladder, liver.

Distribution: Occurring in Asia (Azerbaijan); **in Georgia:** EG: Gardabani, Marneuli reported by Kurashvili (1950), Kurashvili (1953a), Kurashvili (1957), Kurashvili (1961a).

Genus *Petasiger* Dietz, 1909

Petasiger exaeretus Dietz, 1909

Parasite of: birds - *Phalacrocorax carbo*.

Site of infection: small intestine.

Distribution: Eurasia, Africa, Australia; **in Georgia:** EG: Gardabani – Jandari (Karaiazi) Lake; WG: Surroundings of Sokhumi reported by Kurashvili (1941), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b).

Petasiger radiatus (Dujardin, 1845) Tkach, Kudlai & Kostadinova, 2016

Nomenclature:

Synonym: *Paryphostomum radiatum* (Dujardin, 1845) Dietz, 1909

Parasite of: birds - *Phalacrocorax carbo*.

Site of infection: intestine.

Distribution: Cosmopolitan distribution; **in Georgia:** EG: Gardabani reported by Kurashvili (1941), Kurashvili (1957), Kurashvili (1961a).

Family Encyclometridae Mehra, 1931

Genus *Encyclometra* Baylis & Cannon, 1924

Encyclometra colubrimurorum (Rudolphi, 1891) Dollfus, 1931

Parasite of: reptiles - *Natrix natrix*.

Site of infection: esophagus, intestine, stomach.

Distribution: Palaearctic distribution; **in Georgia:** EG: Jinvali, Kazbegi, surroundings of Tbilisi; WG: surroundins of Batumi – Kakhaberi Lake**,** Anaklia, Kulevi, Khobi, Zugdidi reported by Kurashvili (1984b), Jankarashvili (1985).

Family Eucotylidae Skrjabin, 1924

Genus *Eucotyle* Cohn, 1904

Eucotyle popowi Skrjabin & Evramova, 1942

Parasite of: birds - *Anas platyrhynchos*, *Melanitta fusca, Podiceps cristatus*.

Site of infection: ureter, urethra.

Distribution: Holarctic distribution; **in Georgia**: WG: Batumi, Paliastomi Lake, Poti reported by Kurashvili (1961b), Kurashvili (1984b), Kurashvili et al. (1976).

Genus *Neoeucotyle* Kanev, Radev & Fried, 2002

Neoeucotyle zakharowi (Skrjabin, 1920) Kanev, Radev & Fried, 2002

Nomenclature:

Synonym: *Eucotyle zakharowi* Skrjabin, 1920

Parasite of: birds - *Anas penelope*, *A. plathyrynchos*, *A. plathyrynchos* f. *domestica*, *A. querquedula*.

Site of infection: kidney, ureter, urethra.

Distribution: Occurrence in Palaearctic Region; **in Georgia**: EG: Dusheti – Bazaleti Lake, Gardabani, surroundings of Tbilisi Sea, Tetritskaro, Tsalka; WG: Samtredia reported by Kurashvili et al. (1976).

Genus *Tamerlania* Skrjabin, 1924

Tamerlania zarudnyi Skrjabin, 1924

Parasite of: birds - *Passer domesticus*.

Site of infection: kidneys, ureter, urethra.

Distribution: Occurring in the Holarctic, Madagascar; **in Georgia**: EG: surroundings of Tbilisi reported by Kurashvili (1941), Kurashvili (1957), Kurashvili (1961a), Kurashvili et al. (1976).

Family Eumegacetidae Travassos, 1922

Genus *Eumegacetes* Looss, 1900

Eumegacetes ibericus Kurashvili, 1941

Parasite of: birds - *Passer domesticus*.

Site of infection: large intestine.

Distribution: Occurring in Europe; **in Georgia:** EG: surroundings of Tbilisi reported by Kurashvili (1940), Kurashvili (1941), Kurashvili (1957), Kurashvili (1961a).

Family Fasciolidae Railliet, 1895

Genus *Fasciola* Linnaeus, 1758

Fasciola gigantica Cobbold, 1855

Parasite of: mammals - Bovidae, *Bos taurus, Capreolus capreolus*, Cervidae, *Ovis aries.*

Site of infection: hepatic duct, liver.

Distribution: Cosmopolitan distribution; **in Georgia:** EG: Dusheti, Tsalka; WG: Gudauta, Khobi, Lanchkhuti, Poti, Samtredia, Senaki, Zugdidi reported by Gamtsemlidze (1941), Burjanadze and Baratashvili (1941), Burjanadze (1943), Kurashvili and Rodonaia (1954), Kurashvili (1961a), Kurashvili (1984b), Rodonaia (1962), Rodonaia (1966a), Rodonaia (1971).

Fasciola hepatica Linnaeus, 1758

Parasite of: mammals - Bovidae, Cervidae, Leporidae, Myocastoridae, Suidae; *Bos taurus, Bubalus bubalis*, *Capra hircus*, *Capreolus capreolus*, *Equus caballus*, *Lepus europaeus*, *Myocastor coypus*, *Ovis aries, Sus scrofa*.

molluscs (intramolluscan stage) - *Galba truncatula*, *Lymnaea stagnalis*, *Pisidium* sp.

Site of infection: gallbladder, hepatic ducts, hepatopancreas, intestine, liver, lungs.

Distribution: Cosmopolitan distribution; **in Georgia** : EG: Akhaltsikhe, Akhmeta, Bakuriani, Dusheti, Gardabani, Gori, Samgori, Signagi, Tbilisi, Telavi; WG: Chiatura, Batumi, Khobi, Khulo, Kobuleti, Kutaisi, Lanchkhuti, Poti, Qobuleti, River Shavtskali, Samtredia, Senaki, Sokhumi, Tsalenjikha, Vani, Zugdidi reported by Gamtsemlidze (1941), Burjanadze (1943), Kurashvili and Rodonaia (1954), Qoiava (1956a), Qoiava (1956b), Qoiava (1961), Kurashvili (1961a), Kurashvili (1984a), Rodonaia (1962), Rodonaia (1966a), Rodonaia (1966b), Rodonaia (1971), Chiaberashvili (1964), Chiaberashvili (1971a), Kurashvili et al. (1983b), Kurashvili et al. (1990).

Family Faustulidae

Genus *Pronoprymna* Poche, 1926

Pronoprymna ventricosa (Rudolphi, 1819) Poche, 1926

Nomenclature:

Synonym: *Pentagramma symmetricum* Chulkova, 1939

Parasite of: Fish - *Alosa tanaica*, *A. immaculata.*

Site of infection: no data.

Distribution: Occurring in the Palaearctic; **in Georgia:** WG: Paliastomi Lake reported by Chernova (1973).

Family Gorgoderidae Looss, 1899

Genus *Gorgodera* Looss, 1899

Gorgodera asiatica Pigulewski, 1943

Parasite of: amphibians - *Pelophylax ridibundus*, *Rana macrocnemis*.

Site of infection: urinary bladder.

Distribution: Palaearctic distribution; **in Georgia:** EG: Akhaldaba, Borjomi, Aragvi River, Lakes: Bazaleti, Jandari Lake, Kumisi; WG: Ozurgeti, Tkibuli Reservoir reported by Chiaberashvili and Mchedlidze (1961), Kurashvili et al. (1973), Kurashvili et al. (1975), Kurashvili et al. (1991), Burtikashvili and Getzadze (1981), Giorgadze (1985), Petriashvili et al. (1985), Murvanidze et al. (2008a).

Gorgodera cygnoides (Zeder, 1800) Looss, 1899

Parasite of: amphibians - *Bufotes viridis*, *Pelophylax ridibundus*, *Rana macrocnemis*.

Site of infection: urinary bladder.

Distribution: Holarctic and Australasian distribution; **in Georgia:** EG: Bazaleti Lake, Kumisi Reservoir, Tbilisi Reservoir; WG: Khobi, Ozurgeti, Senaki, Tkibuli Reservoir reported by Chiaberashvili and Mchedlidze (1961), Petriashvili (1964), Kurashvili (1984b), Kurashvili et al. (1991), Giorgadze (1985), Murvanidze et al. (2008a).

Gorgodera dollfusi Pigulewsky, 1946

Parasite of: amphibians - *Bufo bufo*, *Bufotes viridis*, *Pelophylax ridibundus*.

Site of infection: urinary bladder.

Distribution: Occurring in Asia; **in Georgia**: EG: Aragvi River, Martkhopi reported by Kurashvili et al. (1977), Burtikashvili et al. (1978), Burtikashvili and Getzadze (1981), Petriashvili et al. (1985), Murvanidze et al. (2008a).

Gorgodera pagenstecheri Sinizin, 1905

Parasite of: amphibians - *Pelophylax ridibundus*, *Rana macrocnemis*.

molluscs (intramolluscan stage) - *Sphaerium corneum*.

Site of infection: urinary bladder.

Distribution: Occurring in Europe; **in Georgia**: EG: Akhaldaba, Kodjori, Tbilisi Botanic garden; WG: Ozurgeti, Sukhumi, Tkibuli Reservoir reported by Chiaberashvili and Mchedlidze (1961), Kurashvili (1984b), Giorgadze (1985), Petriashvili et al. (1985), Kurashvili et al. (1991), Murvanidze et al. (2008a).

Genus *Gorgoderina* Looss, 1902

Gorgoderina vitelliloba (Olsson, 1876) Looss, 1902

Parasite of: amphibians - *Pelophylax ridibundus*, *Rana macrocnemis*.

molluscs (intramolluscan stage) - *Euglesa casertana*, *Sphaerium corneum*.

Site of infection: hepatopancreas, urinary bladder.

Distribution: With Palaearctic distribution; **in Georgia**: EG: Jandari Lake, Kazbegi, Tbilisi – Samgori; WG: Bebesiri Lake, Khobi, Ozurgeti, Samtredia, Tkibuli Reservoir reported by Chiaberashvili and Mchedlidze (1961), Chiaberashvili (1971a), Kurashvili et al. (1975), Kurashvili (1984a), Kurashvili (1984b), Giorgadze (1985), Petriashvili et al. (1985), Murvanidze et al. (2008a).

Genus *Phyllodistomum* Braun, 1899

Phyllodistomum folium (Olfers, 1816) Braun, 1899

Nomenclature:

Synonym: *Phyllodistomum elongatum* Nybelin, 1926

Parasite of: fishes - *Abramis brama, Alburnus chalcoides, Barbus barbus, Luciobarbus capito, Rutilus rutilus*, *Scardinius erythrophthalmus*, *Squalius cephalus*, *Vimba vimba*.

Site of infection: urinary bladder.

Distribution: Palaearctic distribution; **in Georgia**: EG: River Mtkvari; WG: Rivers: Mtkvari, Rioni, Tekhura; Bebesiri Lake reported by Chiaberashvili (1962b), Kurashvili et al. (1980), Murvanidze et al. (2018).

Phyllodistomum pseudofolium Nybelin, 1926

Parasite of: fishes - *Alburnus derjugini*, *Chondrostoma colchicum*, *Vimba vimba*.

Site of infection: urinary bladder.

Distribution: Occurring in Europe; **in Georgia**: WG: Bebesiri Lake, River Rioni reported by Chiaberashvili (1962b), Murvanidze et al. (2018).

Family Haematoloechidae Freitas & Lent, 1939

Genus *Haematoloechus* Looss, 1899

Nomenclature:

Synonym: *Pneumonoeces* Looss,1902

Haematoloechus asper Looss, 1899

Parasite of: amphibians - *Bufo bufo*, *Pelophylax ridibundus*.

Site of infection: lungs.

Distribution: Occurring in Europe; **in Georgia**: EG: Aragvi River Basin, Jandari Lake reported by Burtikashvili et al. (1978), Burtikashvili and Getzadze (1981), Petriashvili et al. (1985), Murvanidze et al. (2008a).

Haematoloechus variegatus (Rudolphi, 1819) Looss, 1899

Parasite of: amphibians - *Bufo bufo*, *Bufotes viridis*, *Pelophylax ridibundus*, *Rana macrocnemis*.

Site of infection: lungs.

Distribution: Occurring in Europe, Asia; **in Georgia**: EG: Aragvi River Basin, Lakes: Bazaleti, Jandari; Kumisi Reservoir, Samgori, surroundings of Tbilisi; WG: Ozurgeti, Poti, Samtredia, Tkibuli Reservoir reported by Chiaberashvili and Mchedlidze (1961), Petriashvili (1964), Kurashvili et al. (1973), Kurashvili et al. (1991), Burtikashvili et al. (1978), Giorgadze (1985), Petriashvili et al. (1985), Murvanidze et al. (2008a).

Haematoloechus sp.

Parasite of: amphibians - *Pelophylax ridibundus*.

Site of infection: lungs.

Distribution: in Georgia: WG: Ozurgeti reported by Kurashvili (1984b).

Family Haploporidae Nicoll, 1914

Genus *Saccocoelium* Looss, 1902

Saccocoelium obesum Looss, 1902

Parasite of: fishes - *Chelon auratus, Mugil cephalus*.

Site of infection: intestine.

Distribution: Occurring in Europe; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1973), Murvanidze et al. (2018).

Family Haplosplanchnidae Poche, 1926

Genus *Haplosplanchnus* Looss, 1902

Haplosplanchnus pachysoma (Eysenhardt, 1829) Looss, 1902

Parasite of: fishes - *Chelon auratus*, *Mugil cephalus*.

Site of infection: intestine.

Distribution: Occurring in Europe, Africa, Oceanian Regions; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1973), Murvanidze et al. (2018).

Genus *Schikhobalotrema* Skrjabin & Guschanskaya, 1955*S*

Schikhobalotrema sparisomae (Manter, 1938) Skrjabin & Guschanskaya, 1955

Parasite of: fishes - *Chelon auratus*.

Site of infection: digestive tract.

Distribution: Holarctic distribution; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1973), Murvanidze et al. (2018).

Family Hemiuridae Looss, 1899

Genus *Aphanurus* Looss, 1907

Aphanurus stossichii (Monticelli, 1891) Looss, 1907

Parasite of: fishes - *Alosa tanaica*.

Site of infection: no data.

Distribution: Palaearctic distribution; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1973).

Genus *Hemiurus* Rudolphi, 1809

Hemiurus appendiculatus (Rudolphi, 1802) Looss, 1899

Parasite of: fishes - *Alosa tanaica*, *A. immaculata*, *Chelon auratus*, *Mugil cephalus*, *Perca fluviatilis*.

Site of infection: stomach.

Distribution: Occurring in Europe, North America, North Africa; **in Georgia**: WG: Paliastomi Lake reported by Kurashvili et al. (1951), Kurashvili (1961a), Kurashvili and Petriashvili (1977), Murvanidze et al. (2018).

Hemiurus luehei Odhner, 1905

Parasite of: fishes - *Alosa immaculata*.

Site of infection: stomach.

Distribution: Holarctic distribution; **in Georgia**: WG: Sokhumi reported by Kurashvili and Tabidze (1947).

Family Heterophyidae Leiper, 1909

Genus *Ascocotyle* Looss, 1899

Ascocotyle italica Alessandrini, 1906

Nomenclature:

Synonym: *Parascocotyle italica* (Alessandrini, 1906) Price, 1932

Parasite of: mammals - *Canis lupus familiaris*.

Site of infection: intestine.

Distribution: Occurring in Europe, Africa; **in Georgia**: WG: Kolkheti Lowland reported by Burjanadze (1943), Kurashvili (1984b).

Ascocotyle longa Ransom, 1920

Nomenclature:

Synonyms:

Parascocotyle longa (Ransom, 1920) Stunkard & Haviland, 1924

Metascocotyle witenbergi Ciurea, 1933

Parasite of: mammals - *Felis catus.*

fishes: *Blicca bjoerkna, Luciobarbus mursa*.

Site of infection: gills, intestine, muscles.

Distribution: Occurring in Europe, Asia, Africa, America; **in Georgia**: EG: rivers: Alazani, Mtkvari; WG: Kolkheti reported by Gamtsemlidze (1941), Burjanadze (1943), Chiaberashvili (1957), Chiaberashvili (1968), Murvanidze et al. (2018).

Genus *Metagonimus* Katsurada, 1912

Metagonimus ciureanus (Witenberg, 1929) Price, 1931

Nomenclature:

Synonym: *Dexiogonimus ciureanus* Witenberg, 1929

Parasite of: mammals - *Canis aureus*, *Felis chaus*, *Vulpes vulpes*.

Site of infection: intestine.

Distribution: Occurring in Asia; **in Georgia**: EG: Adigeni, Bolnisi, Marneuli, rivers: Khrami, Mashavera, Mtkvari; Tbilisi – Samgori reported by Rodonaia (1966b), Rodonaia (1971), Kurashvili (1984b).

Metagonimus yokogawai (Katsurada, 1912) Katsurada, 1912

Parasite of: mammals - *Canis lupus familiaris*, *Felis catus*.

molluscs (intramolluscan stage) - *Melanopsis praemorsa.*

Site of infection: intestine.

Distribution: Holarctic distribution; **in Georgia**: WG: Batumi, Kolkheti, Rivers of western Georgia reported by Gamtsemlidze (1941), Burjanadze (1943), Kurashvili (1984b), Ataev and Dobrovolskiy (1992).

Genus *Pygidiopsis* Looss, 1907

Pygidiopsis genata Looss, 1907

Parasite of: fishes (metacercariae) - *Babka gymnotrachelus* , *Neogobius melanostomus*.

Site of infection: gills, muscles.

Distribution: Occurring in Europe, Africa; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1973), Kurashvili and Petriashvili (1977), Murvanidze et al. (2018).

Family Lecithasteridae Odhner, 1905

Genus *Aponurus* Looss, 1907

Aponurus tschugunovi Issaitschikov, 1927

Parasite of: fishes - *Mugil cephalus.*

Site of infection: no data

Distribution: Occurring in the Black sea, European part of Russia; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1973).

Genus *Lecithaster* Lühe, 1901

Lecithaster confusus Odhner, 1905

Nomenclature:

Synonym: *Lecithaster musteli* Srivastava, 1966

Parasite of: fishes - *Alburnus derjugini*, *Alosa immaculata*.

Site of infection: intestine.

Distribution: Occurring in the Holarctic Region, Africa; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1977), Murvanidze et al. (2018).

Lecithaster tauricus Pigulewsky, 1938

Parasite of: fishes - *Esox lucius*, *Perca fluviatilis*.

Site of infection: intestine.

Distribution: Occurring in the Black Sea; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1977), Murvanidze et al. (2018).

Family Lecithodendriidae Lühe, 1901

Genus *Lecithodendrium* Looss, 1896

Lecithodendrium dryomi Mazaberidze & Chotenovskiy, 1966

Parasite of: mammals - *Dryomys nitedula*, Myoxidae.

Site of infection: small intestine.

Distribution: Occurrence recorded in Georgia only; **in Georgia**: EG: Borjomi – Gujareti reported by Matsaberidze (1966b), Matsabaridze (1976), Matsaberidze and Khotenovskii (1966b), Matsaberidze and Khotenovskii (1967).

Lecithodendrium linstowi Dollfus, 1931

Parasite of: mammals - *Eptesicus serotinus*, *Pipistrellus nathusii*.

Site of infection: small intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: Aspindza, Borjomi, Dmanisi, Khashuri, Lagodekhi, Sagarejo; WG: Tkibuli reported by Matsaberidze (1966b), Matsabaridze (1976), Matsaberidze and Khotenovskii (1967).

Lecithodendrium rysavyi Dubois, 1960

Parasite of: mammals - *Pipistrellus kuhlii*.

Site of infection: small intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: Tbilisi; WG: Tsalenjikha reported by Matsaberidze and Khotenovskii (1967), Matsabaridze (1976).

Lecithodendrium semen Kirschenblatt, 1941

Parasite of: mammals - *Dryomis nitedula*.

Site of infection: small intestine.

Distribution: Recorded in Georgia only; **in Georgia**: WG: Bakhmaro, Chokhatauri reported by Kirshenblat (1941), Kurashvili (1961a), Rodonaia (1971), Matsabaridze (1976).

Lecithodendrium skrjabini Matsaberidze, 1963

Parasite of: mammals - *Pipistrellus nathusii*.

Site of infection: small intestine.

Distribution: Occurring in Europe; **in Georgia**: WG: Tkibuli reported by Matsaberidze (1963), Matsabaridze (1976), Matsaberidze and Khotenovskii (1967).

Genus *Ophiosacculus* Macy, 1935

Ophiosacculus mehelyi (Mödlinger, 1930) Macy, 1935

Nomenclature:

Synonym: *Ophiosacculus eptesicus* Matsaberidze et Chotenowsky, 1965

Parasite of: mammals - *Eptesicus serotinus*.

Site of infection: small intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: Mtskheta, Sagarejo – Gombori, Tbilisi reported by Matsaberidze (1966b), Matsabaridze (1976), Matsaberidze and Khotenovskii (1966a), Matsaberidze and Khotenovskii (1967), Tkach et al. (2002).

Genus *Prosotocus* Looss, 1899

Prosotocus confusus (Loos, 1896) Looss, 1899

Parasite of: amphibians - *Pelophylax ridibundus, Rana macrocnemis.*

Site of infection: small intestine.

Distribution: With Palaearctic distribution; **in Georgia**: WG: Ozurgeti, Samtredia, Senaki reported by Chiaberashvili and Mchedlidze (1961), Kurashvili (1984b).

Prosotocus fuelleborni Travassos, 1930

Parasite of: amphibians - *Pelophylax ridibundus*.

Site of infection: small intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: Lakes: Bazaleti, Kumisi reported by Petriashvili (1964), Kurashvili et al. (1973).

Genus *Prosthodendrium* Dollfus, 1931

Prosthodendrium ascidia (van Beneden, 1873) Bhalerao, 1936

Parasite of: mammals - *Eptesicus serotinus*, *Pipistrellus kuhlii*, *P. nathusii*, *Rhinolophus ferrumequinum*.

Site of infection: small intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: Dedoflistskaro – Shiraqi, Gareji, Sagarejo-Gombori; WG: Tkibuli reported by Matsaberidze and Khotenovskii (1967), Matsabaridze (1976).

Prosthodendrium chilostomum (Mehlis, 1831) Travassos, 1921

Parasite of: mammals - *Eptesicus serotinus*, *Pipistrellus nathusii*, *Rhinolophus ferrumequinum*.

Site of infection: small intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: Mtskheta, Natakhtari, Sagarejo-Gombori; WG: Tkibuli reported by Matsaberidze and Khotenovskii (1967), Matsabaridze (1976).

Prosthodendrium parvouterus (Bhalerao, 1926) Skrjabilovich, 1948

Parasite of: mammals - *Eptesicus serotinus*, *Nyctalus noctula*.

Site of infection: small intestine.

Distribution: Occurring in the Holarctic Region, Africa; **in Georgia**: EG: Borjomi, Dedoflistskaro – Shiraqi, Sagarejo-Gombori; WG: Tkibuli reported by Matsaberidze and Khotenovskii (1967), Matsabaridze (1976).

Prosthodendrium skrjabini (Shaldybin in Skarbilovich, 1948)

Nomenclature:

Synonym: *Paralecithodendrium skrjabini* Shaldybin, 1948

Parasite of: mammals - *Eptesicus serotinus*, *Rhinolophus ferrumequinum*.

Site of infection: intestine.

Distribution: Occurring in Europe; **in Georgia**: EG: Borjomi, Davit Gareji reported by Matsaberidze (1966b), Matsabaridze (1976).

Genus *Pycnoporus* Looss, 1899

Pycnoporus kuraschvili Matzaberidse, 1976

Parasite of: mammals - *Myotis mistacinus*.

Site of infection: small intestine.

Distribution: Recorded in Georgia only; **in Georgia**: EG: Tbilisi reported by Matsabaridze (1976).

Family Leptophallidae Dayal, 1938

Genus *Leptophallus* Lühe, 1909

Leptophallus nigrovenosus (Bellingham, 1844) Lühe, 1909

Parasite of: reptiles - *Natrix natrix*.

Site of infection: intestine.

Distribution: Palaearctic distribution; **in Georgia:** EG: Jinvali, Kazbegi, Lagodekhi, Surroundings of Tbilisi; WG: Khobi, surroundins of Batumi – Kakhaberi Lake, Zugdidi reported by Sharpilo (1962), Jankarashvili (1985).

Genus *Paralepoderma* Dollfus, 1950

Paralepoderma cloacicola (Lühe, 1909) Dollfus, 1950

Parasite of: reptiles - *Natrix natrix*, *N. tesselata*.

Site of infection: intestine.

Distribution: Occurring in the Palaearctic, Africa; **in Georgia:** EG: Borjomi, Jinvali, Kazbegi, surroundings of Tbilisi; WG: Khobi, Kulevi, surroundings of Batumi, Zugdidi reported by Sharpilo (1962), Kurashvili (1984b), Jankarashvili (1985), Kurashvili et al. (1991).

Family Lissorchiidae Magath, 1917

Genus *Asymphylodora* Looss, 1899

Asymphylodora demeli Markowski, 1935

Parasite of: fishes - Gobiidae, *Ponticola constructor.*

Site of infection: intestine.

Distribution: Occurring in Europe; **in Georgia**: River Mtkvari reported by Kurashvili et al. 1980.

Asymphylodora kubanica Issaitschikov, 1923

Parasite of: fishes - *Abramis brama, Alburnus chalcoides, Ballerus sapa, Blicca bjoerkna, Cyprinus carpio, Esox lucius, Leuciscus aspius, Rutilus rutilus, Silurus glanis.*

Site of infection: intestine.

Distribution: Occurring in Europe, Asia; **in Georgia**: River Mtkvari reported by Kurashvili et al. (1980).

Asymphylodora markewitschi Kulakowskaya, 1947

Parasite of: fishes - *Barbus lacerta, Cyprinus carpio*.

Site of infection: esophagus, intestine.

Distribution: Occurring in Europe, Asia; **in Georgia**: EG: River Mtkvari reported by Kurashvili et al. (1980), Kurashvili et al. (2005).

Asymphylodora tincae (Modeer, 1790) Lühe, 1909

Parasite of: fishes - *Alosa tanaica*, *A. immaculata*, *Esox lucius*, *Luciobarbus capito*, *Mugil cephalus, Tinca tinca*.

Site of infection: esophagus, intestine.

Distribution: Occurring in Europe; **in Georgia**: River Mtkvari; WG: Lakes: Japana, Paliastomi reported by Chernova (1973), Kurashvili et al. (1980), Murvanidze et al. (2018).

Family Macroderidae (Goodman, 1952)

Genus *Macrodera* Looss, 1899

Macrodera longicollis (Abildgaard in Müller, 1788) Lühe, 1909

Parasite of: reptiles - *Natrix natrix*, *N. tesselata*.

Site of infection: lungs, respiratory tract.

Distribution: Palaearctic distribution; **in Georgia:** EG: Bazaleti Lake, Jinvali, Kazbegi surroundings of Borjomi, surroundings of Tbilisi; WG: Khobi, Surroundings of Batumi, Zugdidi reported by Sharpilo (1962), Petriashvili (1966), Kurashvili (1984b), Jankarashvili (1985), Kurashvili et al. (1991).

Family Notocotylidae Lühe, 1909

Genus *Notocotylus* Diesing, 1839

Notocotylus attenuatus (Rudolphi, 1809) Kossack, 1911

Parasite of: birds - *Anas clypeata*, *A. plathyrynchos*, *A. plathyrynchos* f. *domestica*, *Anser anser, Aythya fuligula*, *A. ferina*, *Cygnus cygnus*.

molluscs (intramolluscan stage) - *Radix auricularia*, *Peregriana peregra*, *Lymnaea stagnalis*.

Site of infection: caecum, large intestine, rectum (birds), hepatopancreas (molluscs).

Distribution: Cosmopolitan distribution; **in Georgia**: EG: Bolnisi, Dedoplistskaro – Qvemo qedi, Dmanisi, Gardabani, Marneuli, Tetritskaro, Tsalka – Khrami Reservoir, Lakes: Bazaleti, Paravani; WG: Lakes: Bebesiri, Madatafa; Samtredia, surroundings of Poti – Paliastomi Lake reported by Burjanadze (1943), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984a), Kurashvili (1984b), Japaridze and Savateeva (1967), Kurashvili et al. (1976), Tkachenko (1988), Arabuli et al. (2015).

Notocotylus ephemera (Nitzsch, 1817) Harwood, 1939

Parasite of: molluscs (intramolluscan stage) - *Planorbis planorbis.*

Site of infection: no data.

Distribution: Occurrence in Europe; **in Georgia**: EG: Gori – Khidistavi reported by Chiaberashvili (1971a).

Notocotylus noyeri Joyeux, 1922

Parasite of: mammals - *Arvicola terrestris*.

Site of infection: small intestine.

Distribution: Occurrence in Europe; **in Georgia**: EG: Gori – Khidistavi reported by Matsabaridze (1976).

Notocotylus ponticus Tshiaberashwili, 1964

Parasite of: molluscs (intramolluscan stage) - *Bithynia tentaculata*.

Site of infection: no data.

Distribution: Recorded only in Georgia; **in Georgia**: WG: Bebesiri Lake reported by Chiaberashvili (1971b), Kurashvili (1984a), Cribb (1991).

Notocotylus zduni Chiaberashvili & Dzavelidze, 1968 Chiaberashvili & Dzavelidze, 1968

Parasite of: molluscs (intramolluscan stage) - *Theodoxus fluviatilis*.

Site of infection: no data.

Distribution: Occurrence in Europe; **in Georgia**: WG: West Georgia reported by Chiaberashvili and Javelidze (1968).

Family Opecoelidae Ozaki, 1925

Genus *Sphaerostoma* Rudolphi, 1809

Sphaerostoma bramae (Müller, 1776) Lühe, 1909

Parasite of: fishes - *Alburnus chalcoides, Ballerus sapa, Blicca bjoerkna, Esox lucius*.

Site of infection: intestine.

Distribution: Palaearctic distribution; **in Georgia**: River Mtkvari reported by Kurashvili et al. (1980).

Sphaerostoma globiporum (Rudolphi, 1802) Looss, 1899

Parasite of: fishes - *Rutilus rutilus*.

Site of infection: intestine.

Distribution: Occurrence in Europe, North America; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1973), Murvanidze et al. (2018).

Sphaerostoma salmonis Slusarski, 1958

Nomenclature:

Synonym: *Sphaerostoma kurensis* Mikailov, 1969

Parasite of: fishes - *Alburnus chalcoides*.

Site of infection: intestine.

Distribution: Occurring in Europe; **in Georgia**: River Mtkvari reported by Kurashvili et al. (1980).

Family Opisthorchiidae Looss, 1899

Genus *Apophallus* Lühe, 1909

Apophallus donicus (Skrjabin & Lindtrop, 1919) Price, 1931

Parasite of: fishes (metacercariae) - freshwater fishes.

Site of infection: fins, skin.

Distribution: Holarctic distribution; **in Georgia**: WG: freshwaters of West Georgia reported by Chiaberashvili (1955), Murvanidze et al. (2018).

Apophallus muehlingi (Jägerskiöld, 1899) Lühe, 1909

Parasite of: fishes (metacercariae) - *Abramis brama*.

Site of infection: fins, skin.

Distribution: Palaearctic distribution; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1977), Kurashvili and Petriashvili (1977), Murvanidze et al. (2018).

Genus *Cryptocotyle* Lühe, 1899

Cryptocotyle concava (Creplin, 1825) Lühe, 1899

Parasite of: fishes (metacercariae) - *Babka gymnotrachelus*, *Neogobius melanostomus*.

Site of infection: skin, musculature.

Distribution: Holarctic distribution; **in Georgia**: WG: Paliastomi Lake reported by Chernova (1977), Kurashvili and Petriashvili (1977), Murvanidze et al. (2018).

Genus *Metorchis* Looss, 1899

Metorchis bilis (Braun, 1790) Odening, 1962

Parasite of: fishes (metacercariae) - *Cyprinus carpio*, *Rutilus rutilus* , *Scardinius erythrophthalmus*.

Site of infection: muscle.

Distribution: Holarctic distribution; **in Georgia**: WG: Didi Narionali Lake, Paliastomi Lake reported by Chernova (1977), Kurashvili and Petriashvili (1977), Murvanidze et al. (2018).

Metorchis xanthosomus (Creplin, 1846) Braun, 1902

Nomenclature:

Synonym: *Metorchis intermedius* Heinemann, 1937

Parasite of: birds - *Anas acuta*, *A. crecca*, *A. plathyrynchos* f. *domestica*, *Anser anser*, *Aythya fuligula*.

Site of infection: gallbladder, hepatic ducts.

Distribution: Occurring in Europe; **in Georgia** : EG: Marneuli; WG: Abasha – Tskhenistskali, Samtredia, Zugdidi reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b), Kurashvili et al. (1976).

Genus *Opisthorchis* Branchard, 1895

Opisthorchis geminus (Looss, 1896) Looss, 1899

Parasite of: birds - *Ardeolla ralloides*.

Site of infection: gallbladder, hepatic ducts.

Distribution: Occurring in Southeast Asia, Africa; **in Georgia:** EG: Gardabani – Jandari Lake, surroundings of Tbilisi reported by Kurashvili (1957), Kurashvili (1961a).

Opisthorchis simulans (Looss, 1896) Kowalewski 1898

Parasite of: birds - *Anas plathyrynchos* f. *domestica*.

Site of infection: hepatic ducts.

Distribution: Occurring in Africa; **in Georgia**: WG: Samtredia reported by Kurashvili et al. (1976), Kurashvili (1984b).

Family Orientocreadiidae Yamaguti, 1958

Genus *Orientocreadium* Tubangui, 1931

Orientocreadium pseudobagri Yamaguti, 1934

Nomenclature:

Synonym: *Orientocreadium siluri* (Dubinina & Bychowsky in Skrjabin, 1954) Yamaguti, 1958; *Paratormopsolus siluri* Dubinina & Bychowsky, 1954

Parasite of: fishes - *Silurus glanis*.

Site of infection: intestine.

Distribution: Known from Asia (Iraq); **in Georgia**: WG: Bebesiri Lake, River Tekhura reported by Chiaberashvili (1962b), Murvanidze et al. (2018).

Family Paramphistomidae Fischoeder, 1901

Genus *Calicophoron* Näsmark, 1937

Calicophoron calicophorum (Fischoeder, 1901) Näsmark, 1937

Parasite of: mammals - cattle.

molluscs (intramolluscan stage) - *Planorbis planorbis*.

Site of infection: omasum, rumen.

Distribution: Occurring in Asia, Africa, Oceanian; **in Georgia:** EG: Akmeta, Gardabani, Gurjaani, Krtsanisi, Kvareli, Lagodekhi, Signagi, Telavi, Teritskaro, Tsalka. WG: Khobi, Lanchkhuti, Samtredia reported by Kurashvili (1984b), Sey (2001), Fotskhveria (2002).

Genus *Paramphistomum* Fischoeder, 1901

Paramphistomum cervi (Zeder, 1790) Fischoeder, 1901

Parasite of: mammals - *Capreolus capreolus*, cattle, Bos taurus, Ovies aries.

molluscs (intramolluscan stage) - *Planorbis planorbis*.

Site of infection: omasum, rumen, small intestine, stomach.

Distribution: Cosmopolitan distribution; **in Georgia**: EG: Bakuriani. WG: Akhalqalaqi, Khobi (Qarieta), Lanchkhuti, Poti, Samtredia, Sokhumi, Qutaisi reported by Gamtsemlidze (1941), Burjanadze (1943), Rodonaia (1962), Rodonaia (1966a), Chiaberashvili (1971a), Kurashvili (1984b), Sey (2001).

Paramphistomum scotiae Willmott, 1950

Nomenclature:

Synonym: *Liorchis scotiae* (Willmott,1950) Velichko, 1966

Parasite of: mammals - *Capreolus capreolus*.

Site of infection: rumen.

Distribution: Occurring in Europe; **in Georgia**: WG: Khobi, Poti, Qarieta reported by Rodonaia (1971), Kurashvili (1984b).

Paramphistomum skrjabini Popova, 1927

Parasite of: mammals - Cattle, buffalo, *Bos taurus*

molluscs (intramolluscan stage) - *Planorbis planorbis*.

Site of infection: rumen.

Distribution: Reported from Georgia only; **in Georgia**: EG: Eastern Georgia reported by Burjanadze (1943), Rodonaia (1960), Rodonaia (1971).

"fam. Paramphistomidae" gen. sp.

Parasite of: molluscs (intramolluscan stage) - *Planorbis planorbis*.

Site of infection: no data.

Distribution: in Georgia: EG: Gori, Khashuri, Lagodekhi, Manglisi, Qareli, Tetritskaro, Tsalka reported by Matsaberidze et al. (1989).

Family Phaneropsolidae Mehra, 1935

Genus *Combesia* Mas-Coma, Roset & Montoliu, 1985

Combesia macrobursata (Tschertkova & Rodonaja, 1965) Mas-Coma, Roset & Montoliu, 1985

Nomenclature:

Synonym: *Plagiorchis macrobursatum* Tschertkova & Rodonaja, 1965

Parasite of: mammals - *Talpa europea*, *T.orientalis*.

Site of infection: small intestine.

Distribution: Recorded from Georgia and Spain; **in Georgia**: WG: Sokhumi reported by Chertkova and Rodonaia (1965), Rodonaia (1971), Matsabaridze (1976).

Family Philophthalmidae

Genus *Philophthalmus Looss, 1899*

Philophthalmus rhionica Tichomirov, 1976

Parasite of: molluscs (intramolluscan stage) - *Melanopsis praemorsa.*

Site of infection: hepatopancreas.

Distribution: Recorded in Georgia only; **in Georgia**: WG: River Rioni reported by Tichomirov (1976), Ataev (1991), Ataev and Dobrovolskiy (1992).

Family Plagiorchiidae Lühe, 1901

Genus *Haplometra* Looss, 1899

Haplometra brevicaeca Timon-David, 1962

Parasite of: amphibians - *Rana macrocnemis*.

Site of infection: lungs.

Distribution: Occurring in Europe; **in Georgia**: EG: Kazbegi, Cross Pass, Minor Caucasus reported by Petriashvili et al. (1985), Murvanidze et al. (2008a).

Genus *Plagiorchis* Lühe, 1899

Plagiorchis maculosus (Rudolphi, 1802) Braun, 1901

Parasite of: birds - *Caprimulgus europaeus meridionalis*, *Hirundo rustica rustica*.

Site of infection: intestine.

Distribution: Occurrence in the Holarctic Region, India, Australia; **in Georgia:** EG: Gardabani, Lagodekhi National Park, Tbilisi; WG: Samtredia, Surroundings Poti reported by Kurashvili (1957), Kurashvili (1961a).

Plagiorchis vespertilionis (Müller, 1780) Braun, 1900

Parasite of: mammals - *Eptesicus serotinus*, *Myotis mystacinus*, *Nyctalus leisleri, N. noctula*, *Rhinolophus hipposideros*, *R. mehelyi*, *Vespertilio subtilis*.

Site of infection: small intestine.

Distribution: Holarctic distribution; **in Georgia**: EG: Akhmeta, Bolnisi, Gomareti, Lagodekhi reported by Matsaberidze (1961), Matsabaridze (1976), Rodonaia (1966b), Matsaberidze and Khotenovskii (1967).

Plagiorchis sp.

Parasite of: molluscs (intramolluscan stage) - *Radix euphratica*.

Site of infection: body cavity, liver.

Distribution: in Georgia: EG: Turtle Lake reported by Arabuli, unpublished data 2021.

Genus *Skrjabinoeces* Sudarikov, 1950

Skrjabinoeces similis Looss, 1899

Parasite of: molluscs (intramolluscan stage) - *Planorbis planorbis*.

Site of infection: no data.

Distribution: Palaearctic distribution; **in Georgia: EG:** Rustavi reported by Tkachenko (1990).

Family Pleurogenidae Looss, 1899

Genus *Pleurogenes* Looss, 1896

Pleurogenes claviger (Rudolphi, 1819) Looss, 1896

Parasite of: amphibians - *Pelophylax ridibundus*, *Rana macrocnemis*.

Site of infection: intestine.

Distribution: Occurring in Europe; **in Georgia**: WG: Bebesiri Lake, Gali, Gudauta reported by Chiaberashvili and Mchedlidze (1961), Kurashvili (1984b), Petriashvili et al. (1985), Murvanidze et al. (2008a).

Pleurogenes intermedius Issaitschikov, 1926

Parasite of: amphibians - *Bufotes viridis*, *Pelophylax ridibundus*, *Rana macrocnemis*.

Site of infection: intestine.

Distribution: Palaearctic distribution; **in Georgia**: EG: Akhaldaba, Borjomi reported by Kurashvili et al. (1991), Murvanidze et al. (2008a).

Genus *Pleurogenoides* Travassos, 1921

Pleurogenoides medians (Olsson, 1876) Travasos, 1921

Parasite of: amphibians - *Bufotes viridis*, *Rana macrocnemis*, *Pelophylax ridibundus*.

Site of infection: small intestine.

Distribution: Holarctic distribution; **in Georgia**: EG: Aragvi River Basin, Bazaleti Lake, Martkhopi; WG: Gali, Khobi reported by Petriashvili (1964), Kurashvili et al. (1977), Burtikashvili and Getzadze (1981), Petriashvili et al. (1985), Murvanidze et al. (2008a).

Family Prosthogonimidae Lühe, 1909

Genus *Prosthogonimus* Lühe, 1899

Prosthogonimus ovatus (Rudolphi, 1803) Lühe, 1899

Parasite of: birds - *Anas plathyrynchos*, *A. platyrhynchos* f. *domestica*, *A. strepera*, *Anser anser, Gallus gallus* f. *domestica*, *Phasianus colchicus*.

molluscs (intramolluscan stages) - *Bithynia tentaculata*.

Site of infection: bursa Fabricii, oviduct.

Distribution: Occurring in Europe, Asia, Americas; **in Georgia**: EG: Dusheti – Bazaleti Lake, Gardabani, Lisi Lake, Tetritskaro, Tsalka; WG: Bebesiri Lake, Gagra, Samtredia reported by Burjanadze (1943), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984a), Kurashvili (1984b), Japaridze and Savateeva (1967), Kurashvili et al. (1976).

Family Psilostomidae Looss, 1900

Genus *Psilochasmus* Lühe, 1909

Psilochasmus longicirratus Skrjabin, 1913

Parasite of: birds - *Anas acuta*, *A. clypeata*, *Anas platyrhynchos* f. *domestica*, *Anser anser* f. *domestica*, *Aythya nyroca*.

Site of infection: caecum, intestine.

Distribution: Europe, North America; **in Georgia**: EG: Dusheti – Bazaleti Lake, Tsalka – Khrami Reservoir. WG: Gurianta, Khobi, Ozurgeti – Gomi, Samtredia, surroundings of Poti reported by Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b), Japaridze and Savateeva (1967), Kurashvili et al. (1976).

Psilochasmus oxyurus (Creplin, 1825) Lühe, 1909

Parasite of: birds - *Anas acuta*, *Anas plathyrynchos*, *Gallus gallus* f. *domestica*, *Tadorna tadorna*.

Site of infection: intestine.

Distribution: North America, Europe, Asia (Iraq); **in Georgia**: EG: Lagodekhi – Alazani valley. WG: Khobi, Rioni valley, Samtredia, Senaki, surroundings of Poti reported by Kurashvili (1953a), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b), Japaridze and Savateeva (1967), Kurashvili et al. (1976).

Family Stomylotrematidae Poche, 1926

Genus *Stomylotrema* Looss, 1900

Stomylotrema spasskii Sobolev, 1946

Parasite of: birds - *Gallinago media*.

Site of infection: bursa Fabricii, large intestine.

Distribution: Occurring in Europe; **in Georgia**: WG: Sokhumi reported by Kurashvili (1950), Kurashvili (1953a), Kurashvili (1957), Kurashvili (1961a), Kurashvili (1984b).

Family Telorchiidae Looss, 1899

Genus *Opisthioglyphe* Looss, 1899

Opisthioglyphe ranae (Frölich, 1791) Looss, 1907

Parasite of: reptiles - *Natrix natrix*.

amphibians: *Bufo bufo*, *Bufotes viridis*, *Hyla arborea*, *Pelophylax ridibundus*, *Rana macrocnemis*.

molluscs (intramolluscan stage) - *Galba palustris*, *Peregriana peregra*.

Site of infection: gall bladder, large intestine, small intestine.

Distribution: Occurring in Europe, Asia (Iraq), North Africa; **in Georgia:** EG: Aragvi River Basin, Borjomi, Jinvali, Kazbegi, Kodjori, Samgori, Surroundings of Tbilisi, Tbilisi – Botanic garden; WG: Batumi, Bebesiri Lake, Gali, Khobi, Lanchkhuti, Ozurgeti, Samtredia, Senaki, Tkibuli Reservoir, Zugdidi reported by Chiaberashvili and Mchedlidze (1961), Javelidze (1964), Burtikashvili and Getzadze (1981), Kurashvili (1984a), Kurashvili (1984b), Giorgadze (1985), Jankarashvili (1985), Petriashvili et al. (1985), Kurashvili et al. (1991), Murvanidze et al. (2008a).

Opisthioglyphe rastellus (Olsson, 1876) Looss, 1907

Nomenclature:

Synonym: *Dolichosaccus rastellus* (Olsson, 1876) Travassos, 1930

Parasite of: amphibians - *Rana macrocnemis*, *Pelophylax ridibundus*.

molluscs (intramolluscan stage) - *Ampullaceana balthica*.

Site of infection: intestine, hepatopancreas.

Distribution: With Palaearctic distribution; **in Georgia**: EG: Central Caucasus (Georgia); Samgori reported by Chiaberashvili (1971a), Petriashvili et al. (1985).

Genus *Telorchis* Lühe, 1899

Telorchis assula (Dujardin, 1845) Dollfus, 1957

Parasite of: reptiles - *Emys orbicularis*, *Natrix natrix*, *N. tesselata*.

Site of infection: intestine.

Distribution: Palaearctic distribution; **in Georgia:** EG: Borjomi, Jinvali, Kazbegi, Lagodekhi, Tbilisi, Lakes: Bazaleti, Jandari; WG: Anaklia, Khobi, Kulevi, surroundings of Batumi, Zugdidi reported by Sharpilo (1962), Petriashvili (1966), Kurashvili et al. (1975), Kurashvili (1984b), Jankarashvili (1985), Kurashvili et al. (1991), Murvanidze et al. (2008b).

Telorchis stossichi Goldberger, 1911

Parasite of: reptiles - *Emys orbicularis*.

Site of infection: intestine.

Distribution: Occurring in Europe; **in Georgia: EG:** Lakes: Bazaleti, Jandari reported by Petriashvili (1966), Kurashvili et al. (1975), Jankarashvili (1978), Murvanidze et al. (2008b).

Telorchis sp.

Parasite of: reptiles - *Lacerta strigata*.

molluscs (intramolluscan stage) - *Radix euphratica*.

Site of infection: intestine, liver.

Distribution: in Georgia: EG: Lakes: Jandari, Turtle reported by Kurashvili et al. (1975), Arabuli, unpublished data 2021.

Family Typhlocoelidae Harrah, 1922

Genus *Tracheophilus* Skrjabin, 1913

Tracheophilus sisowi Skrjabin, 1913

Parasite of: birds - *Anas acuta*, *A. clypeata*, *A. platyrhynchos*, *A. platyrhynchos* f. *domestica*, *A. querquedula*, *Anser anser* f. *domestica*, *Aythya fuligula*.

Site of infection: abdominal cavity, lungs, trachea.

Distribution: Holarctic distribution; **in Georgia**: EG: Bolnisi, Dusheti – Bazaleti Lake, Gardabani, Marneuli, Tetritskaro. WG: Samtredia reported by Burjanadze (1943), Kurashvili (1957), Kurashvili (1961a), Japaridze and Savateeva (1967), Kurashvili et al. (1976).

Analysis

Results

Based on data from the literature and our new records, digeneans in Georgia are represented by 186 taxa, of which 173 are identified to species level, belonging to 108 genera and 48 families. The majority of trematode species comprised adult stages (160 species), a small proportion was made up by cercariae (33) or metacercariae (24) in their first and second intermediate hosts, respectively. For 28 species (15%) at least two life-cycle stages were recorded (adult in combination with cercariae/metacercariae). Trematodes were mainly recorded in birds (62 trematode species), followed by those parasitizing fish (50), mammals (33) and amphibians (25), and only few were found in reptiles (12). Birds and mammals were recorded as definitive hosts only, while the other groups were recorded as definitive and also as second intermediate hosts - fish hosted 32 species as adults and 18 as metacercariae, amphibians hosted 23 species as adults and 2 as metacercariae, and reptiles hosted 9 species as adults and 3 as metacercariae. A total of 35 trematode species were recorded in molluscs, which were used as first or second intermediate hosts. Predominantly freshwater digeneans were recorded (154 species), while a much lower number of marine (12) and terrestrial (21 species) digeneans was found. A total of 202 free-living vertebrate and mollusc species were recorded as hosts for digeneans – fish of 57 species, amphibians of 6 species, reptiles of 4 species, birds of 74 species, mammals of 40 species, and molluscs of 21 species.

Discussion

In the present study, we compiled data on digenean trematode fauna of Georgia, which is represented by 186 species belonging to 108 genera of 48 families. Among these, 37 species belong to the order Diplostomida and 149 species to Plagiorchiida. Predominantly trematode species using birds as hosts were recorded (62 species), followed by those parasitizing fishes (50), mammals (33), and amphibians (25), and the fewest species were reported from reptiles (12), a trend common in trematodes (see Yamaguti 1971). The majority of digeneans were recorded as adults (160 species), 33 species as cercariae and 24 species as metacercariae. Adult digeneans recorded together with a metacercarial and/or cercarial stage comprised 28 species (15 %), which indicates that the Georgian fauna of trematodes and their life-cycles are understudied, and large-scale investigations of molluscs are needed to assess the trematode species spectrum completing their life-cycles in Georgia.The majority of species were recorded as associated with freshwater, most probably because of lack of investigation in the marine realm.

Apart from well identified species, there are taxa of dubious identity appearing in the Georgian scientific literature, which we decided not to include in the checklist above. One of them is *Clinostomum* sp. of Kurashvili (Kurashvili 1950, Kurashvili 1953a, Kurashvili 1957, Kurashvili 1961a), which was not identified to species level, but it was claimed to be

closest to *Clinostomum hornum*; however, there is no voucher specimen available for checking, leaving the question of the identity of this record unanswered. The next record is *Petasiger jubilarum* (Elperina in Skrjabin, Petrov & Baschkirova, 1947) Skrjabin & Baschkirova, 1956 found in *Anas plathyrynchos* from Paliastomi Lake (Kurashvili 1957, Kurashvili 1961a, Kurashvili 1984b), however this species is currently considered a species inquirendum (see Faltýnková et al. 2008). In another study, Javelidze (1976) obtained an adult experimentally from *Melanopsis praemorsa* and presumed it could be *Philophtalmus* sp. (*nyrocae*? Yamaguti, 1934), however, there is no clear species delimitation.

A specific topic in the literature on digeneans are reports of cercariae (the motile larval stages of digenean trematodes emerging from mollusk hosts). Because of the historical development of understanding of trematode life-cycles, the nomenclature and taxonomy of cercariae was originally separated from that of adult trematodes. This resulted in a substantial amount of cercarial names, many of which now have to be regarded as provisional, unless they can be assigned to a valid species described based on an adult. In Georgia, surveys of larval trematodes from snails were carried out and some of the cercariae found can be identified to genus level or only to family: *Cercaria monostomi* Linstow, 1884 *ex Ampullaceana balthica* and *A. lagotis* from surroundings of Sartichala (Chiaberashvili 1971a) belongs to the Notocotylidae; *Cercaria stylosa* Linstow, 1884 (Chiaberashvili 1971a) could possibly belong to *Ichtyocotylurus* sp.; while *Cercaria limnaeae ovatae* Linstow, 1884 *ex A. balthica* (Chiaberashvili 1971a) most probably belongs to Plagiorchiidae (for all compare with Cichy et al. (2011). The following cercariae most probably belong to the family Lecithodendriidae: *Cercaria ksaniensis ex Melanopsis praemorsa* from the River Qsani (Eastern Georgia) (Javelidze 1973), *Cercaria thezamiensis* from River Thezami (Eastern Georgia) (Javelidze 1973), *Cercaria rosetae* and *Cercaria ginetzinskaiae ex M. praemorsa* from the River Qsani (Javelidze and Chiaberashvili 1973), and *Cercaria colchica* I *ex Peregriana peregra* from Kolkheti lowland water reservoirs (Kurashvili 1984a). There were more cercariae recorded which could not be assigned to any genus or family, and because of lack of information, we do not make any attempt for grouping into families; they are the following: *Cercaria samgoriensis ex A. balthica* from surroundings of Samgori (Chiaberashvili 1971a); *Cercaria joriensis ex A. balthica* and *P. planorbis* from Sartichala and Gardabani (Chiaberashvili 1971a); *Cercaria burti ex P. planorbis* from Samgori (Chiaberashvili 1971a); *Cercaria gracilis ex A. balthica* from surroundings of Sartichala and Gardabani (Chiaberashvili 1971a); *Cercaria rhionica* I from River Pichori (Kurashvili 1984a); *Cercaria rhionica* VIII Olenov & Doborovolskiy, 1975, and *Cercaria rhionica XII* Olenov & Doborovolskiy, 1975 *ex M. praemorsa* from rivers of western Georgia (Ataev and Dobrovolskiy 1992); *Cercaria ascanica* Chiaberashvili & Javelidze 1977 *ex M. praemorsa* (Chiaberashvili and Javelidze 1977). Many of them were designated by the authors (Chiaberashvili 1971a, Javelidze 1973, Javelidze and Chiaberashvili 1973, Kurashvili 1984a) as new species, however without providing any adults as vouchers.

Our revision of digenean species listed in the monograph by Kurashvili et al. (1980) revealed that some of the data on species distribution are vague and inaccurate. This is mainly because the transboundary River Mtkvari (Kura) and the mountain ranges

(Caucasus Mountains), which stretch over all Caucasian countries, are frequently considered a continuous distributional area for the taxa, and their locations were not distinguished by country. As a result, subsequent sources citing Kurashvili et al. (1980) and listing the Caucasian countries for species distribution are frequently imprecise. For instance, according to the NHM London database (NHML 2022), all digenean species recorded in the South Caucasus based on Kurashvili et al. (1980) are also indicated for Georgia. However, after checking the original literary sources (Kurashvili et al. 1951, Chiaberashvili 1955, Chiaberashvili 1957, Chiaberashvili 1959, Chiaberashvili 1968, Qoiava 1966, Petriashvili 1971), we found out that the following digenean species (that were actually recorded in Azerbaijan) were not reported from Georgia: *Acanthocreadium araxicus* Mikailov, 1969; *A. talischiensis* Mikailov, 1969; *Ascocotyle coleostoma* (Looss, 1896) Looss, 1899; *Asymphylodora imitans* (Muhling, 1898) Looss, 1899; *A. kurensis* Paschajev, 1970; *Bunocotyle cingulata* Odhner, 1928; *Bychowskycreadium bychowsky* Mikailov, 1968; *B. schiliani* Mikailov, 1967; *Hysteromorpha triloba* (Rudolphi, 1819) Lutz, 1931; *Ichthyocotylurus pileatus* (Rudolphi, 1802) Odening, 1969 and *Sanguinicola inermis* Plehn, 1905. Similar results were found for host species and their distribution. Careful checking of the original literature (Petriashvili 1964, Petriashvili 1966) cited by Sey (2001) revealed that *R. esculenta* is not a host for *D. mehrai* in Georgia; while *Emys orbicularis* and *Triturus vulgaris* are not hosts of *D. subclavatus*, however, they are listed as such in the database of NHM London. This highlights the continuing importance of assessing primary sources.

In recent years, we recorded trematode intramolluscan stages (sporocysts, rediae, cercariae and metacercariae) in snails, which were new host records for trematodes in Georgia: *Helix lucorum* for Brachylaimidae (Arabuli et al. 2019, Murvanidze et al. 2010); *Oxychilus mingrelicus* for *Dicrocoelium* sp. (Arabuli 2018); *Lymnaea stagnalis* for *Diplostomum spathaceum*, *Moliniella anceps* and *Notocotylus attenuatus*; *Radix euphratica* for *Telorchis* sp., *Tylodelphys* sp., and *Plagiorchis* sp. (Arabuli, unpublished data). *Moliniella anceps* (Molin, 1859) Hübner, 1939 was recorded for the first time in Georgia by Arabuli et al. (2015).

Conclusion

Data on the digeneans of Georgia are mainly represented by adults in their definitive hosts, and they are predominantly from freshwater. Most of the research was conducted many decades ago and was based solely on morphology and was published predominantly in Georgian or Russian language. Since there is a striking shortage of studies on intermediate hosts (i.e., molluscs), large-scale and site-intensive investigations are needed to explore species diversity and distribution, and to obtain data on life-cycles and transmission pathways to be further used for ecological and epidemiological studies but also for biodiversity conservation in Georgia.

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