A checklist of British and Irish freshwater fish parasites with notes on their distribution

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One hundred and sixty eight species of parasite are listed from 36 species of freshwater fish from Britain and Ireland, and notes on their distribution are provided. A list of hosts together with the parasites recorded from them is also given. Although almost twice as many species are listed as in the most recent published reference list, the parasite fauna of Britain appears to be considerably poorer in number of species than that of mainland Europe, and that of Ireland poorer still. The distribution of most species, apart from two endemic species and a very few which have clearly been introduced into Britain in recent years from America or the mainland of Europe, appears to show no peculiarities and is probably contiguous with that of their hosts.

I. INTRODUCTION

The most recent reference list of parasite species recorded in freshwater fish from Great Britain and Ireland was published by Chappell & Owen in 1969, and lists some 90 species. The list was compiled only from published records, and although other unpublished information was known to exist, it was omitted from the final account. The amount of information incorporated in such unpublished forms as theses and personal records is in fact quite considerable, and together with records that have appeared in published form since the list of Chappell & Owen, have rendered the latter rather out of date. For this reason an attempt has been made here to produce a new and comprehensive check list, incorporating all published and unpublished information to date.

II. CHECKLIST

The following parasite and host lists have been compiled from all the published and unpublished records of parasite species found in freshwater fish and known to the author. It is recognized that the list is still not complete and other species are known to occur in Britain, but in some cases they have yet to be described and in others permission to incorporate the record in this account could not be obtained. The British freshwater fish for the purposes of this account are all those listed by Maitland (1972), and no distinction is made between those endemic to, and those introduced to, the British Isles. Parasites of marine origin recorded from estuarine and migratory fish have been omitted, and so the lists for such hosts are only complete with respect to freshwater parasites. For the sake of convenience, the parasites are arranged by phyla and then in some cases only class, and then alphabetically. No attempt is made to provide a complete classification. No claim is made for the accuracy of the records. Where the author is in doubt about the identification this is indicated by *, but in other cases, although there may be a strong probability of a
misidentification, this is not indicated. No indication of the status of each host is given, and so what must in many cases be accidental occurrences are also listed. Synonyms are only given where the synonymous name is still in common use. Where there is still confusion over identification or nomenclature, as within *Diphyllobothrium*, the current position as it appears to this author is listed. Localities are given to the level of river or lake, and no more precisely than that. Where the species is clearly widespread throughout the country, then only a list of hosts and references is given. Where the parasite species is apparently more restricted in its distribution, the locality for each record is also given. Almost certainly many of these species will prove in time to be widely distributed, but until this has been shown it was considered more helpful to provide detailed records. The choice of which procedure to adopt in any case was arbitrary.

The abbreviation p.c. stands for personal communication, and R.A. for River Authority.

### III. PARASITE LIST

**PROTOZOA**

*Apiosoma* sp. (*=Glossatella* sp.)
- Brown trout, salmon—Inverness-shire (Needham, p.c.); *perch—Loch Leven (Campbell, 1974).

*Chilodonella cyprini* (Moroff, 1902)
- Salmon—Inverness-shire (Needham, p.c.); crucian carp, roach, tench—laboratory, after removal from gravel pit, Berks (Canning, p.c.).

*Chloromyxum esocinum* Dogiel, 1934
- Pike—Loch Leven (Campbell, 1974), Loch Faskally (Campbell, p.c.).

*Chloromyxum phoxini* Quadri, 1962
- Minnow—Windermere (Quadri, 1962).

*Chloromyxum truttae* Léger, 1906
- Brown trout—Loch Leven (Campbell, 1974), R. Tay, R. Leader (Campbell, p.c.).

*Costia necatrix* (Henneguy, 1884)
- Salmon, brown trout, rainbow trout—Inverness-shire (Needham, p.c.); brown trout—Cam Brook, Somerset (Bristol Avon R.A.); salmon—hatchery, Devon (Devon R.A.); crucian carp, roach, tench—laboratory, after removal from gravel pit, Berks (Canning, p.c.).

*Cryptobia borelli* (Laveran & Mesnil, 1901)
- Crucian carp, roach, tench—gravel pit, Berks (Canning, p.c.); roach—Slapton Ley, Devon (Canning *et al.*, 1973).

*Cryptobia keisselitzi* (Minchin, 1909)
- Crucian carp, tench—gravel pit, Berks (Needham, p.c.).

*Dermocystidium gasterostei* Elkan, 1962

*Dermocystidium* sp.
- Brown trout, perch, three-spined stickleback—Loch Leven (Campbell, 1974); brown trout—streams in Perthshire (Campbell, p.c.).

*Eimeria rutili* Dogiel & Bykhovski, 1938
Epistylis sp.

Glugea anomala (Moniez, 1887)

Henneguya oviperda (Cohn, 1895)

Henneguya psorospermica Thélohan, 1895
Perch, pike—Lake Bala, Merioneth (Chubb, 1963a), Rostherne Mere, Cheshire (Chubb, 1965a); pike—R. Lugg, Hereford (Davies, 1968).

Henneguya tegidiensis Nicholas & Jones, 1959
Gwyniad—Lake Bala, Merioneth (Chubb, 1963a).

Henneguya zschokkei (Gurley, 1894)
Dace—R. Lugg, Hereford (Davies, 1968).

Henneguya sp.
Brown trout, three-spined stickleback—Loch Leven (Campbell, 1974); bream, dace, roach, ruffe, three-spined stickleback—Fen drains, Lincs (Lincolnshire R.A.); carp, dace, perch, pike, roach—Rs Blackwater, Chelmer and Roding, Essex (Essex, R.A.).

Ichthyophthirius multifiliis Fouquet, 1876

Leptotheca sp.
Salmon—Inverness-shire (Needham, p.c.).

Myxidium lieberkuhni Butschli, 1882
Pike—Rostherne Mere, Cheshire (Chubb, 1965a).

Myxidium oviforme Parisi, 1912

Myxidium rhodei Léger, 1905

Myxidium scardini Quadri, 1962
Rudd—Windermere (Quadri, 1962).

Myxidium truttae Léger, 1930
Brown trout—Loch Leven (Campbell, 1974), R. Dee, Aberdeen and other localities in Scotland (Campbell, p.c.); salmon—R. Dee, Aberdeen (Campbell, p.c.).

Myxidium sp.
Roach—Brynmill Lake, Glam. (Williams, 1964); eel—R. Almond, Perth (Campbell, p.c.).

Myxobolus artus Akhmerov, 1960
Myxobolus cyprini Doflein, 1898

Myxobolus macrocapsularis Reuss, 1906
Chub—R. Lugg, Hereford (Davies, 1968).

Myxobolus mülleri Bütschli, 1882
Chub, dace, roach—R. Lugg, Hereford (Davies, 1968); dace—Lee Navigation Canal, Herts (Walliker, 1967); bream—Dagenham, Essex (Anderson, 1971); perch—Serpentine, London (Lees, p.c.).

Myxobolus neurobius Schuberg & Schröder, 1905
Brown trout—Loch Leven (Campbell, 1974), numerous rivers and lochs on the mainland and islands of Scotland (Campbell, p.c.); salmon—L. Awe, Argyll (Campbell, p.c.).

Myxobolus pseudodispar Gorbunova, 1936

Myxobolus sp.
Roach—Brynmill Lake, Glam (Williams, 1964); rudd—Corconnolly Lake, Monaghan, Ireland (Kane, 1966), Slapton Ley, Devon (Canning et al., 1973); minnow—Loch Leven (Campbell, 1974), Llyn Fran Goch, Cards (Rees, p.c.).

Myxosoma cerebralis (Hofer, 1903)
Rainbow trout—Scotland (Roberts & Elson, 1970; Needham, p.c.).

Octomitus truttae (Schmidt, 1920) (= Hexamita truttae)
Brown trout—Loch Leven (Campbell, 1974).

Plistophora longifilis (Schuberg, 1910)

Scyphidia sp.
Brown trout, salmon—Inverness-shire (Needham, p.c.).

Sphaerospora elegans Thélohan, 1892
Three-spined stickleback—Loch Leven (Campbell, 1974).

Thelohanellus sp.
Roach—Brynmill Lake, Glam (Williams, 1964).

Trichodina domerguei (Wallengren, 1897) sub. sp. domerguei
Three-spined stickleback—Norfolk Broads (Dartnall et al., 1972), Llyn Padarn, Caerns (Chubb, 1970b); ten-spined stickleback—R. Roding, Essex (Dartnall, 1973).

Trichodina reticulata Hirschmann & Partsch, 1955 (= T. megamicronucleata)
Bream, carp, minnow, pike, rudd, tench, three-spined stickleback—numerous lakes in Ireland (Kane, 1966); *three-spined stickleback—Bradford, Yorks (Chappell, 1969).

Trichodina tenuidens Faure-Fremiet, 1943
Three-spined stickleback—Norfolk Broads (Dartnall et al., 1972), Llyn Padarn, Caerns (Chubb, 1970b); ten-spined stickleback—R. Roding, Essex (Dartnall, 1973).

Trichodina sp.
Roach—Brynmill Lake, Glam (Williams, 1964); three-spined stickleback—Farnley, Yorks (Arme & Owen, 1967), Loch Leven (Campbell, 1974), Bellshill, Lanark (Hopkins, 1959); minnow, three-spined stickleback—Llyn Padarn, Caerns (Powell, 1966; Chubb, 1970a); perch, roach—Slapton Ley, Devon (Canning et al., 1973); crucian carp, gudgeon—Dagenham, Essex (Anderson, p.c.); roach, rudd—ponds, Essex (Essex R.A., p.c.); salmon—hatchery, Devon (Devon R.A., p.c.); Inverness-shire (Needham, p.c.); three-spined stickleback—widespread (Walkey, p.c.).
Trichophrya sp.
Salmon, rainbow trout—Inverness-shire (Needham, p.c.).

Trypanosoma carassii (Mitrofanov, 1883)
Crucian carp—gravel pit, Berks (Needham, 1969).

Trypanosoma granulosum Laveran & Mesnil, 1909
Eel—Slapton Ley, Devon (Canning et al., 1973), R. Avon, Hants (Needham, 1969), streams near Aberystwyth, Cards (Rees, p.c.).

Trypanosoma leucisci Brumpt, 1906

Trypanosoma percae Brumpt, 1906
Perch—Slapton Ley, Devon (Canning et al., 1973), Hanningfield Reservoir, Essex (Needham, 1969), gravel pit, Berks (Canning, p.c.).

Trypanosoma remaki Laveran & Mesnil, 1901
Pike—Slapton Ley, Devon (Canning et al., 1973).

Trypanosoma tincae Laveran & Mesnil, 1904
Tench—gravel pit, Berks (Needham, 1969).

Trypanosoma sp.
Bullhead, minnow—Windermere (Hawking, 1957).

Zschokkella cyprini Quadri, 1962
Carp—Shenley, Herts (Quadri, 1962).

PLATYHELMINTHES

Monogenea

Ancyrocephalus paradoxus Creplin, 1839
Perch—Lake Bala, Merioneth (Chubb, 1963a).

Dactylogyrus amphibothrium Wagener, 1857

Dactylogyrus anchoratus (Dujardin, 1845)
Crucian carp—Ockendon Moat, Essex (Shillcock, 1972).

Dactylogyrus auriculatus (Nordmann, 1832)
Bream—R. Bure, Norfolk (Kearn, 1968).

Dactylogyrus cordus Nybelin, 1936
Dace—R. Lugg, Hereford (Davies, 1967), R. Roding, Essex (Shillcock, p.c.).

Dactylogyrus crucifer Wagener, 1857

Dactylogyrus folkmanovae Ergens, 1956
Chub—R. Lugg, Hereford (Davies, 1967).

Dactylogyrus gobii Gvosdev, 1950

Dactylogyrus nanus Dogiel & Bykhovsky, 1934
Roach—R. Lugg, Hereford (Davies, 1967).
Dactylogyrus phoxini Malevitskaya, 1949

Dactylogyrus prostae Molnar, 1964
   Chub—R. Lugg, Hereford (Davies, 1967).

Dactylogyrus similis (Wegener, 1907)

Dactylogyrus sphyrna Linstow, 1878

Dactylogyrus suecicus Nybelin, 1936

Dactylogyrus tuba Linstow, 1878
   Dace—R. Lugg, Hereford (Davies, 1967).

Dactylogyrus vastator Nybelin, 1924
   Carp—Kilsheelan, Tipperary, Ireland (Kane, 1966).

Dactylogyrus vistulae Prost, 1957

Dactylogyrus wunderi Bykhovsky, 1931

Dactylogyrus sp.

Diplozoon paradoxum Nordman, 1832

Discocotyle sagittata (Leuckart, 1842)

Gyrodactylus aphyae Malmberg, 1956
   Minnow—Llyn Padarn, Caerns (Chubb, 1964a; Powell, 1966).
*Gyrodactylus arcuatus* Bykhowsky, 1933

*Gyrodactylus elegans* Nordmann, 1832
Three-spined stickleback—(Bradley, 1861; Houghton, 1862; Sproston, 1946; Dawes, 1947); ten-spined stickleback—(Dawes, 1947); bream, crucian carp—(Sproston, 1946); bream, roach—Dagenham, Essex (Anderson, 1971); minnow—Lake District (Rees, p.c.); three-spined stickleback—Cards (Rees, p.c.).

*Gyrodactylus laevis* Malmberg, 1956
Minnow—Llyn Padarn, Caerns (Powell, 1966).

*Gyrodactylus limneus* Malmberg, 1956
Minnow—Llyn Padarn, Caerns (Powell, 1966).

*Gyrodactylus lucii* Kulakovskaya, 1952
Pike—Loch Leven (Campbell, 1974).

*Gyrodactylus macronychus* Malmberg, 1956
Minnow—Llyn Padarn, Caerns (Powell, 1966).

*Gyrodactylus medius* Kathariner, 1893
Minnow—Edinburgh (Baylis, 1928), Windermere (Rawson, 1952), (Sproston, 1946); roach—Windermere (Chubb, 1965a; crucian carp—Dagenham, Essex (Anderson, 1971).

*Gyrodactylus pungitii* Malmberg, 1964
Three-spined stickleback—Llyn Padarn, Caerns (Powell, 1966; Chubb, 1970b).

*Gyrodactylus rarus* Wegener, 1909

*Gyrodactylus salaris* Malmberg, 1956
Brown trout—Loch Leven (Campbell, 1974).

*Gyrodactylus* sp.
Widespread. Three-spined stickleback—(Vickers, 1951; Hopkins, 1959; Madan, 1965; Chubb, 1964a; Arme & Owen, 1967; Dartnall et al., 1972); ten-spined stickleback—(Vickers, 1951; Dartnall, 1973); three-spined stickleback, minnow, perch—(Campbell, 1974); three-spined stickleback, roach—(Lincolnshire R.A., p.c.); three-spined stickleback, roach, dace, gudgeon—(Shillcock, 1972); brown trout—(Campbell, p.c.).

*Tetraonchus borealis* (Olsson, 1893)
Grayling—R. Lugg, Hereford (Davies, 1967).

*Tetraonchus monenteron* Diesing, 1858

*Urocleidus principalis* (Mizelle, 1936)
Digenea

*Allocreadium isoporum* (Looss, 1894)


*Allocreadium transversale* (Rudolphi, 1802)

Grayling—R. Lugg, Hereford (Davies, 1967).

*Asymphylodora kubanicum* (Isaichikov, 1923)


*Asymphylodora tincae* (Modeer, 1790)

Tench—Dunkeld, Perth (Campbell, p.c.).

*Azygia lucii* (Müller, 1776)


*Bucephalus polymorphus* Baer, 1827

Pike—Wilts (Baylis, 1939a); dace, perch, pike, roach—drains, Boston, Lincs (Lincolnshire R.A., p.c.).

*Bunodera luciopercae* (Müller, 1776)


*Crepidostomum farionis* (Müller, 1784)


*Crepidostomum metoecus* (Braun, 1900)

Widespread throughout Britain and Ireland. Brown trout—(Aderounmu, 1966; Awachie, 1968; Awachie & Chubb, 1964; Canning et al., 1973; Chubb, 1963a; Campbell, 1974; Corbett, 1955; Chubb, 1964a; Kane, 1966; Thomas, 1957, 1958a, 1964); brown trout, salmon—(Kennedy, unpublished); grayling—(Chubb, 1963a; Davies, 1967).

*Crepidostomum* sp.

Brown trout—numerous localities in mainland and islands of Scotland (Campbell, p.c.); three-spined stickleback—Shropshire Union Canal, Cheshire (Rawson, 1952); brown trout—Windermere (Rawson, 1952).
Diplostomum gasterostei Williams, 1966

Diplostomum petromyzti-fluviatilis Dies., 1850
Brook lamprey, river lamprey—(Brown, 1899), R. Ure, Yorks (Sweeting, p.c.).

Diplostomum phoxini (Faust, 1918)

Diplostomum spathaceum (Rud., 1819)
Widespread throughout the whole of mainland Britain, and recorded from a range of species of fish in almost every county. Brown trout, rainbow trout, salmon, grayling, perch, ruffe, pike, eel, three-spined stickleback, ten-spined stickleback, loach, bream, carp, crucian carp, chub, dace, gudgeon, minnow, roach, rudd, silver bream (Baylis, 1939b; Berrie, 1960; Campbell, 1974; Canning et al., 1973; Chappell, 1969; Chubb, 1963a, 1970b; Campbell, 1974; Hine, 1970; Powell, 1966; Robertson, 1953; unpublished data).

Diplostomum truttae Lal, 1953
Brown trout—Scotland (Lal, 1953).

Diplostomum sp.
Widespread in several species of fish throughout Britain. Brown trout, rainbow trout, salmon, grayling, perch, pike, eel, three-spined stickleback, chub, dace, minnow, roach—(Arme & Owen, 1967; Chubb, 1963a, 1970b; Campbell, 1974; Hine, 1970; Powell, 1966; Robertson, 1953; unpublished data).

*Ichthyocotylurus cucullus* (Thoss, 1897) (=*Cotylurus cucullus*)
Perch—Loch Leven (Campbell, 1974).

Ichthyocotylurus erraticus (Szidat, 1928) (=*Cotylurus erraticus*)
Brown trout—Loch Leven (Campbell, 1974), several localities in Scotland (Campbell, p.c.), brown trout, rainbow trout—Hanningford Reservoir, Essex (Wootten, 1973), powan—Loch Lomond (Copland, 1957).

Ichthyocotylurus sp.

Macrolecithus papilliger Rees, 1968
Minnow—Frongoch Lake, Cards (Bibby, 1972; Rees, 1968), Loch Achray, Scotland (Campbell, p.c.), Windermere, Ireland, Scotland (Rees, p.c.).

Nicolla gallica Dollfus, 1959

Phyllodistomum folium (Olfers, 1816)
Three-spined stickleback—Cambridge (Baylis, 1939a), Bradford, Yorks (Chappell, 1969), Llyn Padarn, Caerns (Chubb, 1964a, 1970a), London (Dawes, 1952), Liverpool (Madan, 1965), Windermere (Rawson, 1952; Chubb, 1965a), Monkton, Durham (Walkey, 1967), Epping Forest, Essex, Kent (Walkey, p.c.); brown
trout—R. Severn (Rawson, 1952), brown trout, charr, minnow—Llyn Padarn, Caerns (Chubb, 1964a, 1970b); charr—Lake District (Rees, p.c.); gwyniad—Lake Bala, Merioneth (Chubb, 1964a); grayling—R. Lugg, Hereford (Davies, 1967); bullhead—Yorks (Rees, p.c.).

*Phyllodistomum simile* Nybelin, 1926

Brown trout, salmon, eel—R. Teifi, Cards (Thomas, 1958b), several localities in Scotland (Campbell, p.c.).

*Posthodiplostomum cuticola* Nordmann, 1832


*Prohemistomulum* sp.


*Rhipidocotyle ilense* (Ziegler, 1883)

Minnow, perch—R. Roding, Essex (Shillcock, 1972); perch—Serpentine, London Lees, p.c.).

*Rhipidocotyle* sp.

Pike—Preston to Lancaster Canal (Lancashire R.A., p.c.).

*Sanguinicol a volgensis* (Rasin, 1929)


*Sphaerostoma bramae* (Müller, 1776)


*Tetracotyle percafluviatilis* Linstow, 1856

Perch—Grand Canal, Ireland (Kane, 1966); perch, loach, bullhead—R. Roding, Essex (Shillcock, 1972).

*Tetracotyle variegatus* (Creplin, 1825)


*Tetracotyle* sp.

Perch—Rostherne Mere, Cheshire (Chubb, 1965a), Lough Sheelin, Lough Derravaragh, Ireland (Kane, 1966); salmon—R. Dee, R. Esk, R. Tay, Scotland (Smith, p.c.).

*Tylodelphys clavata* (Nordmann, 1832) (= *Diplostomum clavatum*)

Roach, perch, pike—Rostherne Mere, Cheshire (Chubb, 1965a); bream, roach, crucian carp, gudgeon, perch, pike—Dagenham, Essex (Anderson, 1971); bream—Aberton Reservoir, Essex (Anderson, p.c.); roach, dace, chub—R. Roding, Essex
(Shillcock, 1972); brown trout, rainbow trout, perch, ruffe, roach, three-spined stickleback—Hanningfield Reservoir, Essex (Wootten, 1973); grayling—R. Ure, Yorks (Sweeting, p.c.); bream, pike—Lancaster Canal (Sweeting, p.c.); gudgeon—Serpentine, London (Lees, p.c.); rainbow trout, salmon—Inverness-shire (Needham, p.c.).

_Tylolebias podicipina_ Kozicka & Niewiadomska, 1960
Rainbow trout, perch, ruffe—Hanningfield Reservoir, Essex (Wootten, 1973); perch, pike—gravel pits, Thames valley (Sweeting, p.c.).

_Cestoda_

_Biacetabulum appendiculatum_ (Szidat, 1937)

_Bothriocephalus claviceps_ (Goeze, 1782)
Eel—Hants, Worcs (Baylis, 1928), Lake Bala, Merioneth (Chubb, 1963a), Lough Arrow, Sligo, Ireland (Kane, 1966), Llyn Padarn, Caerns (Powell, 1966), R. Avon, Hants (Hine, 1970), Hanningfield Reservoir, Essex (Wootten, 1973), R. Teifi, Cards (Rees, p.c.), drains, Boston, Lincs (Lincolnshire R.A., p.c.), R. Otter, Devon (Kennedy, unpublished); pike—Shropshire Union Canal, Cheshire (Rawson, 1952); three-spined stickleback—Widewater, Sussex (Walkey, p.c.).

_Bothriocephalus_ sp.

_Caryophyllaeides femnica_ (Schneider, 1902)

*Caryophyllaeus fimbriceps* Annenkova-Khlopina, 1919
Barbel—drain, Boston, Lincs (Kennedy, unpublished); dace—R. Avon, Hants (Kennedy, unpublished).

_Caryophyllaeus laticeps_ (Pallas, 1781)

*Cyathocephalus truncatus* (Pallas, 1781)
Brown trout—Afon Terrig, Wales (Awachie, 1966), L. Walton (Robertson, 1953), Loch Leven (Campbell, 1974), Morton Loch, Brother Loch, Loch Skiach (Campbell, p.c.); brown trout, eel—R. Test, Hants (Baylis, 1939a); brown trout, salmon, eel—Llyn Padarn, Caerns (Powell, 1966); salmon—Loch Kinardochy (Campbell, p.c.); pike—L. Coin, L. Skiach, L. Kinardochy (Robertson, 1953).

*Diphyllobothrium dendriticum* (Nitzsch., 1824)
Brown trout—Chirk, Denbigh (Aderounmu, 1966), Poulaphouca Reservoir, Garradice Lough, Ireland (Hickey & Harris, 1945, 1947), R. Tolka, Kilbream Lough, Ireland (Kane, 1966), Loch Leven (Campbell, 1974), L. Broom, R. Tay (Campbell, p.c.), R. Teifi, Cards (Rees, p.c.); brown trout, charr, three-spined stickleback—Windermere (Rawson, 1952; Chubb, 1965a); brown trout, grayling, gwyniad—Lake Bala, Merioneth (Chubb, 1963a, 1964a, b); brown trout, charr, salmon, three-spined stickleback—Llyn Padarn, Caerns (Chubb, 1964a, b); brown trout, rainbow trout—Hanningfield Reservoir, Essex (Wootten, 1973); rainbow trout—Ireland (Kane, 1966); charr—Garradice Lough, Ireland (Hickey & Harris, 1945); pike—(Unsworth, 1944); three-spined stickleback—(Unsworth, 1944; Kane, 1966).

*Diphyllobothrium ditremum* (Creplin, 1825)
Brown trout—Chirk, Denbigh (Aderounmu, 1966), Blagdon, Somerset (Fraser, 1960), Poulaphouca Reservoir, Ireland (Hickey & Harris, 1945, 1947), Lake Bala, Merioneth (Chubb, 1963a), Windermere (Chubb, 1964b); brown trout, charr, salmon—Llyn Padarn, Caerns (Chubb, 1964a, b, 1970b); charr—Windermere (Chubb, 1965a); grayling—Lake Bala, Merioneth, Windermere (Chubb, 1964b); gwyniad—Lake Bala, Merioneth (Chubb, 1963a, 1964b).

*Diphyllobothrium latum* (L., 1758)
Brown trout—South Wales (Duguid & Sheppard, 1944); perch—Garradice Lough, Ireland (Hickey & Harris, 1945); *pike—Windermere (Rawson, 1952; Chubb, 1965a).

*Diphyllobothrium medium* (Fahmy, 1954)
Brown trout—Bristol (Fraser, 1960).

*Diphyllobothrium norvegicum* Vik, 1957
Brown trout, three-spined stickleback—Malham Tarn, Yorks (Holmes, 1960).

*Diphyllobothrium sp.*
Widespread. Brown trout—(Chaloner, 1912; Copland, 1957; Campbell, 1974 and p.c.; Kane, 1966; Robertson, 1953; Avery, p.c.; Essex R.A., p.c.); pike—(Campbell, 1974; Kane, 1966); perch—(Chubb, 1965a); charr—(Rees, p.c.); three-spined stickleback—(Rawson, 1952; Chubb, 1965a); powan—Loch Lomond (Copland, 1957).

*Eubothrium crassum* (Bloch, 1779)
Widespread throughout the whole of Britain and Ireland. Brown trout—(Aderounmu, 1966; Chubb, 1963a, 1964a, 1965a; Campbell, 1974 and p.c.; Copland, 1957; Corbett, 1955; Holmes, 1960; Kennedy, 1969b; Kane, 1966; Markowski, 1966; Rawson, 1952, 1957; Robertson, 1953; Wootten, 1972); rainbow
trout (Ingham & Arme, 1973; Kane, 1966; Wootten, 1972); salmon—(Chubb, 1963a, 1965a; Kane, 1966; Kennedy, 1969 and unpublished; Mulcahy & Kennedy, 1970; Powell, 1966); bream, pike, perch—(Kane, 1966); ruffe—(Wootten, 1973); three-spined stickleback—(Madan, 1963).

*Eubothrium salvelini* (Schrank, 1790)
Charr—Windermere (Rawson, 1952, 1957; Chubb, 1965a), Llyn Padarn, Caerns (Chubb, 1964a).

*Eubothrium* sp.
Carp, rudd—Ireland (Kane, 1966); brown trout, perch, pike, three-spined stickleback—Windermere (Rawson, 1952); salmon, brown trout, charr, three-spined stickleback—Llyn Padarn, Caerns (Chubb, 1970b).

*Ligula intestinalis* (L. 1758)

*Proteocephalus filicollis* (Rudolphi, 1810)

*Proteocephalus macrocephalus* (Creplin, 1825)

*Proteocephalus neglectus* La Rue, 1911

*Proteocephalus parallacticus* Mac Lulich, 1943

*Proteocephalus percae* (Müller, 1780)
Perch—Shropshire Union Canal, Cheshire (Chubb, 1965a; Mishra & Chubb, 1969), Rotherne Mere, Cheshire (Chubb, 1965a), Swithland Reservoir, Leics (Rawson, 1952); pike—Shropshire Union Canal, Cheshire (Chubb, 1965a), Rotherne Mere, Cheshire (Chubb, 1965a); perch, ruffe, brown trout, rainbow trout—Hanningford Reservoir, Essex (Wootten, 1973); perch, ruffe—Serpentine, London (Lees, p.c.).

*Proteocephalus pollanicola* Gresson, 1952
Pollan—Lough Neagh, Ireland (Gresson, 1952; Gresson & Corbett, 1954; R. Bann, Down, Ireland (Gresson, 1952).
Proteocephalus torulosus (Batsch, 1786)

Proteocephalus sp.
Salmon, grayling, gwyniad, eel, Pike—Lake Bala, Merioneth (Chubb, 1963a); charr—Windermere (Rawson, 1952); brown trout—Chirk, Denbigh (Aderounmu, 1966); eel—Shropshire Union Canal, Cheshire (Mishra & Chubb, 1969); three-spined stickleback—Royal Canal, Ireland (Kane, 1966), Loch Leven (Campbell, 1974), Hanningford Reservoir, Essex (Wootten, 1973); perch, roach, dace—drains, Boston, Lincs (Lincolnshire R.A., p.c.); perch, chub, dace—R. Blackwater, Essex (Essex R.A., p.c.); lamprey—R. Severn (Rees, p.c.).

Schistocephalus solidus (Müller, 1776)

Triaenophorus nodulosus (Pallas, 1781)

ASCHELMINTHES

Nematoda

Anisakis sp.
Brown trout—L. Sheelin, R. Boyne, Ireland (Kane, 1966), Morton Loch, Lake of Mentieth, Scotland (Campbell, p.c.); brown trout, rainbow trout—Hanningfield Reservoir, Essex (Wootten, 1973); rainbow trout—Lake of Mentieth (Campbell, p.c.).

Camallanus lacustris (Zoega, 1776)
gudgeon—drains, Boston, Lincs (Lincolnshire R.A., p.c.); ruffe—Bucks (Baylis, 1939a); perch, pike, bream, roach, rudd, tench, salmon, brown trout, rainbow trout—Ireland (Kane, 1966); perch, eel—Hanningford Reservoir, Essex (Wootten, 1973).

*Capillaria salvelini* Polyanskii, 1952

Brown trout, perch, pike—Loch Leven (Campbell, 1974); brown trout—numerous localities on mainland and Islands of Scotland (Campbell, p.c.); salmon—L. Awe, Argyll, R. Dee, Aberdeen (Campbell, p.c.).

*Capillaria* sp.


*Cucullanus truttae* (Fabricius, 1794)

Brown trout—Hants (Baylis, 1928), Llyn Padarn, Caerns (Chubb, 1964a), R. Avon, R. Itchen, R. Test, Hants (Stranack, 1966), R. Teifi, Cards (Thomas, 1964), R. Exe, Devon (Kennedy, unpublished); char—Lake District (Rees, p.c.); grayling—R. Lugg, Hereford (Davies, 1967); grayling, perch, pike, eel—R. Avon, R. Itchen, R. Test, Hants (Stranack, 1966); pike, eel—Lake Bala, Merioneth (Chubb, 1963a).

*Cystidicola farionis* Fischer, 1778

Brown trout—Chirk, Denbigh (Aderounmu, 1966), Hants, Herts (Baylis, 1928), Loch Leven (Campbell, 1974), Lake Bala, Merioneth (Chubb, 1963a), R. Avon, Hants (Hine, 1970), R. Exe, Devon (Kennedy, unpublished), Llyn Padarn, Caerns (Powell, 1966), numerous localities in Scotland (Campbell, p.c.; Robertson, 1953); brown trout, rainbow trout, salmon—several localities in Ireland (Kane, 1966); salmon—several localities in Scotland (Campbell, p.c., Smith, p.c.); grayling—Lake Bala, Merioneth (Chubb, 1963a), R. Lugg, Hereford (Davies, 1967), R. Avon, Hants (Hine, 1970).

*Cystidicola tenuissima* (Zeder, 1800) (= *Metabronema truttae* (Baylis, 1939)

Brown trout—Monmouth (Baylis, 1939a), Loch Leven (Campbell, 1974), numerous localities in Scotland (Campbell, p.c.), R. Dart, R. Exe, Devon (Kennedy, unpublished), Windermere (Rawson, 1952); salmon—R. Tummel, Balmoral, Scotland (Campbell, p.c.).

*Cystidicoloides* sp.

Minnow—Windermere (Rawson, 1952); salmon—R. Conan, R. Polly, R. Tweed, Scotland (Smith, p.c.).

*Eustrongylides* sp.

Brown trout—Lake Bala, Merioneth (Aderounmu, 1966), Arran (Baylis, 1928), Loch Leven (Campbell, 1974), numerous lochs in Scotland (Campbell, p.c., Maxwell, p.c., Robertson, 1953), Fernworthy, Kenrick and Wistlandpound Reservoirs, Devon (Devon R.A., p.c.; Kennedy, unpublished); ruffe—Hanningford Reservoir, Essex (Wootten, 1973); ruffe, perch—Serpentine, London (Lees, p.c.).

*Paraquimperia tenerrima* (Linstow, 1878)

Eel—Hants (Baylis, 1939a), Lake Bala, Merioneth (Chubb, 1963a), Llyn Padarn, Caerns (Chubb, 1970a), Westmoreland (Rawson, 1952), Pitlochry, R. Almond, Scotland (Campbell, p.c.), R. Teifi, Cards (Rees, p.c.), R. Otter, Devon (Kennedy, p.c.).
Philometra rischta Skryabin, 1917

Philometra sp.
  Roach—drains, Boston, Lines (Lincolnshire R.A., p.c.).

Raphidascaris acus (Bloch, 1779)
  Pike, chub, dace, roach—R. Lugg, Hereford (Davies, 1967); brown trout, pike, perch—Loch Leven (Campbell, 1974).

Raphidascaris cristata (Linstow, 1872)
  Eel—Worcs (Baylis, 1928), Lake Bala, Merioneth (Chubb, 1963a), Windermere (Frost, 1946); pike—Wilts, Surrey (Baylis, 1939a), R. Severn (Rawson, 1952), Preston and Lancaster Canal (Lancashire R.A., p.c.); perch—Lake Bala, Merioneth (Chubb, 1963a); brown trout—Chirk, Denbigh (Aderounmu, 1966), Lake Bala, Merioneth (Chubb, 1970a); salmon, brown trout, eel, minnow, three-spined stickleback—Llyn Padarn, Caerns (Powell, 1966; Chubb, 1970b); brown trout, eel—R. Teifi, Cards (Rees, p.c.).

Raphidascaris sp.
  Three-spined stickleback—Shropshire Union Canal (Rawson, 1952); loach—Windermere (Rawson, 1952).

Rhabdias sp.
  Brown trout, pike—R. Boyne, Ireland (Kane, 1966).

* Rhabdochona denudata (Dujardin, 1845)
  Minnow—Windermere (Rawson, 1952).

Rhabdochona salvelini (Fujita, 1920)
  Salmon—R. Dee, R. Tay, R. Tweed, Scotland (Smith, p.c.).

Rhabdochona sp.
  Salmon, brown trout—R. Boyne, Brosna River, Ireland (Kane, 1966), R. Dee, Loch Awe, Scotland (Campbell, p.c.).

Spinitectus inermis (Zeder, 1800)
  Eel—Lake Bala, Merioneth (Chubb, 1963a), R. Almond, Perth (Campbell, p.c.); pike—R. Lugg, Hereford (Davies, 1967).

ACANTHOCEPHALA

Acanthocephalus anguillae (Müller, 1789)
  Perch, powan—Loch Lomond (Copland, 1957); brown trout—Loch Ree, Ireland (Kane, 1966); rudd—Mullingar, Athlone, Ireland (Kennedy, 1966); pike, perch—relief channels, R. Ouse (Great Ouse R.A., p.c.).

Acanthocephalus clavula (Dujardin, 1845) (=Echinorhynchus clavula)
  Brown trout, grayling, gwyniad, roach, pike, perch—Lake Bala, Merioneth (Chubb, 1963a, 1964d, 1970a); brown trout, eel, three-spined stickleback—Llyn Padarn, Caerns (Chubb, 1964a, 1970b); eel, perch, dace, roach—localities in Ireland (Kane, 1966); brown trout—Chirk, Denbigh (Aderounmu, 1966); three-spined stickleback—Liverpool (Madan, 1965), Priddy Pool, Somerset (Pennycuick, 1971), Northumberland, Glamorgan (Walkey, p.c.); perch, roach—Slapton Ley, Devon (Canning et al. 1973).

Acanthocephalus lucii (Müller, 1776)
  Widespread throughout Britain and Ireland. Recorded from brown trout, salmon, rainbow trout, powan, pike, perch, ruffe, eel, bream, chub, crucian carp, dace, roach, rudd—(Anderson, 1971; Campbell, p.c.; Canning et al., 1973; Chubb,
BRITISH AND IRISH FRESHWATER FISH PARASITES


_Echinorhynchus salmonis_ Müller, 1776

Eel—Wores (Baylis, 1928); brown trout—Ireland (Kane, 1966).

**Echinorhynchus truttae** Schrank, 1788


_Echinorhynchus sp._


**Neoechinorhynchus rutili** (Müller, 1780)


**Pomphorhynchus laevis** (Müller, 1776)


**ANNELIDA**

**Hirudinea**

**Hemiclepsis marginata** (Müller, 1774)

Widespread throughout Britain and Ireland. Can occur on all species of fish. For distribution see Mann (1964).

**Piscicola geometra** (L., 1761)

Widespread throughout England, Wales and Ireland, but not yet reported from Scotland. Can occur on all species of fish. For distribution see Mann (1964).

**ARTHROPODA**

**Crustacea**

**Achtheres percarum** Nordmann, 1832

Perch—several localities around R. Ouse, Yorks (Aubrook & Fryer, 1955; Fryer, 1969c; Rostherne Mere, Cheshire (Chubb, 1965a), Kennet and Avon Canal, Dorset, Grand Union Canal, R. Colne, Herts (Harding & Gervers, 1956), Hanningford Reservoir, Essex (Wootten, 1973), Teggs Nose Reservoir, Cheshire (Mersey and Weaver R.A., p.c.).
Argulus coregoni Thorell, 1864
Brown trout—Chirk, Denbigh (Aderounmu, 1966), R. Clyde (Campbell, 1971), Longleat, Wilts (Bristol Avon R.A., p.c.), Warwick, R. Eden, Carlisle (Campbell, p.c.); grayling—R. Clyde (Campbell, 1971; Scott, 1900; Scott & Scott, 1913); grayling, brown trout, roach, pike—Lake Bala, Merioneth (Chubb, 1970a); bream—R. Yare, Norfolk (Fryer, p.c.); chub—R. Cherwell, Oxford (Fryer, p.c.).

Argulus foliaceus (L. 1758)  
Widespread throughout Britain and Ireland. Recorded from brown trout, rainbow trout, salmon, powan, vendace, pike, perch, bream, carp, crucian carp, gudgeon, roach, rudd, tench, three-spined stickleback—(Anderson, 1971; Bower-Shore, 1940; Campbell, 1971 and p.c.; Chubb, 1963a, 1965a; Copland, 1957; Fryer, p.c.; Gurney, 1948; Kane, 1966; Mishra & Chubb, 1969; Canning et al., 1973; Williams, 1964; Wootten, 1973; all River Authorities, p.c.).

Ergasilus gibbus Nordmann, 1832  
Eels—Slapton Ley, Devon (Canning et al., 1973).

Ergasilus sieboldi Nordmann, 1832  
Brown trout—Howbrook Reservoir, Yorks (Fryer, 1969b); bream—R. Blackwater, Essex (Essex R.A.); tench—aquarium specimens, London (Needham, p.c.).

Lerneia cyprinacea L., 1758  
Goldfish—London; Ilford, Essex; Chertsey, Surrey; Rickmansworth, Herts; Milford Haven, Pembroke; Pontefract, Bradford, Yorks (Fryer, 1968, 1969a), Honiton, Devon (Kennedy, unpublished); carp, orfe, roach—Chertsey, Surrey (Fryer, 1968); roach—Doddingtonhurst, Essex (Essex R.A., p.c.); three-spined stickleback—Epping Forest, Essex (Walkey, p.c.).

Salmincola salmonea (Gissler, 1751)  
Salmon—widespread throughout Britain and Ireland (Chubb, 1963a; Friend, 1939, 1941; Gurney, 1933; Hutton, 1923; Kane, 1966; Kennedy, unpublished; Scott, 1900; Scott & Scott, 1913); brown trout (as S. gordoni)—Dunalastair Reservoir, Loch Rannoch (Campbell, p.c., Robertson, 1953), Loch Lyon, R. Devon, Perth (Friend, 1939), R. Rye, Yorks (Gurney, 1933), R. Swale and other sites, Yorks (Fryer, 1969).

Salmincola thymalli (Kessler, 1868)  
Brown trout—(Gurney, 1933; Scott & Scott, 1913); grayling—(Scott & Scott, 1913).

Thersitina gasterostei (Pagenstechner, 1861)  
Three-spined stickleback—R. Forth, Loch Etive, Barra (Scott & Scott, 1913), Wirral, Cheshire (Galliford & Williams, 1948), several localities in England (Walkey et al., 1970); three-spined stickleback, ten-spined stickleback—East Anglia (Gurney, 1913, 1933), R. Bure, R. Yare and Norfolk Broads (Walkey et al., 1970); ten-spined stickleback—Coalhouse Fort, Essex (Dartnell, 1973).

Tracheliastes polycolpus Nordman, 1832  
Dace, chub—R. Derwent, R. Ouse, R. Rye, R. Swale, Yorks (Aubrook & Fryer, 1965); golden orfe—Edinburgh (Gurney, 1933).

MOLLUSCA

Glochidia larvae  
IV. HOST LIST

The list below includes all the parasites of freshwater fish reported from Britain and Ireland and mentioned in the parasite list with the exception of *Hemiclepsis marginata*, *Piscicola geometra* and *Glochidia*; these can apparently be found on any species of fish.

The arrangement of hosts and their nomenclature follows Maitland (1972) with one exception: the coregonid whitefish are listed under their local names as this is considered to be more helpful from the point of view of parasite distribution. Species with no recorded parasites are omitted.

The symbol * indicates that there is some doubt about the identity of the species expressed by the author who recorded it. The symbol (I) indicates that the parasite occurs in fish in a larval form.

### FAM. PETROMYZONIDAE

<table>
<thead>
<tr>
<th>Host</th>
<th>Parasite</th>
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<tbody>
<tr>
<td>Lampetra fluviatilis</td>
<td>Diplostomum petromyzii-fluviatilis (I)</td>
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<tr>
<td>Lampetra planeri</td>
<td>Diplostomum petromyzii-fluviatilis (I)</td>
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<tr>
<td>Proteocephalus sp.</td>
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<td><em>Lamproelaps</em></td>
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### FAM. SALMONIDAE

<table>
<thead>
<tr>
<th>Host</th>
<th>Parasite</th>
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<tbody>
<tr>
<td><em>Salmo salar</em> (salmon)</td>
<td><em>Acanthocephalus</em> lucii</td>
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<td><em>Aciella</em></td>
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<td><em>Chilodonella</em> cyprini</td>
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<td><em>Costia</em> necatrix</td>
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<tr>
<td><em>Epistylis</em> sp.</td>
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<tr>
<td><em>Ichthyophthirius</em> multiplis</td>
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<td><em>Leptotheca</em> sp.</td>
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<td><em>Myxidium</em> oviforme</td>
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<td><em>M. truttae</em></td>
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<tr>
<td><em>Myxobolus</em> neurobius</td>
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<td><em>Scyphidia</em> sp.</td>
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<tr>
<td><em>Trichodina</em> sp.</td>
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<tr>
<td><em>Trichophrya</em> sp.</td>
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<tr>
<td><em>Discocotyle</em> sagittata</td>
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<tr>
<td><em>Crepidotomus</em> farionis</td>
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<tr>
<td><em>Crepidotomus</em> metoecus</td>
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<td><em>Diplostomum</em> spathaceum (l)</td>
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<tr>
<td><em>Diplostomum</em> sp.</td>
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<td><em>Phyllopharynx</em> simile</td>
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<td><em>Tetracotyle</em> sp.</td>
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<tr>
<td><em>Tyloschistoma</em> clavata</td>
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<tr>
<td><em>Cyathocephalus</em> truncatus</td>
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<tr>
<td><em>Diphyllobothrium</em> dendriticum (l)</td>
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<td><em>D. ditremum</em> (l)</td>
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<tr>
<td><em>Eubothrium</em> crassum</td>
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<td><em>Proteocephalus</em> sp.</td>
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<td><em>Capillaria</em> lacustris</td>
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<td><em>Capillaria</em> salvelini</td>
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<td><em>Cysticola</em> farionis</td>
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<td><em>Cysticocoloides</em> tenussima</td>
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<td><em>Cysticocoloides</em> sp.</td>
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<td><em>Raphidascaris</em> cristata</td>
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<td><em>Rhabdochona</em> salvelini</td>
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<tr>
<td><em>Rhabdorchona</em> sp.</td>
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<tr>
<td><em>Acanthocephalus</em> lucii</td>
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<tr>
<td><em>Ichthyophthirius</em> multiplis</td>
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<td><em>Leptotheca</em> sp.</td>
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<td><em>M. truttae</em></td>
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<td><em>Myxobolus</em> neurobius</td>
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<td><em>Octomitus</em> truttae</td>
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<td><em>Scyphidia</em> sp.</td>
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<td><em>Discocotyle</em> sagittata</td>
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<tr>
<td><em>Gyrodactylus</em> salaris</td>
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<tr>
<td><em>Gyrodactylus</em> sp.</td>
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<td><em>Bunodera</em> luciopercaes</td>
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<td><em>Crepidotomus</em> farionis</td>
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<td><em>C. metoecus</em></td>
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<td><em>Crepidotomus</em> sp.</td>
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<td><em>Diplostomum</em> spathaceum (l)</td>
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<td><em>D. truttae</em> (l)</td>
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<tr>
<td><em>Diplostomum</em> sp.</td>
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<tr>
<td><em>Ichthyocotylurus</em> erraticus(1)</td>
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<tr>
<td><em>Phyllobothrium</em> dendriticum (l)</td>
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<tr>
<td><em>P. simile</em></td>
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<tr>
<td><em>Tylodelphys</em> clavata (l)</td>
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<tr>
<td><em>Cyathocephalus</em> truncatus</td>
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### FAM. SALMONIDAE—continued

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<th>Species</th>
<th>Notes</th>
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<td><em>Diphyllobothrium dendriticum</em></td>
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<td><em>D. ditremum</em></td>
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<td><em>D. latum</em></td>
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<td><em>D. medium</em></td>
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<td><em>D. norvegicum</em></td>
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<td><em>Diphyllobothrium</em> sp.</td>
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<td><em>Eubothrium crassum</em></td>
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<td><em>Eubothrium</em> sp.</td>
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<td><em>Ligula intestinalis</em></td>
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<td><em>Proteocephalus neglectus</em></td>
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<td><em>Camallanus lacustris</em></td>
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<td><em>Capillaria salvelini</em></td>
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<td><em>Capillaria</em> sp.</td>
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<td><em>Cystidicola farionis</em></td>
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<td><em>Cystidicolaoides tenuissima</em></td>
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<td><em>Eustrongylides</em> sp.</td>
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<tr>
<td><em>Raphidascaris</em> acus</td>
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<tr>
<td><em>R. cristata</em></td>
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<tr>
<td><em>Rhabdias</em> sp.</td>
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<tr>
<td><em>Rhabdochona</em> sp.</td>
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<td><em>Acanthocephalus anguillae</em></td>
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<tr>
<td><em>A. clavula</em></td>
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<td><em>A. lucii</em></td>
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<td><em>Echinorhynchus salmonis</em></td>
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<td><em>E. truttae</em></td>
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<td><em>Neoechinorhynchus rutili</em></td>
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<td><em>Argulus coregoni</em></td>
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<td><em>A. foliaceus</em></td>
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<td><em>Ergasilus sieboldi</em></td>
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<tr>
<td><em>Salmincola salmonea</em></td>
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### FAM. COREGONIDAE

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<tr>
<th>Species</th>
<th>Notes</th>
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<tbody>
<tr>
<td><em>Coregonus lavaretus</em> (gwyniad)</td>
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<tr>
<td><em>Henneguya tegidiensis</em></td>
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<td><em>Discocotyle sagittata</em></td>
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<td><em>Phyladistomum folium</em></td>
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<tr>
<td><em>Diphyllobothrium dendriticum</em></td>
<td>(1)</td>
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<tr>
<td><em>D. ditremum</em></td>
<td>(1)</td>
</tr>
<tr>
<td><em>Proteocephalus</em> sp.</td>
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</tr>
<tr>
<td><em>Acanthocephalus clavula</em></td>
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</tr>
<tr>
<td><em>Coregonus lavaretus</em> (powan)</td>
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</tr>
<tr>
<td><em>Ichthyocotylurus erraticus</em></td>
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### FAM. THYMALLIDAE

<table>
<thead>
<tr>
<th>Species</th>
<th>Notes</th>
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<tbody>
<tr>
<td><em>Thymallus thymallus</em> (grayling)</td>
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<tr>
<td><em>Discocotyle sagittata</em></td>
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<tr>
<td><em>Tetracotyle variegatus</em></td>
<td>(1)</td>
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<tr>
<td><em>Proceocephalus pollanicola</em></td>
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<tr>
<td><em>Coregonus albula</em> (pollan)</td>
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<tr>
<td><em>Acanthocephalus anguillae</em></td>
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<tr>
<td><em>A. lucii</em></td>
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</tr>
<tr>
<td><em>Coregonus albula</em> (vendace)</td>
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<tr>
<td><em>Coregonus albula</em> (pollan)</td>
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<td><em>Discocotyle</em> sp.</td>
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<tr>
<td><em>Discocotyle</em> sp.</td>
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<td><em>Phyladistomum folium</em></td>
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<tr>
<td><em>Diphyllobothrium dendriticum</em></td>
<td>(1)</td>
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<td><em>D. ditremum</em></td>
<td>(1)</td>
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<tr>
<td><em>Eubothrium crassum</em></td>
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<tr>
<td><em>Eubothrium</em> sp.</td>
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<tr>
<td><em>Pomphorhynchus laevis</em></td>
<td></td>
</tr>
<tr>
<td><em>Argulus coregoni</em></td>
<td></td>
</tr>
<tr>
<td><em>A. foliaceus</em></td>
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<tr>
<td><em>Coregonus albula</em> (powan)</td>
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<td><em>Tetracotyle variegatus</em></td>
<td>(1)</td>
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<tr>
<td><em>Proceocephalus pollanicola</em></td>
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<td><em>Crepidostrum farionis</em></td>
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<td><em>C. metoecus</em></td>
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<td><em>Diplostomum spathaceum</em></td>
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<tr>
<td><em>Diplostomum</em> sp.</td>
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FAM. THYMALLIDAE—continued

Phyllodistomum folium
Tyloodelphys clavata (I)
Diplostomum spathaceum (I)
Diplostomum sp. (I)
Phyllodistomum folium
Prohemistomulum sp. (I)
Rhipidocotyle sp.
Sanguinicola volgensis
Tyloodelphys clavata (I)
T. podicipina (I)
Bothriocephalus claviceps
Cyathocephalus truncatus
Diphyllolothrium dendriticum (I)
* D. latum
Diphyllolothrium sp.
Eubothrium crassum
Eubothrium sp.
Proteocephalus percae
Proteocephalus sp.
Triaenophorus nodulosus
Camallanus lacustris
Capillaria salvelini

FAM. ESOCIDAE

Esox lucius (pike)
*Chloromyxum esocinum
Henneguya oviperda
H. psorospermica
Henneguya sp.
Ichthyophthirius multifiliis
Myxidium leiberkuhni
Trichodina reticulata
Trypanosoma remaki
*Gyrodactylus lucii

FAM. CYPRINIDAE

Cyprinus carpio (carp)
Henneguya sp.
Ichthyophthirius multifiliis
Trichodina reticulata
Zschokkella cyprini
Dactylogyrus vastator
Diplostomum spathaceum (I)
Eubothrium sp.
Argulus foliaceus
Lerneia cyprinacea
Carassius carassius (crucian carp)
Chilodona laevis
Costia necatrix
Cryptobia borelli
C. keisselitzi
Ichthyophthirius multifiliis
Trichodina sp.
FAM. CYPRINIDAE—continued

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<th>Taxonomy</th>
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<td>Trichodina sp.</td>
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<tr>
<td>Dactylogyrus gobii</td>
<td>Alburnus alburnus (bleak)</td>
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<tr>
<td>Diplozoon paradoxum</td>
<td>Ligula intestinalis (I)</td>
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<tr>
<td>Gyroactylus sp.</td>
<td>Phoxinus phoxinus (minnow)</td>
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<td>Tylodelphys clavata (I)</td>
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<td>Myxobolus sp.</td>
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<td>Trichodina reticulata</td>
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<td>Neoechinorhynchus rutili</td>
<td>Trypanosoma sp.</td>
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<td>Argulus foliaceus</td>
<td>Dactylogyrus sp.</td>
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<tr>
<td>Tinca tinca (tench)</td>
<td>Diplozoon paradoxum</td>
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<tr>
<td>Chlidonella cyprini</td>
<td>Gyroactylus aphyae</td>
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<td>Costia necatrix</td>
<td>G. elegans</td>
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<td>Cryptobia borelli</td>
<td>G. laevis</td>
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<td>C. kisellitzi</td>
<td>G. limneus</td>
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<tr>
<td>Blicca bjørkna (silver bream)</td>
<td>Posthodiplostomum cuticola (I)</td>
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<tr>
<td>Dactylogyrus sp.</td>
<td>Rhipidocotyle illeste</td>
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<td>Sphaerostoma bramae</td>
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<td>Caryophyllaeides fennica</td>
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<tr>
<td>Abramis brama (bream)</td>
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<td>Cystidicoides sp.</td>
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<tr>
<td>D. crucifer</td>
<td>Scarditus erythrophthalmus (rudd)</td>
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<td>D. wunderi</td>
<td>Myxidium scardini</td>
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<td>Dactylogyrus sp.</td>
<td>Myxobolus sp.</td>
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<td>Trichodina reticulata</td>
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<td>Trichodina sp.</td>
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<td>Allocreadium isoporum</td>
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<td>Diplostomum spathaceum (I)</td>
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<td>Sphaerostoma bramae</td>
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<td>Eubothrium sp.</td>
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<td>Ligula intestinalis (I)</td>
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<td>Camallanus lacustris</td>
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<tr>
<td>Eubothrium crassum</td>
<td>Acanthocephalus anguillae</td>
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<td>Ligula intestinalis (I)</td>
<td>A. lucii</td>
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<tr>
<td>Camallanus lacustris</td>
<td>Pomphorhynchus laevis</td>
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<tr>
<td>Acanthocephalus lucii</td>
<td>Argulus foliaceus</td>
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<tr>
<td>Pomphorhynchus laevis</td>
<td>Rutilus rutilus (roach)</td>
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<td>Argulus coregoni</td>
<td>Chlidonella cyprini</td>
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BRITISH AND IRISH FRESHWATER FISH PARASITES

FAM. CYPRINIDAE—continued

Costia necatrix  
Cryptobia borelli  
Eimeria rutili  
Henneguya sp.  
Ichthyophthirius multifiliis  
Myxidium rhodei  
Myxidium sp.  
Myxobolus artus  
M. mulleri  
M. pseudodspar  
Myxobolus sp.  
Plistophora longifilis  
Thelohanellus sp.  
Trichodina sp.  
Trypanosoma leucisci  
Dactylogyrus crucifer  
D. nanus  
D. similis  
D. sphyrna  
D. suecicus  
Dactylogyrus sp.  
Diplozoon paradoxum  
Gyroactylus elegans  
G. medius  
Gyroactylus sp.  
Allocreadium isoporum  
Asymphylodora kuhanicum  
Bucephalus polymorphus (I)  
Diplostomum spathaceum (I)  
Diplostomum sp. (I)  
Posthodiplostomum cuticola (I)  
Sanguinicola volgensis  
Sphaerostoma bramae  
Tylodelphys clavata (I)  
Biaecetabulum appendiculatum  
Caryophyllaeides fennica  
Caryophyllaeus laticeps  
Ligula intestinalis (I)  
Proteocephalus torulosus  
Proteocephalus sp.  
Camallanus lacustris  
Philometra rischta (I)  
Philometra sp.  
Raphidascaris acus  
Acanthocephalus clavula  
A. lucii  
Echinorhynchus travtae  
Neoechinorhynchus rutili  
Pomphorhynchus laevis  
Argulus coregoni  
Argulus foliaceus  
Lernea cyprinacea  
Leuciscus cephalus  
Leuciscus idis (orfe)  
Leuciscus lewiscus (dace)  
Henneguya zschokkei  
Henneguya sp.  
Ichthyophthirius multifiliis  
Myxobolus mulleri  
Dactylogyrus cordus  
D. tuba  
Dactylogyrus sp.  
Diplostomum spathaceum (I)  
Diplostomum sp. (I)  
Posthodiplostomum cuticola (I)  
Sanguinicola volgensis  
Sphaerostoma bramae  
Tylodelphys clavata (I)  
Biaecetabulum appendiculatum  
Caryophyllaeides fennica  
Caryophyllaeus laticeps  
Ligula intestinalis (I)  
Proteocephalus torulosus  
Proteocephalus sp.  
Camallanus lacustris  
Philometra rischta (I)  
Philometra sp.  
Raphidascaris acus  
Acanthocephalus clavula  
A. lucii  
Echinorhynchus travtae  
Neoechinorhynchus rutili  
Pomphorhynchus laevis  
Argulus coregoni  
Argulus foliaceus  
Lernea cyprinacea  
Leuciscus cephalus  
Leuciscus idis (orfe)  
Leuciscus lewiscus (dace)  
Henneguya zschokkei  
Henneguya sp.  
Ichthyophthirius multifiliis  
Myxobolus mulleri  
Dactylogyrus cordus  
D. tuba  
Dactylogyrus sp.  
Diplostomum spathaceum (I)  
Diplostomum sp. (I)  
Posthodiplostomum cuticola (I)  
Sanguinicola volgensis  
Sphaerostoma bramae  
Tylodelphys clavata (I)  
Biaecetabulum appendiculatum  
Caryophyllaeides fennica  
Caryophyllaeus laticeps  
Ligula intestinalis (I)  
Proteocephalus torulosus  
Proteocephalus sp.  
Camallanus lacustris  
Philometra rischta (I)  
Philometra sp.  
Raphidascaris acus  
Acanthocephalus clavula  
A. lucii  
Echinorhynchus travtae  
Neoechinorhynchus rutili  
Pomphorhynchus laevis  
Argulus coregoni  
Argulus foliaceus  
Lernea cyprinacea  
Leuciscus cephalus (chub)  
M. mulleri  
Dactylogyrus folkmannovae
FAM. COBITIDAE
Noemacheilus barbatulus (stone loach)
Diplostomum spathaceum (I)
Nicolla gallica
Tetracytyle percafutivatilis (I)

FAM. ANGUILLIDAE
Anguilla anguilla (eel)
Myxidium sp.
Trypanosoma granulosum
Crepidostomum farionis
Diplostomum spathaceum
Diplostomum sp. (I)
Phylloidostomum simile
Bothriocephalus claviceps
Cyathocephalus truncatus
Proteocephalus macrocephalus
Proteocephalus sp.
Triaenophorus nodulosus (I)

FAM. GASTEROSTEIDAE
Gasterosteus aculeatus (three-spined stickleback)
Dermocystidium gasterostei
Dermocystidium sp.
Glugea anomala
Henneguya sp.
Ichthyophthirius multifilis
Sphaerospora elegans
Trichodina domerguei
* T. reticulata
T. tenuidens
Trichodina sp.
* Gyrodactylus arcuatus
G. elegans
* G. pungitii
G. rarus
Gyrodactylus sp.
Bunodera luciopercae
Crepidostomum sp.
Diplostomum gasterostei (I)
D. spathaceum (I)
Diplostomum sp. (I)
Phylloidostomum folium
Tylodelphys clavata (I)
* Bothriocephalus claviceps
Bothriocephalus sp.
Diphyllobothrium dendriticum (I)

FAM. CENTRARCHIDAE
Micropterus salmoides (largemouth bass)

FAM. PERCIDAE
Perca fluviatilis (perch)
* Apiosoma sp.
Henneguya psorospermica

* Urocleidus principalis

Henneguya sp.
Myxobolus mulleri
Trichodina sp.
**V. DISCUSSION**

Chappell & Owen (1969) listed approximately 90 species of freshwater fish parasites from Britain. The present list records at least 168 species. Thus, within the space of a few years, the number of species from Britain and Ireland has almost doubled. Nevertheless, the fauna is still considerably poorer than that of mainland Europe, and that of Ireland poorer than that of Britain. There can be little doubt also that there remain several species yet to be recorded from Britain. In part this is due to taxonomic difficulties, particularly in genera such as *Dactylogyrus*, and in part to the uneven coverage of studies on the British fish. Species such as trout and roach have been examined for parasites on many occasions and in many localities, but several fish species have been examined on a single occasion only or not at all. The present list contains records from 36 fish species, yet Maitland (1972) lists 55 species from Britain. The other species are either too rare or too unimportant to have attracted the attention of parasitologists, yet species such as the burbot and bitterling probably have some parasites characteristic to them. It is clear that parts of the British parasite fauna are still poorly known.

Because the list of parasites is still incomplete and because, inevitably, the distributional records of the parasites reflect the interest of the parasitologists, it is difficult
to comment upon the distribution of the parasites within Britain. Of the species listed here, 64 have been recorded on one occasion only. Nevertheless, three groups of species can be recognized with respect to their distribution. The first consists of the endemic species. This appears to comprise only *Henneguya tegidiensis* and *Proteocephalus pollanicola*, both parasitizing species of *Coregonus*. Other species may yet fall into this category, but either their status is still uncertain, as with *Diplostomum truttae*, or they have not been sufficiently studied.

The second group comprises those species that have clearly been introduced into Britain within recent times. This includes species such as *Urocleidus principalis* which has almost certainly been introduced together with its host, the largemouth bass from America and has remained, together with its host, very restricted and local in distribution. Other species such as *Ergasilus sieboldi* have been introduced and have spread beyond the site of introduction. Others again such as *Lernea cyprinacea* have clearly been introduced on a number of separate occasions, and although generally confined to domestic localities, have started to spread to native fish. It would seem possible that other introduced parasites may be found on such introduced hosts as the wels, pumpkinseed and pikeperch.

The third group, containing by far the greatest number of species, comprises those parasites which are probably native to Britain and whose distribution, where sufficient evidence is available, appears to show no peculiarities. In these cases their distribution appears to be contiguous with that of their hosts, and their centres of distribution and location throughout Britain to be governed by them.

The author would like to express his thanks to the many people mentioned in the text who have assisted in this survey by providing information from their theses or their own unpublished records. In particular I am grateful to all the River Authorities referred to for their co-operation, to Drs E. U. Canning, K. Lyons, R. Wootten and Mr A. D. Campbell for permitting me to see manuscripts of papers whilst still in press, to Mr K. A. Pyefinch for permission to quote from an unpublished report in his department and, amongst many others, to Drs R. M. Anderson, G. Fryer, FRS, E. A. Needham, D. J. Shillcock, R. Sweeting, M. Walkey and R. Wootten, Mr R. L. G. Lee, Mr J. Smith, and Mr A. D. Campbell, and Prof. G. Rees, FRS for making available to me so many of their own unpublished records.

References


Rawson, D. (1957). The anatomy of *Eubothrium crassum* (Bloch) from the pyloric caeca and small intestine of *Salmo trutta* L. *J. Helminth.* 31, 103–120.


