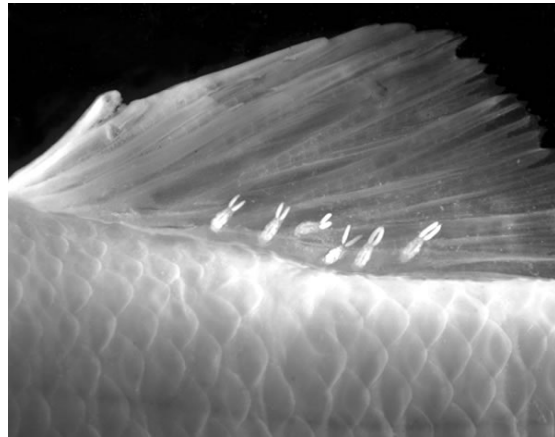


Parasites of Fish from the Great Lakes: A Synopsis and Review of the Literature, 1871-2010



Miscellaneous Publication 2011-01

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Parasites of Fish from the Great Lakes: A Synopsis and Review of the Literature, 1871-2010

Patrick M. Muzzall¹ and Gary Whelan

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PREFACE

There has been no comprehensive work on the parasites of fish in the Great Lakes and their connecting waters, so to us, the need for the present synopsis was obvious. This synopsis organizes and discusses the available information from previous studies on the protozoans, helminths (parasitic worms), leeches, copepods, and molluscs that are parasites of the fish in the Great Lakes and their connecting waters. Original material resulting from the research of P. Muzzall and G. Whelan and their colleagues forms only a small fraction of this synopsis. Indeed, the most-perplexing problem was interpretation of these organized data and materials because of their lack of uniformity as well as the absence of data and information for some parasites. Considerable documentation has been provided in this synopsis to find and consult the literature. By no means should this synopsis replace the original literature. This synopsis will be of practical use and a source of information for aquatic parasitologists, ichthyologists, fisheries biologists, and other researchers.

This synopsis, in addition to providing a descriptive analysis of the parasites infecting fish in the Great Lakes, should provide a foundation for future studies. The effects of parasites on their fish hosts are often underestimated, unappreciated, and ignored by many investigators. In addition, the occurrence and effect of non-native parasite species on exotic and endemic fishes has been little studied. Aquatic parasitologists along with fish-health specialists, fisheries biologists and other investigators should take a holistic approach to study each Great Lake. Parasites are major players in the biology of fishes and more research into their role on the Great Lakes ecosystem is needed. It is hoped that this synopsis will stimulate renewed interest in current and future fish-parasite research.

OVERVIEW

This synopsis is the first one to describe and summarize the parasites of fish from the Great Lakes and their connecting waters. The synopsis is based on information from the literature (articles, theses, dissertations, reports) on the major parasite groups (protozoans, digenetic trematodes, monogeneans, aspidobothreans, cestodes, nematodes, acanthocephalans, leeches, copepods, molluscs) of fish in the Great Lakes from 1871 through 2010. The synopsis is organized into two sections for each lake or connecting water: 1) a list of the parasite species by taxonomic group and family, followed by their synonyms, site of infection, fish hosts and studies; and 2) a list of the fish species in each Great Lake and connecting body of water by family, followed by their parasites and studies. The number of parasite species found, the number of fish species examined, and the number of studies performed for each lake are, respectively: Lake Michigan—90, 44, 41; Lake Superior—148, 37, 35; Lake Huron—242, 76, 60; Lake Erie—231, 89, 69; and Lake Ontario—228, 60, 39. There was no significant correlation between the number of parasite species reported from the lakes and their surface area ($r_s = 0.100$). Although not significant, correlations were high between the number of parasite species from each lake and number of fish species examined ($r_s = 0.800$) and number of parasite studies performed ($r_s = 0.600$). Parasites considered to be pathogenic to fish and found to be contributors to fish mortality are identified and discussed. The few parasite species in Great Lakes fish that may be hazardous to human health are also detailed in this synopsis. Fish species that are widespread and common were most studied and, in general, more parasite species were reported from them compared to the less-studied fish species. Consequently, yellow perch (*Perca flavescens*) had the highest parasite species-richness in each lake, except for lake herring/cisco (*Coregonus artedi*) in Lake Superior. The acanthocephalan *Echinorhynchus salmonis* infected the most fish species in Lakes Michigan and Superior, whereas the larval digenetic trematodes (*Diplostomum spathaceum* or unidentified species of *Diplostomum*) infected the most species in Lakes Huron, Erie, and Ontario. A total of 31 and 49 parasite species infected fish from all 5 Great Lakes and from 4 lakes, respectively. Few studies have been performed on the parasites of fish in the connecting waterways of the Great Lakes.

Jaccard coefficients of parasite-community similarity, the autogenic-allogenic helminth species dichotomy, and the most-important parasite groups based on percentages were analyzed and separated by the five fish families (Centrarchidae, Cyprinidae, Catostomidae, Percidae, Salmonidae) for each lake. Jaccard coefficients for the parasite faunas among these five fish families were low in each lake, indicating that fish in these families do not share many parasite species and their parasite faunas are different. Similarly, low Jaccard coefficients for rock bass (*Ambloplites rupestris*), spottail shiner (*Notropis hudsonius*), white sucker (*Catostomus commersonii*), *Perca flavescens*, lake whitefish (*Coregonus clupeaformis*), lake trout (*Salvelinus namaycush*), and rainbow smelt (*Osmerus mordax*) among the lakes also indicate that the parasite communities are not similar. Fish in these five families were similar to one another when the percentages of major parasite groups are compared, but the specific parasite species in each major parasite group were not that similar among the lakes. Based on the available literature involving

fish species examined and parasites found, each Great Lake was somewhat different from the others. Percids were the prominent fish species examined in Lake Michigan; salmonids in Lake Superior; cyprinids, percids, and centrarchids in Lake Huron; and centrarchids, percids, and cyprinids in Lakes Erie and Ontario. Autogenic helminths were common to all of the prominent fish in each lake.

INTRODUCTION

Prior to this effort there have been limited attempts to synthesize and compile all of the existing parasite data into one document. The literature on the parasites of fish in the Great Lakes is extensive, diverse, and fragmented throughout many publications. Historically, studies have focused on three major areas: parasite taxonomy, parasite faunal surveys, and parasite life histories. Many of these parasite studies are limited in that only one parasite species or parasite group was studied, only one fish species was studied, or the number of fish examined was small. Only a few of the studies are on parasites that are considered to be pathogenic to fish and contribute to fish mortality. Scattered among these articles are those dealing with the presence of parasites in edible fish products and fish-transmitted parasites of human-health importance. These studies were not prompted by some pressing or continuous issue involving fish biology, parasites, pathology, or holistic lake approach, but represent the unknown interests of specific investigators at certain agencies and institutions. Margolis and Arthur (1979) and Dechtiar and co-workers listed the parasites of fishes in Canadian waters of the Great Lakes and Hudson et al. (2003) presented a list on the internet of some parasitic copepods of some fish species in the Great Lakes. However, these efforts were not totally inclusive and no other synopses have been published since that time. The objective of this present study was to summarize all of the available information on the parasites of fishes from the Great Lakes and their connecting waters in an accessible form in a single document. This synopsis will provide a baseline reference for investigators interested in these parasites and fish and provide an initial descriptive analysis of the parasites and their communities of fish from these lakes. This fish-parasite baseline will be valuable in evaluating changes brought about by environmental variation and the introduction of exotic organisms.

Esch (1971) proposed a means of characterizing aquatic environments using autogenic and allogenic helminth species. Autogenic helminth species complete their life cycles in fish, and allogenic helminth species complete their life cycles in piscivorous birds and mammals. Using this autogenic-allogenic dichotomy, another study objective was to describe, compare, and separate the helminth faunas of specific fish species and fish families in the Great Lakes, as well as to attempt to characterize the Great Lakes using the parasite species of fish. Finally, the present study describes the entire parasite fauna of fish in the Great Lakes and not just the helminth fauna as many previous studies have done in other aquatic environments.

MATERIALS, METHODS, AND INTERPRETATION

Literature Analyses

Information for this synopsis was gleaned from all forms of scientific literature (theses, dissertations, journal reports, as well as agency reports and other grey literature) on the parasites of fish from the Great Lakes and their connecting waters. This information is presented as a parasite-host list and as a host-parasite list. The parasite-host list is organized on a taxonomic basis and includes for each parasite species: the major taxonomic group; family; synonym(s), if any; the site of infection in/on the fish; the host-fish species; author(s) and date(s) of article(s); date(s) when fish were collected; parasite prevalence (percentage of fish infected in a sample), and/or mean intensity (mean number of individual parasites per infected fish), and/or mean abundance (mean number of individual parasites per examined fish); and study location in the lake, including latitude and longitude, if available. Authors responsible for this information are listed in alphabetical order. When the site of infection for a parasite species in or on its fish host was not provided in the original record, the site typical for that parasite on that fish host from non-Great Lakes records was provided in brackets. If a string of different fish hosts refers to the same study for a parasite species, the date of fish collection and latitude and longitude are included only once with the first entry of the string. It is important to emphasize that some data/information were difficult to interpret in some original sources and may be interpreted differently depending on the investigator. The association of some parasitological studies with a Great Lake may be conjecture, but we did our best to understand the data and the author(s) interpretation. The compiled information covers the period 1871 through 2010. Studies on viruses, bacteria, fungi, and lamprey parasitism of fish from the Great Lakes are not included in this synopsis.

Classification and Taxonomy

The basis of the higher classification used for the Protozoa is that proposed by Lom and Dykova (1992). Taxonomic systems for the helminth phyla and families and leeches (Hirudinea) are based on the following sources: Monogenea and Aspidobothrea (Yamaguti 1963a; Schell 1985), Digenea (Yamaguti 1953; Yamaguti 1971; Schell 1985; Gibson 1996); Cestoda (Wardle and Mcleod 1952; Yamaguti 1959); Nematoda (Yamaguti 1961; Anderson 1992); Acanthocephala (Yamaguti 1963b; Amin 2002); and Hirudinea (Klemm 1972; Klemm 1991). Classification of the Copepoda follows that proposed by Yamaguti (1963c) and Kabata (1969, 1988), and classification of the freshwater mussels follows that of Thorp and Covich (2001). Hoffman (1999) was consulted for information on the taxonomic status of several parasite species if there was ambiguity in the above sources. Current accepted scientific names are used for each parasite species. Synonyms of parasite species used in the past are included to assist the reader in interpreting earlier studies. Over the years, the scientific names of many parasite species have

changed, especially some monogeneans. Current scientific names are used in this publication, and it is emphasized that investigators should check the status of these current scientific names when specific work is being done on each parasite species. Remarks for each parasite species (biology, taxonomy, misidentification, etc.) are included where appropriate.

The host-parasite list is organized according to the taxonomy of the fish host by family. Within each fish family, genera and species are listed alphabetically. The scientific names of fish follow those recommended by Nelson et al. (2004) and are used throughout this synopsis to avoid confusion since there are numerous parasite species that are host-specific. An alphabetical list of fish scientific names and their corresponding common names is given in Table 1. Parasites reported in each fish species are followed by the specific literature source(s) listed alphabetically by author(s). When a parasite species such as *Eubothrium salvelini* occurs in a fish species such as *Salvelinus namaycush*, and the genus *Eubothrium* sp. is also found, these are counted as only one species when quantitative information is presented. Furthermore, when a parasite species is reported as an adult in a fish species and as a larval/immature stage in the same fish species or different fish species in the same fish family, this parasite is only counted in the adult parasite category.

Table 1. A list of scientific and common names of fish used in this publication.

| Scientific name | Common name |
|------------------------------|-----------------------|
| <i>Acipenser fulvescens</i> | lake sturgeon |
| <i>Alosa chrysochloris</i> | skipjack herring |
| <i>Alosa pseudoharengus</i> | alewife |
| <i>Ambloplites rupestris</i> | rock bass |
| <i>Ameiurus melas</i> | black bullhead |
| <i>Ameiurus natalis</i> | yellow bullhead |
| <i>Ameiurus nebulosus</i> | brown bullhead |
| <i>Ameiurus</i> sp. | bullhead |
| <i>Amia calva</i> | bowfin |
| <i>Ammocrypta pellucida</i> | eastern sand darter |
| <i>Anguilla rostrata</i> | American eel |
| <i>Apeltes quadracus</i> | fourspine stickleback |
| <i>Aphredoderus sayanus</i> | pirate perch |
| <i>Aplodinotus grunniens</i> | freshwater drum |
| <i>Apollonia melanostoma</i> | round goby |
| <i>Campostoma anomalum</i> | central stoneroller |
| <i>Carassius auratus</i> | goldfish |
| <i>Carpodes cyprinus</i> | quillback |

Table 1, continued.

| Scientific name | Common name |
|---|-----------------------------|
| <i>Catostomus catostomus</i> | longnose sucker |
| <i>Catostomus commersonii</i> | white sucker |
| centrarchid | bream |
| <i>Chaenobryttus gulosus</i> | warmouth |
| <i>Coregonus alpenae</i> | longjaw chub |
| <i>Coregonus artedi</i> | lake herring/cisco |
| <i>Coregonus clupeaformis</i> | lake whitefish |
| <i>Coregonus hoyi</i> | bloater |
| <i>Coregonus johanna</i> | deepwater cisco |
| <i>Coregonus kiyi</i> | kiyi |
| <i>Coregonus nigripinnis</i> | blackfin cisco |
| <i>Coregonus reighardi</i> | shortnose cisco |
| <i>Coregonus prognathus</i> | longjaw whitefish |
| <i>Coregonus zenithecus</i> | shortjaw cisco |
| <i>Coregonus</i> spp. | coregonids |
| <i>Coregonus</i> spp. | ciscoes |
| <i>Cottus bairdii</i> | mottled sculpin |
| <i>Cottus cognatus</i> | slimy sculpin |
| <i>Cottus ricei</i> | spoonhead sculpin |
| <i>Cottus</i> spp. | sculpin |
| cottid | sculpin |
| <i>Couesius plumbeus</i> | lake chub |
| <i>Culaea inconstans</i> | brook stickleback |
| <i>Cyprinus carpio</i> | common carp |
| <i>Cyprinus carpio</i> x <i>Carassius auratus</i> | common carp/goldfish hybrid |
| <i>Cyprinella lutrensis</i> | red shiner |
| <i>Cyprinella spiloptera</i> | spotfin shiner |
| <i>Cyprinella whipplei</i> | steelcolor shiner |
| <i>Dorosoma cepedianum</i> | gizzard shad |
| <i>Erimyzon oblongus</i> | creek chubsucker |
| <i>Erimyzon sucetta</i> | lake chubsucker |
| <i>Esox americanus</i> | redfin pickerel |
| <i>Esox lucius</i> | northern pike |

Table 1, continued.

| Scientific name | Common name |
|--------------------------------|------------------------|
| <i>Esox masquinongy</i> | muskellunge |
| <i>Esox niger</i> | chain pickerel |
| <i>Etheostoma blennioides</i> | greenside darter |
| <i>Etheostoma caeruleum</i> | rainbow darter |
| <i>Etheostoma exile</i> | Iowa darter |
| <i>Etheostoma flabellare</i> | fantail darter |
| <i>Etheostoma microperca</i> | least darter |
| <i>Etheostoma nigrum</i> | Johnny darter |
| <i>Etheostoma olmstedi</i> | tessellated darter |
| <i>Fundulus diaphanus</i> | banded killifish |
| <i>Fundulus</i> spp. | killifish/topminnow |
| <i>Gasterosteus aculeatus</i> | threespine stickleback |
| Gasterosteidae | sticklebacks |
| <i>Gymnocephalus cernuus</i> | ruffe |
| <i>Hiodon tergisus</i> | mooneye |
| <i>Hybognathus hankinsoni</i> | brassy minnow |
| <i>Hypentelium nigricans</i> | northern hog sucker |
| <i>Ichthyomyzon castaneus</i> | chestnut lamprey |
| <i>Ichthyomyzon fossor</i> | northern brook lamprey |
| <i>Ichthyomyzon unicuspis</i> | silver lamprey |
| <i>Ictalurus punctatus</i> | channel catfish |
| <i>Ictiobus cyprinellus</i> | bigmouth buffalo |
| <i>Labidesthes sicculus</i> | brook silverside |
| <i>Lampetra appendix</i> | American brook lamprey |
| <i>Lepisosteus oculatus</i> | spotted gar |
| <i>Lepisosteus platostomus</i> | shortnose gar |
| <i>Lepomis cyanellus</i> | green sunfish |
| <i>Lepomis gibbosus</i> | pumpkinseed |
| <i>Lepomis humilis</i> | orangespotted sunfish |
| <i>Lepomis macrochirus</i> | bluegill |
| <i>Lepomis megalotis</i> | longear sunfish |
| <i>Lota lota</i> | burbot |
| <i>Luxilus cornutus</i> | common shiner |

Table 1, continued.

| Scientific name | Common name |
|---|----------------------|
| <i>Lythrurus umbratilis</i> | redfin shiner |
| <i>Macrhybopsis storeriana</i> | silver chub |
| <i>Margariscus margarita</i> | pearl dace |
| <i>Micropterus dolomieu</i> | smallmouth bass |
| <i>Micropterus salmoides</i> | largemouth bass |
| <i>Micropterus</i> spp. | bass |
| <i>Minytrema melanops</i> | spotted sucker |
| <i>Misgurnus anguillicaudatus</i> | oriental weatherfish |
| <i>Morone americana</i> | white perch |
| <i>Morone chrysops</i> | white bass |
| <i>Moxostoma anisurum</i> | silver redhorse |
| <i>Moxostoma duquesnei</i> | black redhorse |
| <i>Moxostoma erythrurum</i> | golden redhorse |
| <i>Moxostoma macrolepidotum</i> | shorthead redhorse |
| <i>Moxostoma valenciennesi</i> | greater redhorse |
| <i>Moxostoma</i> spp. | redhorse |
| <i>Myoxocephalus thompsonii</i> | deepwater sculpin |
| <i>Notropis atherinoides</i> | emerald shiner |
| <i>Nocomis biguttatus</i> | hornyhead chub |
| <i>Nocomis micropogon</i> | river chub |
| <i>Notemigonus crysoleucas</i> | golden shiner |
| <i>Notropis anogenus</i> | pugnose shiner |
| <i>Notropis atherinoides</i> | emerald shiner |
| <i>Notropis buccatus</i> | silverjaw minnow |
| <i>Notropis bifrenatus</i> | bridle shiner |
| <i>Notropis buchanani</i> | ghost shiner |
| <i>Notropis delicatus</i> (= <i>Notropis atherinoides</i>) | emerald shiner |
| <i>Notropis heterodon</i> | blackchin shiner |
| <i>Notropis heterolepis</i> | blacknose shiner |
| <i>Notropis hudsonius</i> | spottail shiner |
| <i>Notropis rubellus</i> | rosyface shiner |
| <i>Notropis stramineus</i> (= <i>Notropis ludibundus</i>) | sand shiner |
| <i>Notropis volucellus</i> | mimic shiner |

Table 1, continued.

| Scientific name | Common Name |
|---------------------------------|------------------------|
| <i>Noturus flavus</i> | stonecat |
| <i>Noturus gyrinus</i> | tadpole madtom |
| <i>Noturus miurus</i> | brindled madtom |
| <i>Noturus stigmosus</i> | northern madtom |
| <i>Oncorhynchus gorbuscha</i> | pink salmon |
| <i>Oncorhynchus kisutch</i> | coho salmon |
| <i>Oncorhynchus mykiss</i> | rainbow trout |
| <i>Oncorhynchus nerka</i> | sockeye salmon/kokanee |
| <i>Oncorhynchus tshawytscha</i> | Chinook salmon |
| <i>Opsopoeodus emiliae</i> | pugnose minnow |
| <i>Osmerus mordax</i> | rainbow smelt |
| <i>Perca flavescens</i> | yellow perch |
| <i>Percina caprodes</i> | logperch |
| <i>Percina copelandi</i> | channel darter |
| <i>Percina maculata</i> | blackside darter |
| <i>Percina shumardi</i> | river darter |
| <i>Percopsis omiscomaycus</i> | trout-perch |
| <i>Petromyzon marinus</i> | sea lamprey |
| <i>Phoxinus eos</i> | northern redbelly dace |
| <i>Phoxinus neogaeus</i> | finscale dace |
| <i>Pimephales promelas</i> | fathead minnow |
| <i>Pimephales notatus</i> | bluntnose minnow |
| <i>Pomoxis annularis</i> | white crappie |
| <i>Pomoxis nigromaculatus</i> | black crappie |
| <i>Prosopium coulterii</i> | pygmy whitefish |
| <i>Prosopium cylindraceum</i> | round whitefish |
| <i>Proterorhinus marmoratus</i> | tubenose goby |
| <i>Pungitius pungitius</i> | ninespine stickleback |
| <i>Pylodictis olivaris</i> | flathead catfish |
| <i>Rhinichthys cataractae</i> | longnose dace |
| <i>Rhinichthys obtusus</i> | western blacknose dace |
| <i>Salmo salar</i> | Atlantic salmon |
| <i>Salmo trutta</i> | brown trout |

Table 1, continued.

| Scientific name | Common Name |
|--|-------------------|
| <i>Salvelinus alpinus</i> | Arctic char |
| <i>Salvelinus alpinus</i> | Arctic char |
| <i>Salvelinus fontinalis</i> | brook trout |
| <i>Salvelinus namaycush</i> | lake trout |
| <i>Salvelinus fontinalis</i> x <i>S. namaycush</i> | splake |
| <i>Sander canadensis</i> (= <i>canadense</i>) | sauger |
| <i>Sander glaucum</i> | blue pike |
| <i>Sander vitreus</i> | walleye |
| <i>Scardinius erythrophthalmus</i> | rudd |
| <i>Semotilus atromaculatus</i> | creek chub |
| <i>Semotilus corporalis</i> | fallfish |
| <i>Umbra limi</i> | central mudminnow |

Parasite-Fish Analyses

In this synopsis, developmental stages of helminths were divided into larval, immature, and adult stages. Larval stages are generally considered to be encysted and not occurring in the digestive tract. Also, larval stages of some species of the digenetic trematode *Diplostomum* and a few species of other digenetic trematode genera and other helminth species do not encyst, but these were still considered larvae if they were not in the digestive tract. Immature helminths found in the digestive tract were not classified as larvae nor were they considered adults. Adult helminths mature in their fish hosts, no matter where they infect the fish. This separation of developmental stages is useful to characterize the helminth faunas of fish species and fish families in the Great Lakes.

The parasite faunas of five fish families, and specific fish species in each family (Centrarchidae—*Ambloplites rupestris*, Cyprinidae—*Notropis hudsonius*, Catostomidae—*Catostomus commersonii*, Percidae—*Perca flavescens*, and Salmonidae—*Coregonis clupeaformis*, *Salvelinus namaycush*) common to all five Great Lakes are compared based on host taxonomy and the general thermal-habitat/temperature preferences for fish in these families for each lake. *Osmerus mordax* in Osmeridae is also involved in this comparison. Cyprinids and catostomids are in the order Cypriniformes, centrarchids and percids are in the order Perciformes, and salmonids are in the order Salmoniformes. In general, fish in the Cyprinidae and Catostomidae can be considered coolwater species and temperature generalists, individuals in the Centrarchidae as coolwater-warmwater species, those in the Percidae as coolwater, and fish in the Salmonidae as coldwater. Using this host taxonomy, as well as the general thermal-habitat/temperature preferences for each fish family in each Great Lake as general separations, one would expect the parasite faunas to be

most similar among fish or fish families in the same order and within the general thermal-habitat designations, and most dissimilar among fish or fish families from different orders and different general thermal-habitat designations.

Species-richness is the number of parasite species and distinct genera (parasite genus reported from a fish but a species for that genus was not given in the original article) infecting a fish species or fish family. The Jaccard coefficient of community similarity (CC_j) used to quantify parasite community similarity between two fish species or two fish families, was calculated as

$$CC_j = C/(S_1 + S_2 - C)$$

where S_1 and S_2 are the number of parasite species in each of two fish species or two fish families, and C is the number of species common to both species or families (Brower and Zar 1984). The coefficients range from 0 to 1.0. Generally, as the number of parasite species and distinct genera that infect both fish species or fish in both families being compared increases, so does the coefficient, indicating the parasite communities are more similar.

One caveat is important to mention regarding this synopsis. A rigorous statistical analysis to identify determinants of the parasite species present, the parasite communities present, and parasite species-richness in several fish species and in fish families within a Great Lake, and between and among these lakes is not one of our objectives and is beyond the scope of this synopsis. For those investigators who are interested in such statistical analyses, there are several, including Bell and Burt (1991), Aho and Bush (1993), Takemoto et al. (2005), Kennedy (2009), and references therein.

LAKE MICHIGAN

Results

Parasite Species

Ninety parasite species in 11 major parasite groups (1 Mastigophora, 2 Ciliophora, 20 Myxozoa, 1 Microspora, 12 adult Digenea, 4 larval/immature Digenea, 2 Monogenea, 8 adult Cestoda, 7 larval/immature Cestoda, 10 adult Nematoda, 3 larval/immature Nematoda, 8 adult Acanthocephala, 5 Hirudinea, 7 Copepoda) were found in 44 fish species examined from Lake Michigan (Table 2). The parasites by taxonomic group and family infecting fish from Lake Michigan are listed in Table 3. Although *Eubothrium salvelini*, *Cyathocephalus truncatus*, *Proteocephalus* sp., *Raphidascaris acus*, *Capillaria* sp., *Dichelyne cotylophora*, *Cystidicola stigmatura*, *Acanthocephalus dirus*, *Echinorhynchus salmonis*, *Pomphorhynchus bulbocolli*, and *Leptorhynchoides thecatus* occurred in both adult and larval/immature stages, they are listed as adults and only counted once. A total of 41 studies conducted during 1874-2010 have reported on some aspect of a parasite species infecting one or more fish species from Lake Michigan. Most studies were done after 1959 (Table 4).

Protozoans

Of the protozoans, only one species of mastigophoran, *Trypanosoma* sp., has been reported from fish. Two genera of ciliates, *Trichodina* and *Capriniana*, occurred on the gills of four fish species (Table 3). The myxozoans are the most-common protozoan group based on the number of species found (1 of *Chloromyxum*, 2 of *Myxidium*, 4 of *Henneguya*, 8 of *Myxobolus*, 1 of *Thelohanellus*, 1 of *Zschokkella*, 2 of *Myxobilatus*, and 1 of *Sphaerospora*). Most of these species are host-specific to a particular fish family. Only one microsporan species, *Pleistophora* sp., has been reported from only one fish species, *Myoxocephalus thompsonii*.

Digenetic Trematodes

Thirteen species of adult trematodes representing six families have been reported. Many of these species were reported from only one fish species or from two or more species in one fish family. Most species occurred in the intestine, except for *Acetodextra amiuri* (swim bladder), and *Phyllodistomum staffordi* and *Phyllodistomum superbum* (urinary bladder). At least four species of larval trematodes (metacercariae) have been reported from eight fish species. The entries involving *Diplostomum* spp. are separated based on infection site. It is not known if these are distinct species of *Diplostomum*.

Monogeneans

Only two species of monogeneans (*Urocleidus adspectus* and an unidentified species in the family Octocotyliidae) have been reported from two species of fishes, *Perca flavescens* and *Coregonus hoyi*.

Cestodes

Eight species of adult cestodes representing six genera in five families have been found. *Glaridacris catostomi* was found only in catostomids, *Eubothrium crassum* was found in *Salvelinus namaycush* and *Lota lota*, *Bothriocephalus cuspidatus* was reported only in *Perca flavescens*, *Corallobothrium* sp. was found in *Ameiurus nebulosus*, *Proteocephalus exiguus* was found in coregonids and *Petromyzon marinus*, and *Proteocephalus pearsei* was reported only in *P. flavescens*. *Eubothrium salvelini* infected six fish species in the Salmonidae. *Cyathocephalus truncatus* occurred in six species in four fish families. Two species (*E. salvelini*, *C. truncatus*) found as adults also occurred as immature individuals in the intestine of fish. Although *Proteocephalus ambloplitis*, *Triaenophorus nodulosus*, and *Triaenophorus crassus* occurred as larval and/or immature stages, adults of these species have not yet been reported from fish. At least eight species of immature cestodes in five cestode families have been reported. The family Diphyllbothriidae is represented by three genera (*Diphyllbothrium*, *Ligula*, *Schistocephalus*). *Diphyllbothrium* sp. infected five fish species.

Nematodes

Ten species of adult nematodes in seven families were reported from fishes. Many nematode species are host-specific. *Raphidascaris acus* was only found in esocids, and *Camallanus oxycephalus*, *Philometra cylindracea*, and *Rhabdochona ovifilamenta* occurred only in *Perca flavescens*. *Dichelyne cotylophora* was also found in *Perca flavescens*, but was also reported from *Catostomus commersonii* and *Ameiurus melas*. *Cystidicola farionis* infected five fish species. *Cystidicola* spp. was found only in the swim bladder of salmonids. At least nine nematode species in seven nematode families have been reported as larval or immature stages. Non-intestinal larvae of *Contraecaecum* sp., *R. acus*, *D. cotylophora*, *Cystidicola stigmatura*, *Eustrongylides tubifex*, *Eustrongylides* sp., and *P. cylindracea* were found. Immature *Capillaria* sp., *Spinitectus* sp., and *Haplonema hamulatum* have been documented in the intestines of Lake Michigan fish.

Acanthocephalans

Eight species of adult acanthocephalans representing four families were reported. *Echinorhynchus salmonis* and *Acanthocephalus dirus* infected 17 and 13 fish species, respectively. *Echinorhynchus salmonis* was the most-prevalent and numerous intestinal helminth parasite of *Oncorhynchus*. *Neoechinorhynchus crassus* and *Octospinifer macilentus* are host-specific to catostomids. All species represented as larvae or immature individuals (*A. dirus*, *E. salmonis*, *Pomphorhynchus bulbocolli*, *Leptorhynchoides thecatus*) found in non-intestinal sites are also included in the adult category. Some female *E. salmonis* found in non-intestinal sites of *Osmerus mordax* were gravid.

Leeches

Five species of leeches (*Desserobdella picta*, *Placobdella parasitica*, *Piscicola milneri*, *Piscicola punctata*, *Piscicolaria* sp.) representing two families have been reported. *Desserobdella picta* and *P. milneri* parasitized two and three fish species, respectively.

Crustaceans

At least seven species of copepods in two families were found on Lake Michigan fish. Four species of *Ergasilus* occurred on the gills of a variety of species. *Ergasilus caeruleus* and *Ergasilus luciopercarum* were found on four and five fish species, respectively. *Achtheres pimelodi* occurred on three fish species, and two species of *Salmincola* were found on salmonids.

Fish Species—Parasite Analyses

A total of 44 fish species and three locally extirpated species (*Coregonus johanna*, *C. nigripinnis*, *C. prognathus*) from 19 families in Lake Michigan have had parasites reported from them (Table 5). *Perca flavescens* harbored the most parasite species (31), followed by *Catostomus commersonii* with 15, and *Oncorhynchus tshawytscha* with 14. Fish species found to have eight or more parasite species were *Petromyzon marinus*, *Alosa pseudoharengus*, *Notropis hudsonius*, *Coregonus hoyi*, *Oncorhynchus mykiss*, *Salvelinus namaycush*, and *Ambloplites rupestris*. Of the 44 species examined for parasites, 22 species (50%) had been examined (studied) only once (*Petromyzon marinus*, *Acipenser fulvescens*, *Cyprinus carpio*, *Notropis delicatus* (probably *N. atherinoides*), *Pimephales promelas*, *Catostomus catostomus*, *Apollonia melanostoma*, *Ameiurus nebulosus*, *Noturus gyrinus*, *Esox americanus*, *Umbra limi*, *Coregonus johanna*, *Percopsis omiscomaycus*, *Fundulus* sp., *Culaea inconstans*, *Pungitius pungitius*, *Myoxocephalus thompsonii*, *Ambloplitis rupestris*, *Lepomis gibbosus*, *Micropterus dolomieu*, *Etheostoma exile*, *Aplodinotus grunniens*), 7 species only examined (studied) twice (*Ameiurus melas*, *Esox lucius*, *Coregonus nigripinnis*, *C. prognathus*, *Cottus bairdii*, *Etheostoma nigrum*, *Percina caprodes*), 4 species had three examinations (*Alosa pseudoharengus*, *Notropis hudsonius*, *Catostomus commersonii*, *Osmerus mordax*), and 9 species had at least four examinations (*Coregonus artedi*, *C. clupeaformis*, *C. hoyi*, *Oncorhynchus kisutch*, *O. mykiss*, *O. tshawytscha*, *Salmo trutta*, *Lota lota*, *Cottus cognatus*). *Salvelinus namaycush* and *Perca flavescens* had 8 and 13 studies performed on their parasites, respectively.

Seventy-three fish species plus one hybrid, *Salvelinus namaycush* x *Salvelinus fontinalis*, in Lake Michigan that are not known to have been examined for parasites are: *Ichthyomyzon castaneus*, *I. fossor*, *I. unicuspis*, *Lampetra appendix*, *Lepisosteus oculatus*, *L. osseus*, *L. platostomus*, *Amia calva*, *Hiodon tergisus*, *Alosa chrysochloris*, *Dorosoma cepedianum*, *Campostoma anomalum*, *Carassius auratus*, *Couesius plumbeus*, *Cyprinella lutrensis*, *C. spiloptera*, *Hybognathus hankinsoni*, *Luxilus cornutus*, *Lythrurus umbratilis*, *Margariscus margarita*, *Nocomis biguttatus*, *N. micropogon*, *Notemigonus crysoleucas*, *Notropis anogenus*, *N. heterodon*, *N. heterolepis*, *N. rubellus*, *N. volucellus*, *N. stramineus*, *Opsopoeodus emiliae*, *Phoxinus eos*, *P. neogaeus*, *Pimephales promelas*, *Rhinichthys cataractae*, *R. obtusus*, *Scardinius erythrophthalmus*, *Semotilus atromaculatus*, *Carpionodes cyprinus*, *Erimyzon oblongus*, *Erimyzon sucetta*, *Hypentelium nigricans*, *Ictiobus cyprinellus*, *Minytrema melanops*, *Moxostoma anisurum*, *M. erythrurum*, *M. macrolepidotum*, *M. valenciennesi*, *Misgurnus anguillicaudatus*, *Ameiurus natalis*, *Ictalurus punctatus*, *Noturus flavus*, *Pylodictis olivaris*, *Esox masquinongy*, *Oncorhynchus gorboscha*, *Prosopium cylindraceum*, *Salvelinus fontinalis*, *Aphredoderus sayannus*, *Labidesthes sicculus*, *Gasterosteus aculeatus*, *Morone americana*, *M. chrysops*, *Lepomis macrochirus*, *L. megalotis*, *Micropterus salmoides*, *Pomoxis annularis*, *P. nigromaculatus*, *Etheostoma caeruleum*, *E. flabellare*, *E. microperca*, *Percina maculata*, *P. shumardi*, *Sander canadensis*, and *S. vitreus*.

Fish Families—Parasite Species-Richness, Parasite Analyses

The values for parasite species-richness and number of fish species examined (in parentheses), regardless of parasite life-stage, for each of the five major fish families were Centrarchidae (13, 3), Catostomidae (15, 2), Cyprinidae (12, 4), Percidae (33, 4), and Salmonidae (27, 11). The correlation coefficient between parasite species-richness and number of fish species examined in each of the above five families was nonsignificant ($r_s = 0.307$).

Parasite species or a specific genus found only in centrarchids were adult digenetic trematodes (*Caecinicola parvulus*, *Cryptogonimus chili*), leeches (*Piscicolaria* sp.), and copepods (*Achtheres ambloplitis*, *Ergasilus centrarchidarum*). Parasites found only in cyprinids were protozoans (*Myxobolus bartai*, *Myxobolus xiaoi*, *M. burti*, *Thelohanellus notatus*, *Zschokkella* sp., *Chloromyxum* sp., *Sphaerospora* sp.) and adult digenetic trematodes (*Centrovarium lobotes*). Parasites found only in catostomids were adult digenetic trematodes (*Lissorchis attenuatus*), adult cestodes (*Glaridacris catostomi*), adult nematodes (*Capillaria catostomi*), and adult acanthocephalans (*Neoechinorhynchus crassus*, *N. cylindratus*, *Octospinifer macilentus*). Parasites found only in percids were protozoans (*Henneguya doori*, *Myxobolus neurophilus*, *M. scleroperca*), adult digenetic trematodes (*Bunodera sacculata*, *Crepidostomum cooperi*, *Phyllodistomum superbum*), larval digenetic trematodes (*Apophallus* sp., *Clinostomum complanatum*), monogeneans (*Urocleidus adspectus*), adult nematodes (*Camallanus oxycephalus*, *Philometra cylindracea*, *Rhabdochona ovifilamenta*), and larval/immature nematodes (*Contracaecum* sp., *Dichelyne cotylophora*, *Eustrongylides tubifex*, *Raphidascaris acus*). Parasites found only in salmonids were protozoans (*Capriniana* sp.), adult cestodes (*Eubothrium crassum*, *E. salvelini*, *Proteocephalus exiguus*), larval cestodes (*Diphyllobothrium oblongatum*, *Diphyllobothrium* sp.), adult nematodes (*Capillaria salvelini*, *Cystidicola farionis*, *Cystidicola* sp.), immature nematodes (*Haplonema hamulatum*), leeches (*Piscicola punctata*, *Placobdella parasitica*), and copepods (*Achtheres pimelodi*, *Ergasilus nerkae*, *Salmincola extensus*, *S. extumescens*).

The number and percentage of parasite species and distinct genera in each of the major parasite groups reported for each of the five parasitized fish families from Lake Michigan are in Table 6. The parasite taxa most common in each fish family were protozoans, specifically the myxozoans, in Cyprinidae, acanthocephalans in Catostomidae, digenetic trematodes and copepods in Centrarchidae, digenetic trematodes and nematodes in Percidae, and copepods, cestodes, and nematodes in Salmonidae.

All helminth species reported from the cyprinids (5 species) and catostomids (13 species) are autogenic species. The numbers and percentages of autogenic and allogenic helminth species for the remaining families were Centrarchidae (10 species, 91%; 1 species, 9%), Percidae (21 species, 81%; 5 species, 19%), and Salmonidae (12 species, 92%; 1 species, 8%).

Jaccard Coefficients of Parasite Communities—Fish Families

The fish families (and their species) involved in the calculations and comparisons of Jaccard coefficients of parasite-community similarity were Centrarchidae (*Ambloplites rupestris*, *Micropterus dolomieu*, *Lepomis gibbosus*), Catostomidae (*Catostomus catostomus*, *C. commersonii*), Cyprinidae (*Cyprinus carpio*, *Notropis delicatus* (probably *Notropis atherinoides*), *Notropis hudsonius*, *Pimephale notatus*), Percidae (*Etheostoma exile*, *E. nigrum*, *Perca flavescens*, *Percina caprodes*), Salmonidae (*Coregonus artedi*, *C. clupeaformis*, *C. hoyi*, *C. johanna*, *C. nigripinnis*, *C. prognathus*, *Oncorhynchus kisutch*, *O. mykiss*, *O. tshawytscha*, *Salmo trutta*, *Salvelinus namaycush*). Jaccard coefficients for these five fish families (Table 7) were all low (range 0.0256 to 0.2000) with the highest one between Percidae and Catostomidae (0.2000), followed by Percidae and Centrarchidae (0.1951). Also, fish in the Ictaluridae did not share any parasites with fish in the Centrarchidae, Cyprinidae, and Salmonidae in Lake Michigan, further supporting that the parasite faunas of fish in these families are very different.

The number of parasitic species of each major group found in two or more fish families (number of fish families in parentheses) were few and included adult digenetic trematodes—*Crepidostomum* (*Stephanophiala*?) *farionis* (2); adult cestodes—*Eubothrium crassum* (2), *Cyathocephalus truncatus* (3), *Proteocephalus exiguus* (2); larval cestodes—*Eubothrium salvelini* (3), *Proteocephalus ambloplitis* (2), *Triaenophorus nodulosus* (3); adult nematodes—*Dichelyne cotylophora* (3), *Spinitectus gracilis* (3); larval/immature nematodes—*Philometra cylindracea* (3); adult acanthocephalans—*Acanthocephalus dirus* (8), *Echinorhynchus leidy* (3), *Echinorhynchus salmonis* (10), *Leptorhynchoides thecatus* (2), *Pomphorhynchus bulbocollis* (2) leeches—*Piscicola milneri* (2); and copepods—*Ergasilus caeruleus* (4), *Ergasilus lucioperca* (3).

Discussion

Lake Michigan is located solely within the United States. It has a length and width of approximately 494 km and 190 km, respectively, with a surface area of approximately 57,800 km² and a mean depth of 85 m (maximum depth of 281 m) (Herdendorf, 1982). Water flows from Lake Michigan easterly into Lake Huron through the Straits of Mackinac.

Cudmore-Vokey and Crossman (2000) listed a total of 116 established fish species (species reproducing in the Great Lakes or in the lowest reaches of the tributaries) in Lake Michigan. A total of 44 (38%) fish species of the 116 established fish species and three locally extirpated species (*Coregonus johanna*, *C. nigripinnis*, and *C. prognathus*) in 19 families have had parasites reported from them. The number of fish species examined and not examined for parasites do not add up to 116 because fish species locally extirpated and some fish only identified to genus were included in this synopsis. Lake Michigan had the fewest number of studies on parasites of fish (41) among all the Great Lakes, and only 14 studies (34%) have been done since 1990. Most parasitological studies focused on the parasites of common species, such as *Perca flavescens*, *Osmerus mordax*, *Coregonus* spp., *Oncorhynchus* spp., *Salvelinus*

namaycush, and cyprinids. Of the 41 parasitological studies, the investigations of Amin, Guilford, and Pearse and their co-workers in western Lake Michigan and those of Muzzall and co-workers in eastern Lake Michigan are most obvious. There were no studies performed on a lakewide basis, and the only studies done were usually narrowly focused by the interests of individual investigators. It is believed that the circulatory system (blood) of fish from Lake Michigan has been infrequently examined for parasites. It is not known if the presence of only two monogenean species represents the lack of these species on fish in this lake or the lack of examination of fish for monogeneans.

Pathogenic Parasites

Protozoans

Potentially pathogenic protozoan parasites that could cause fish mortalities are *Trichodina* spp., *Henneguya* spp., *Myxidium* spp., *Myxobolus* spp., and *Thelohanellus notatus*. These protozoans infect a variety of non-intestinal sites damaging the skin, gills, muscle and internal organs, and cause weight loss in fish (Dogiel et al. 1958; Reichenbach-Klinke and Elkan 1965; Reichenbach-Klinke 1973). When abundant, *Trichodina* spp. may cause the fins to become frayed, hyperplasia of the epidermis, and blood-vessel congestion in the skin.

Digenetic Trematodes

Adult and larval digenetic trematodes occur in a variety of sites in fish. The effects of adult trematodes on fish health and mortality is difficult to assess based on the small number of well-performed studies. However, *Crepidostomum farionis* has been reported to have caused mortality to fish in a hatchery (Hoffman 1999). The metacercariae or larval stages of *Clinostomum complanatum*, *Diplostomum spathaceum*, *Diplostomum* spp., and *Ichthyocotylurus* spp. occurring in non-intestinal sites may cause mortality in fish. For information on the pathological effects and mortalities of fishes, especially young ones caused by larval trematodes, see Meyer (1958); Wales (1958b); Kozicka (1958); Bychovskaya-Pavlovskaya and Petrushevski (1963); Dukes (1975); and Williams and Jones (1994).

Cestodes

Adult cestodes such as *Eubothrium crassum*, *E. salvelini*, *Bothriocephalus cuspidatus*, *Cyathocephalus truncatus*, and *Proteocephalus* spp. may cause pathogenic effects to fish. Smith and Margolis (1970) reported that *E. salvelini* can cause damage to young salmonids. It has also been suggested that *E. salvelini* reduced the growth, survival, and swimming performance of *Oncorhynchus nerka* (see Boyce 1979). *Cyathocephalus truncatus* can cause severe inflammation and rupture of the gut wall resulting in mortality (Vik 1954, 1958).

Of the larval cestodes, *Eubothrium* spp., *Cyathocephalus truncatus*, *Diphyllobothrium oblongatum*, *Diphyllobothrium* spp., *Ligula* sp., *Schistocephalus thomasi*, *Proteocephalus ambloplitis*, *Triaenophorus crassus*, and *T. nodulosus* can damage fish. *Diphyllobothrium* spp. have been reported to cause epizootics among trout (Salmonidae) because of the movements of

their plerocercoids (Duguid and Sheppard 1944; Hoffman and Dunbar 1961), and to have caused a major decline of *Salmo trutta* and *Salvelinus alpinus* in Norway (Vik 1965). *Ligula* sp. and *Schistocephalus* sp. have been known to alter the behavior of their fish hosts, making them more susceptible to predation by piscivorous birds (Ness and Foster 1999; Loot et al. 2002). The reports of *Triaenophorus* spp. infecting fish are infrequent, and the last one was by Guilford (1954).

Nematodes

The effect of adult *Cystidicola farionis* in the swim bladder of coregonines and salmonines is difficult to assess based on the small number of studies performed. However, Black (1984) reported that lesions of the swimbladder in *Salvelinus namaycush* may have developed due to chronic mechanical irritation caused by mature *Cystidicola stigmatura* congregating, possibly to mate. The occurrence of large numbers of larval nematodes, such as *Contracaecum* sp., *Raphidascaris acus*, and *Eustrongylides tubifex*, in various non-intestinal sites, may lead to inflammation, tissue damage to the liver and other viscera, and fibrosis (Williams 1967). However, the prevalence and intensity of larval nematodes reported in Lake Michigan fish have been low.

Acanthocephalans

Two acanthocephalan species (*Echinorhynchus salmonis* and *Acanthocephalus dirus*) infect several fish species with high prevalences and intensities. Acanthocephalans use their proboscis with hooks on it to attach to the inner wall of the intestine. Their attachment with their proboscis leads to inflammation of the intestinal tract reducing the amount of surface area for nutrient absorption and possibly reducing the state of nutrition of the fish (Bullock 1963; Pippy and Sandeman 1967; Schmidt et al. 1974). Amin and Burrows (1977) and Muzzall and Peebles (1988) have reported on the occurrence of gravid female *E. salmonis* in non-intestinal sites of *Osmerus mordax*.

Echinorhynchus salmonis is the most-numerous parasite of *Oncorhynchus* spp. in Lake Michigan probably because of the various pathways utilized in its life cycle. *Echinorhynchus salmonis* primarily uses the crustacean *Diporeia* (= *Pontoporeia*) *affinis* (see Amin 1978) as an intermediate host wherein the infective stage called the cystacanth develops. In the first pathway, the intermediate host, *Diporeia*, is eaten by a fish and the cystacanth develops into an adult in the intestine of that fish. In the second pathway, called the postcyclical pathway, the infected fish with *E. salmonis* attached to its intestine is then eaten by another fish, wherein the worm attaches to the intestine, matures, and reproduces in this second fish. Hnath (1969) demonstrated in the laboratory that adult *E. salmonis* can re-establish in a new host fish that has ingested another fish infected with adult worms. The third-transmission pathway involves a paratenic host, where a fish that initially eats the intermediate host is not a suitable host, and as a result the cystacanth of *E. salmonis* penetrates the gut wall and encysts/occurs somewhere else in the fish without undergoing further development. This fish host becomes a paratenic host. If the paratenic host is eaten by a suitable fish host, the acanthocephalan excysts and attaches in the intestine of the

suitable host and matures.

We are not aware of any mortality in adult fishes of Lake Michigan as a result of parasitic infection. Holey et al. (1998) evaluated the effect of *E. salmonis* on the epizootics of *Oncorhynchus tshawytscha* in Lake Michigan, and concluded “it is uncertain if infections of *Echinorhynchus salmonis* alone resulted in enough stress to trigger the epizootics”.

Leeches

The first study on the parasites of Lake Michigan fish was Milner (1874) who commented on the occurrence of the leech *Piscicola milneri* on a “large number of fishes.” The last study involving leeches was in 1977 (Amin 1977). It is difficult to assess the effect of leeches because there are only a few known leech species in the lake and little is known about their prevalences and intensities. Leeches appear to be infrequent parasites of Lake Michigan fish and of minor importance.

Crustaceans

The reported prevalences and intensities of most parasitic copepods on fish from Lake Michigan are low, and copepods seem to be of minor importance as a parasite on fish in Lake Michigan.

Parasite Host Specificity—Jaccard Coefficients

Eighteen parasite species reported from fish in two or more families make up only 20% of all parasitic species reported from fish in Lake Michigan. These parasite species have indirect life cycles with fish becoming infected by eating intermediate hosts or paratenic hosts, except for the leeches and copepods that have direct life cycles. The larval/immature/adult cestode species made up 33% of the parasite species shared by two or more fish families followed closely by the acanthocephalan species (28%). There were no protozoan species, monogenean species, mollusk species, and only one adult digenetic trematode parasite species shared by two or more fish families.

There are 73 parasite species that are host specific to 1 fish species or a fish family in Lake Michigan. This host specificity can be classified and separated based on phylogenetic specificity, ecological specificity, or some combination of the two. Phylogenetic specificity suggests that parasite species occurring in one host species or a few closely related host species evolved from ancestors that infected a single host species or host group. In other words, the evolutionary history of the host-parasite relationship is important. In ecological specificity, hosts and potential parasites do not live in the same habitat, do not eat the same food items, or there is little overlap in their habitat and diet. Bush et al. (2001) stated, “It is probably true that phylogenetic specificity is the template upon which ecological specificity might be superimposed.”

The Jaccard coefficients determined for five major fish families in Lake Michigan were low and there were no apparent relationships between the coefficients and the temperature preferences of fish species representing the five fish families. These low coefficients and lack of relationship with temperature preferences indicate that many parasite species have phylogenetic host specificity, fish species in different families do not occupy the same habitats or their habitats do not overlap much, and the diets of the fish species do not typically overlap either by food items or spatially in foraging areas. The low Jaccard coefficients for parasite-community similarity indicate that the centrarchids, catostomids, cyprinids, percids, and salmonids in Lake Michigan share few parasite species, and that each fish family has its own characteristic parasite fauna.

Fish Families—Parasite Communities

The most-common parasite species in centrarchids and percids were the digenetic trematode species. However, most of these digenetic trematode species were specific to one fish family. The percentage composition of digenetic trematodes in relation to other parasite groups in centrarchids and percids indicates these fish spend time in shallow water since almost all the known digenetic trematodes use molluscs as first intermediate hosts. Most of the parasites reported from cyprinids were protozoans. The studies of Cone et al. (2004) and Cone and Marcogliese (2010), reporting only on the myxozoan protozoans of *Notropis hudsonius*, separated out the cyprinids from the other fish families with this protozoan group. Most of the parasites from catostomids were acanthocephalans, and most from the salmonids were copepods, cestodes, and nematodes. The larval stages (procercooids) of most, if not all, of these cestode species in salmonids use free-living copepods as first intermediate hosts. The parasitic copepods have direct life cycles.

Table 2. Overall number, percentage (in parentheses), and range (in parentheses) of parasite species in each major parasite group reported in each Great Lake during 1871-2010. Lake abbreviations are LM (Lake Michigan), LS (Lake Superior), LH (Lake Huron), LE (Lake Erie), and LO (Lake Ontario). Parasite group abbreviations are Ma (Mastigophora), Ci (Ciliophora), My (Myxozoa), Mi (Microspora), Dt (Digenea (digenetic trematodes)), A (Aspidobothrea), Mo (Monogenea), Ce (Cestoda), Ne (Nematoda), Ac (Acanthocephala), Hi (Hirudinea), Co (Copepoda), and Mol (Mollusca).

| Lake | Parasite group | | | | | | | | | | | | | Total |
|-------|----------------|-----------|-------------|-----------|---------------|------------|-------------|---------------|--------------|------------|-----------|------------|------------|-------|
| | Ma | Ci | My | Mi | Dt | A | Mo | Ce | Ne | Ac | Hi | Co | Mol | |
| LM | 1 (1) | 2 (2) | 20 (22) | 1(1) | 16 (18) | 0 | 2 (2) | 15 (17) | 13 (14) | 8 (9) | 5 (5) | 7 (8) | 0 | 90 |
| LS | 4 (3) | 5 (3) | 8 (5) | 0 | 31 (21) | 0 | 26 (18) | 24 (16) | 21 (14) | 13 (9) | 4 (3) | 11 (7) | 1 (<1) | 148 |
| LH | 2 (<1) | 5 (2) | 16 (7) | 3 (1) | 54 (22) | 0 | 69 (29) | 28 (12) | 27 (11) | 16 (7) | 4(1) | 17 (7) | 1 (<1) | 242 |
| LE | 1 (<1) | 5 (2) | 22 (9) | 2 (<1) | 59 (25) | 1 (<1) | 55 (24) | 27 (12) | 25 (11) | 14 (6) | 6 (3) | 13 (6) | 1 (<1) | 231 |
| LO | 0 | 5 (2) | 15 (6) | 3 (1) | 49 (21) | 1 (<1) | 79 (35) | 27 (12) | 21 (9) | 13 (6) | 4 (2) | 8 (4) | 3 (1) | 228 |
| Range | 0-4 (<1-3) | 2-5 (2-3) | 8-22 (5-22) | 0-3 (0-1) | 16-59 (18-25) | 0-1 (0-<1) | 2-79 (2-35) | 15-28 (12-17) | 13-27 (9-14) | 8-16 (6-9) | 4-6 (1-5) | 7-17 (4-8) | 0-3 (<1-1) | |

Table 3. Parasites reported in fishes from Lake Michigan, 1874-2010. Host documentation, in order, consists of references, when observed (cdnp = collection data not provided), prevalence defined as the percentage (%) of fish infected (pnp = prevalence not provided), mean intensity defined as the mean number of parasites per infected fish (minp = mean intensity not provided), mean abundance defined as the mean number of parasites per examined fish and noted with an asterisk, location (lns = location not specified or incomplete), latitude and longitude (lnk = latitude and longitude not known).

Mastigophora (Flagellates)

Trypanosomatidae Doflein, 1911

Trypanosoma sp.

Site of Infection: Blood

Host:

Cottus bairdii: Yeo 1985; 1982-1983; 79%; minp; Milwaukee, Wisconsin; 43°2'20"/-87°54'23")

Cottus cognatus: Yeo 1985; 79%; minp; Milwaukee, Wisconsin

Ciliophora (Ciliates)

Trichodinidae Raabe, 1959

Trichodina sp.

Site of Infection: Gills

Host:

Petromyzon marinus: Guilford 1954; 1951-1952; 1%; minp; Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

Oncorhynchus tshawytscha (age-0 and age-1 fish): Muzzall 1993; May, August, September 1983, July, August 1989, May-October, 1990; pnp; minp; Scottville, Michigan; 43°57'17"/-86°16'48"

Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; <1%; minp; Ludington, Michigan; 43°57'19"/-86°27'9"

Myoxocephalus thompsonii: Muzzall et al. 1997; 1995; 4%; minp; Ludington, Michigan; 43°57'19"/-86°27'9"

Trichophryidae Fraipont, 1878

Capriniana sp.

Site of Infection: Gills

Host: *Oncorhynchus tshawytscha* (age-0 and age-1 fish): Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; pnp; minp; Scottville, Michigan; 43°57'17"/-86°16'48"

Table 3, continued

Myxozoa (Myxosporans)

Chloromyxidae Thelohan, 1892

Chloromyxum sp.

Site of Infection: Gall bladder

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 6%; minp; west of Michigan City; 41°43'N, 86°54'W; 20%; minp; north of Gary, Indiana; 41°36'N, 87°20' W

Myxidiidae Thelohan, 1892

Myxidium lieberkuehni Butschli, 1882

Synonym: None.

Site of Infection: Urinary bladder

Host: *Esox lucius*: Guilford 1965; April-July 1962, April-July 1963; 6%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Myxidium umbri Guilford, 1965

Synonym: None

Site of Infection: Renal tubules

Host: *Umbra limi*: Guilford 1965; April-July 1962, April-July 1963; 4%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Myxidium sp.

Site of Infection: Gall bladder, liver

Host: *Umbra limi*: Guilford 1965; April-July 1962, April-July 1963; 4%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Myxobolidae Thelohan, 1892

Henneguya doori Guilford, 1963

Synonym: None

Site of Infection: Gills

Host: *Perca flavescens*: Guilford 1963; March-October 1961, March-October 1962; 22%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Henneguya exilis Kudo, 1929

Synonym: None

Site of Infection: Gills

Host: *Ameiurus melas*: Guilford 1965; April-July 1962, April-July 1963; 43%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Table 3, continued.

Henneguya limatula Meglitsch, 1937

Synonym: None

Site of Infection: Bile

Host: *Ameiurus melas*: Guilford 1965; April-July 1962, April-July 1963; 7%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Henneguya umbri Guilford, 1965

Synonym: None

Site of Infection: Gills

Host: *Umbra limi*: Guilford 1965; April-July 1962, April-July 1963; 37%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Myxobolus bartai Salim and Desser, 2000

Synonym: None

Site of Infection: Intracellular in striated muscle

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 13%; minp; west of Michigan City; 41°43'N, 86°54'W

Myxobolus burti Cone and Marcogliese 2010

Synonym: *Myxobolus* sp. of Cone et al. 2004

Site of Infection: Intracellular in striated muscle

Host:

Notropis hudsonius: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 46%; minp; west of Michigan City; 41°43'N, 86°54'W; 46%; minp; West Beach; 41°36'N, 87°11'W; 33%; minp; north of Gary, Indiana; 41°36'N, 87°20'W

Notropis hudsonius: Cone and Marcogliese 2010, same infection data and information as in Cone et al. 2004.

Myxobolus cognati Cone et al. 1996

Synonym: None

Site of Infection: Operculum, perioral tissue, pelvic and pectoral fins, flank of body near lateral line

Host: *Cottus cognatus*: Cone et al. 1996, July 1994; 52%; 13 cysts; Boulder Reef, Lake Michigan; 45°35'24"/-85°58'37"

Myxobolus eucalia (Guilford, 1965) Lom and Noble, 1984

Synonym: *Myxosoma eucalia* (Guilford, 1965) Lom and Noble, 1984

Site of Infection: Cranium, pectoral fin

Host: *Culaea inconstans*: Guilford 1965; April-July 1962, April-July 1963; 4%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Table 3, continued.

Myxobolus neurophilus Guilford, 1963 (Lom and Noble, 1984)

Synonym: *Myxosoma neurophila* Guilford, 1963 (Lom and Noble, 1984)

Site of Infection: Midbrain, optic ventricles

Host:

Perca flavescens: Guilford 1963; March-October 1961, March-October 1962; 45%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Etheostoma nigrum: Guilford 1963; 100%; minp; Green Bay, Wisconsin

Myxobolus procerum (Kudo, 1934) Lom and Noble, 1984

Synonym: *Myxosoma procerum* (Kudo, 1934) Lom and Noble, 1984

Site of Infection: Muscle

Host: *Percopsis omiscomaycus*: Guilford 1965; April-July 1962, April-July 1963; 100%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Myxobolus scleroperca (Guilford, 1963) Lom and Noble, 1984

Synonym: *Myxosoma scleroperca* (Guilford, 1963) Lom and Noble, 1984

Site of Infection: Eyes, sclerotic cartilage

Host:

Perca flavescens: Guilford 1963; March-October 1961, March-October 1962; 13%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Percina caprodes: Guilford 1963; 5%; minp; Green Bay, Wisconsin

Perca flavescens: Muzzall 1995; 1990, 1991; 26%; minp; Michigan City, Indiana; 41°42'27"/-86°53'42"

Myxobolus xiaoi Salim and Desser, 2000

Synonym: None

Site of Infection: Cartilaginous tissue

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 6%; minp; west of Michigan City; 41°43' N, 86°54' W; 6%; minp; north of Gary, Indiana; 41°36' N, 87°20' W

Thelohanellus notatus (Mavor, 1916) Kudo, 1929

Synonym: None

Site of Infection: [Cysts in musculature]

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 6%, minp, west of Michigan City; 41°43' N, 86°54' W; 13%, minp, West Beach, 41°36' N, 87°11' W; 6%, minp, north of Gary, Indiana 41°36' N, 87°20' W

Table 3, continued.

Zschokkella sp.

Site of Infection: Bile ducts of liver

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 26%; minp; west of Michigan City; 41°43' N, 86°54' W; 6%; minp; West Beach; 41°36' N, 87°11' W; 13%; minp; north of Gary, Indiana; 41°36' N, 87°20' W

Sphaerosporidae Davis, 1917

Myxobilatus cotti Guilford, 1965

Synonym: None

Site of Infection: Urinary bladder

Host: *Cottus bairdii*: Guilford 1965; April-July 1962, April-July 1963; 100%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Myxobilatus noturi Guilford, 1965

Synonym: None

Site of Infection: Urinary bladder

Host: *Noturus gyrinus*: Guilford 1965; April-July 1962, April-July 1963; 33%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Myxobilatus sp.

Site of Infection: Urinary bladder

Host: *Culaea inconstans*: Guilford 1965; April-July 1962, April-July 1963; 4%; minp; Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Sphaerospora sp.

Site of Infection: Kidney tubules

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 6%; minp; west of Michigan City, Indiana; 41°43' N, 86°54' W; 20%; minp; West Beach; 41°36' N, 87°11' W; 6%; minp; north of Gary, Indiana; 41°36' N, 87°20' W

Microspora (Microsporans)

Glugeidae Thelohan, 1892

Pleistophora sp.

Site of Infection: Muscle

Host: *Myoxocephalus thompsonii*: Muzzall et al. 1997; 1995; 1%; minp; Ludington, Michigan; 43°57'19"/-86°27'9"

Table 3, continued.

Adult Digenea (Digenetic Trematodes)

Allocreadiidae (Looss, 1902) Stossich, 1903

Bunodera sacculata (Van Cleave and Mueller, 1932) Yamaguti, 1958

Synonym: ?*Bunoderina sacculata*

Site of Infection: Pyloric ceca, anterior intestine

Host: *Perca flavescens*: Muzzall 2002; July-September 1997, July-September 1998; 50-100%; 2-21; Silver Creek, Oceana County, Michigan; 44°19'32"/-83°28'52"

Crepidostomum cooperi Hopkins, 1931

Synonym: *Crepidostomum ambloplitis* Hopkins, 1931; *Crepidostomum solidum* Van Cleave and Mueller, 1932; *Crepidostomum fausti* Hunninen and Hunter, 1933; *Crepidostomum laureatum* of Stafford (1904) and Cooper (1915) (partim); *Bunodera nodulosa* of Stafford (1904) (partim); *Crepidostomum cornutum* of Cooper (1915) (partim)

Site of Infection: Intestine

Host: *Perca flavescens*: Carney and Dick 1999; cdnp; pnp; minp; Milwaukee, Wisconsin; 43°2'20"/-87°54'23"

Crepidostomum farionis (Muller, 1784) Nicoll, 1909

Synonym: *Crepidostomum laureatum* Cooper, 1915

Site of Infection: [Intestine]

Host: *Coregonus hoyi*: DeGiusti 1965; April-September 1964; 5%; minp; Saugatuck, Michigan; 42°39'18"/-86°12'7"

Stephanophiala farionis Mueller

Synonym: *Stephanophiala farionis* is probably a synonym of *Crepidostomum farionis* (Muller, 1780)

Site of Infection: Intestine

Host: *Perca flavescens*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Crepidostomum sp.

Site of Infection: [Intestine]

Host: *Coregonus hoyi*: DeGiusti 1965; April-September 1964; pnp; minp; Saugatuck, Michigan; 42°39'18"/-86°12'7"

Azygiidae Luhe, 1909

Azygia sp.

Site of Infection: Intestine

Host: *Perca flavescens*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Table 3, continued.

Cryptogonimidae (Ward, 1917) Ciurea, 1933

Acetodextra amiuri (Stafford, 1900) Pearse, 1924

Synonym: *Monostomum amiuri* (Stafford, 1900) Pearse, 1924

Site of Infection: Swim bladder

Host:

Ameiurus melas: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Ameiurus nebulosus: Pearse 1924b; pnp; minp; lns; Wisconsin

Caecinicola parvulus Marshall and Gilbert, 1905

Synonym: None

Site of Infection: Intestine

Host: *Ambloplites rupestris*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Centrovarium lobotes (MacCallum, 1895) Stafford, 1904

Synonym: *Distomum lobotes* MacCallum, 1895

Site of Infection: Intestine

Host: *Notropis hudsonius*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Remarks: Individuals of *Centrovarium lobotes* found by Pearse (1924b) could be larval stages.

Cryptogonimus chili Osborn, 1903

Synonym: None

Site of Infection: Intestine

Host:

Ambloplites rupestris: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Lepomis gibbosus: Pearse 1924b; pnp; minp; lns; Wisconsin

Remarks: Species commonly misspelled *chylis*.

Gorgoderidae Looss, 1901

Phyllodistomum staffordi Pearse, 1924a

Synonym: *Phyllodistomum folium* (Olfers, 1816) (partim) of Stafford (1902); *Phyllodistomum superbum* Stafford, 1904 (partim); ?*Phyllodistomum carolini* Holl, 1929; *Phyllodistomum lacustri* of Dechtiar (1972a) and Dechtiar and Nepszy (1988); *Phyllodistomum hunteri* (Arnold, 1934)

Site of Infection: Urinary bladder

Host:

Ameiurus nebulosus: Pearse 1924a; cdnp; pnp; minp; Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

Ameiurus melas: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Ameiurus nebulosus: Pearse 1924b; pnp; minp; lns; Wisconsin

Phyllodistomum superbum Stafford, 1904

Synonym: *Phyllodistomum fausti* Pearse, 1924a; *Phyllodistomum pearsei* Holl, 1929; *Phyllodistomum lohrenzi* (Loewen, 1935) Bhalerao, 1937

Table 3, continued.

Site of Infection: Urinary bladder

Host:

Perca flavescens: Pearse 1924a; cdnpnp; p; minp; Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

“bream”: Pearse 1924a; pnp; minp; Sturgeon Bay, Wisconsin

Perca flavescens: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Remarks: “Bream” refers to one or more species of centrarchids.

Homalometridae (Cable and Hunninen, 1942) Yamaguti, 1971

Synonym: Anallocreadiidae Hunter and Bangham, 1932

Homalometron armatum (MacCallum, 1895) Manter, 1947

Synonym: *Distomum isoporum* var. *armatum* MacCallum, 1895; *Allocreadium armatum* (MacCallum, 1895) Simer, 1929; *Bunodera armatum* (MacCallum, 1895); *Anallocreadium pearsei* Hunter and Bangham, 1932

Site of Infection: Intestine

Host:

Lepomis gibbosus: Pearse 1924a; cdnp; pnp; minp; Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40")

Aplodinotus grunniens: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Lissorchiidae (Poche, 1926) Yamaguti, 1971

Lissorchis attenuatus (Mueller and Van Cleave, 1932) Krygier and Macy, 1969

Synonym: *Triganodistomum attenuatum* Mueller and Van Cleave, 1932

Site of Infection: Intestine

Host: *Catostomus commersonii*: Amin 1977; 1973-1974; 4%; 3; Wisconsin-Illinois state line; llnk

Larval/Immature Digenea (Digenetic Trematodes)

Clinostomidae Luhe, 1901

Clinostomum complanatum (Rudolphi, 1814) Braun, 1899

Synonym: *Clinostomum marginatum* (Rudolphi, 1819) Braun, 1899; ?*Clinostomum gracile* of Stafford (1904); ?*Distomum gracile* of Wright (1879)

Site of Infection: Skin

Host: *Perca flavescens*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Remarks: Dzikowski et al. (2004) reported that *Clinostomum complanatum* and *Clinostomum marginatum* were distinct species based on differences in ribosomal DNA.

Table 3, continued.

Diplostomidae Poirier, 1886

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Synonym: *Diplostomulum spathaceum* (Rudolphi, 1819); *Diplostomum volvens* Nordmann, 1832; *Diplostomum volvens* Nordmann, 1833 of Cooper (1915), probably *Diplostomum emarginatae* Olivier, 1942; *Diplostomum flexicaudum* (Cort and Brooks, 1928); *Diplostomum indistinctum*; *Diplostomum gigas*

Site of Infection: Lens

Host: *Osmerus mordax*: Muzzall and Peebles 1988; 1984, 1985, 1986; 93%; 15; Michigan City, Indiana; 41°42'27"/-86°53'42"

Diplostomum sp.

Site of Infection: Eye, lens

Host:

Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; 21%; 2; Michigan City, Indiana; 41°42'27"/-86°53'42"; <1%; 1; Ludington, Michigan; 43°57'19"/-86°27'9"

Perca flavescens: Carney and Dick 2000; May-July 1992, May-July 1993; 3%; 6; southern Green Bay, Wisconsin; 43°55'31"/-88°46'45"; 5%; 1; offshore from Milwaukee, Wisconsin; 43°2'20"/-87°54'23"

Apollonia melanostoma: Camp et al. 1999; June-October 1995; 6%; 5; <1.0*; Calumet Harbor, Indiana; 41°44'2"/-87°31'26"

Diplostomum sp.

Site of Infection: Skin

Host: *Perca flavescens*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Diplostomum sp.

Site of Infection: Liver, peritoneum, heart, muscle

Host:

Ambloplites rupestris: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Lepomis gibbosus: Pearse 1924b; pnp; minp; lns; Wisconsin

Percina caprodes: Pearse 1924b; pnp; minp; lns, Wisconsin

Diplostomum sp. or *Tylodelphys* sp.

Site of Infection: Eye

Host: *Acipenser fulvescens*: La Rue et al. 1926; 1918-1919, 1925; 100%; minp; lns; llnk

Remarks: Specific genus of trematode not specified.

Heterophyidae Odhner, 1914

Apophallus sp.

Site of Infection: Fins, flesh

Host: *Perca flavescens*: Carney and Dick 2000; May-July 1992, May-July 1993; 79%; 28; offshore from Milwaukee, Wisconsin; 43°2'20"/-87°54'23"

Table 3, continued.

Strigeidae Railliet, 1919

Ichthyocotylurus sp.

Site of Infection: Mesentery

Host: *Alosa pseudoharengus*: Muzzall 1994; May 1990-July 1992; 1%; 1; Ludington, Michigan; 43°57'19"/-86°27'9"

Monogenea (Monogeneans)

Ancyrocephalidae Bykhovski and Nagibina, 1978

Urocleidus adspectus (Mueller, 1936) Beverley-Burton, 1984

Synonym: None

Site of Infection: Gills

Host: *Perca flavescens*: Carney and Dick 2000; May-July 1992, May-July 1993; 61%; 4; southern Green Bay, Wisconsin; 43°55'31"/-88°46'45"; 92%; 6; offshore from Milwaukee, Wisconsin; 43°2'20"/-87°54'23"

Octocotylidae Van Beneden and Hesse, 1863

Synonym: ?

Site of Infection: [External surface]

Host: *Coregonus hoyi*: DeGiusti 1965; April-September 1964; 5%; minp; Saugatuck, Michigan; 42°39'18"/-86°12'7")

Remarks: This family designation may no longer be used.

Adult Cestoda (Cestodes)

Caryophyllaeidae Leuckhart, 1878

Glaridacris catostomi (Cooper, 1920) Mackiewicz, 1965

Synonym: *Caryophyllaeus terebrans* of Bangham and Adams, 1954 (partim); *Glaridacris laruei* of Bangham and Venard, 1946

Site of Infection: Intestine

Host:

Catostomus catostomus: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Catostomus commersonii: Amin 1977; 1973-1974; 64%; minp; Wisconsin-Illinois state line; llnk

Amphicotylidae Ariola, 1899

Eubothrium crassum (Bloch, 1779) Nybelin, 1922

Synonym: *Abothrium crassum* (Bloch, 1779); *Eubothrium oncorhynchi* Wardle, 1932

Site of Infection: Intestine

Host:

Salvelinus namaycush: Cooper 1918; cdnp; pnp; minp; Charlevoix; 45°19'5"/-85°15'30"; and Pentwater, Michigan; 43°46'12"/-86°25'15"

Salvelinus namaycush: Pearse 1924b; pnp; minp; lns; Wisconsin; llnk

Lota lota: Cooper 1919; pnp; minp; Charlevoix, Michigan

Lota lota: Pearse 1924b; pnp; minp; lns; Wisconsin

Table 3, continued.

Eubothrium salvelini (Schränk, 1790) Nybelin, 1922

Synonym: None

Site of Infection: Pyloric ceca, intestine

Host:

Coregonus hoyi: Amin 1977; 1973-1974; 1%; 1; Wisconsin-Illinois state line; llnk

Oncorhynchus kisutch (Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; 33%; 2; Scottville, Michigan; 43°57'17"/-86°16'48"

Oncorhynchus mykiss: Amin 1977; 13%; 3; Wisconsin-Illinois state line

Oncorhynchus mykiss: Muzzall 1993; 48%; 14; Scottville, Michigan

Oncorhynchus tshawytscha: Muzzall 1993; age-0 fish; 10%; 3; near mouth of Pere Marquette River

Oncorhynchus tshawytscha: Muzzall 1993; 11%; 3; Scottville, Michigan

Salvelinus namaycush: Amin 1977; 71%; minp; Wisconsin-Illinois state line

Salvelinus namaycush: Muzzall 1989; July-September 1986; 91%; 74; Ludington; 43°57'19"/-86°27'9"; Manistee, Michigan; 44°14'40"/-86°19'27"

Salmo trutta: Amin 1977; 6%; 1; Wisconsin-Illinois state line

Bothriocephalidae Blanchard, 1849

Bothriocephalus cuspidatus Cooper, 1917

Synonym: *Bothriocephalus cuspidatus luciopercae* Wardle, 1932; *Bothriocephalus cuspidatus hiodontos* Wardle, 1932; *Bothriocephalus cuspidatus cuspidatus* Cooper, 1917

Site of Infection: Intestine

Host: *Perca flavescens*: Carney and Dick 1999; cdnp; pnp; minp; Milwaukee, Wisconsin; 43°2'20"/-86°16'48"

Cyathocephalidae Nybelin, 1922

Cyathocephalus truncatus (Pallas, 1781) Kessler, 1868

Synonym: *Cyathocephalus americanus* Cooper, 1917

Site of Infection: Pyloric ceca, intestine

Host:

Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; 12%; 2; Ludington, Michigan; 43°57'19"/-86°27'9"

Coregonus clupeaformis: Amin 1977; 1973-1974; 13%; minp; Wisconsin-Illinois state line; llnk

Coregonus clupeaformis: Cooper 1919; cdnp; pnp; minp; lns; llnk); *Coregonus hoyi*: DeGiusti 1965; April-September 1964; 51% (combined prevalence for *Cyathocephalus truncatus*, *Proteocephalus* sp., *Diphyllobothrium* sp.); minp; Saugatuck, Michigan; 42°39'18"/-86°12'7"

Coregonus hoyi: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Coregonus hoyi: Olson 1973; January-September 1973; overall minp; intensity analyzed by host age, sex, and season; Racine, Wisconsin; 42°44'58"/-88°4'30"

Cottus cognatus: Amin 1977; 11%; minp; Wisconsin-Illinois state line

Oncorhynchus tshawytscha (age-0 and age-1 fish): Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; pnp; minp; Scottville, Michigan; 43°57'17"/-86°16'48"

Table 3, continued.

Oncorhynchus tshawytscha: Muzzall 1993; 5%; 1; Scottville, Michigan
Perca flavescens: Carney and Dick 1999; cdnp; pnp; minp; Milwaukee, Wisconsin; 43°2'20"/-87°54'23"
Perca flavescens: Carney and Dick 2000; May-July 1992, May-July 1993; 8%; 1; Milwaukee, Wisconsin

Proteocephalidae La Rue, 1911

Corallobothrium sp.

Site of Infection: Intestine

Host: *Ameiurus nebulosus*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Proteocephalus exiguus La Rue, 1911

Synonym: *Ichthyotaenia laruei* (Faust, 1920)

Site of Infection: Intestine

Host:

Petromyzon marinus: Guilford 1954; 1951-1952; 46%; 7; Hibbards Creek, Door County; llnk; or Keweenaw River, Keweenaw County; 44°27'27"/-87°29'28"; or Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

Coregonus artedi: La Rue 1911; cdnp; pnp; minp; lns; llnk

Coregonus artedi: La Rue 1914; cdnp; pnp; minp; Charlevoix, Michigan; 45°19'5"/-85°15'30"

Coregonus clupeaformis: Amin 1977; 1973-1974; 13%; 4; Wisconsin-Illinois state line; llnk

Coregonus nigripinnis: La Rue 1911; pnp; minp; lns

Coregonus nigripinnis: La Rue 1914; 1894; pnp; minp; Charlevoix, Michigan

Coregonus prognathus: La Rue 1911; pnp; minp; lns

Coregonus prognathus: La Rue 1914; pnp; minp; Charlevoix, Michigan

Coregonus spp.: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Proteocephalus pearsei La Rue, 1919

Synonym: None

Site of Infection: Intestine

Host:

Perca flavescens: Carney and Dick 1999; cdnp; pnp; minp; southern Green Bay; 43°55'31"/-88°46'45"; Milwaukee; 43°2'20"/-87°54'23"; Wisconsin

Perca flavescens: Carney and Dick 2000; May-July 1992, May-July 1993; 3%; 1; southern Green Bay, Wisconsin; 5%; 2; Milwaukee, Wisconsin

Perca flavescens: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Proteocephalus sp.

Site of Infection: Intestine

Host:

Catostomus commersonii: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Coregonus hoyi: DeGiusti 1965; April-September 1964; 51% (combined prevalence for *Proteocephalus* sp., *Cyathocephalus truncatus*, *Diphyllobothrium* sp.); minp; Saugatuck, Michigan; 42°39'18"/-86°12'7"

Table 3, continued.

Coregonus spp.: Pearse 1924b; pnp; minp; lns; Wisconsin
Lota lota: Pearse 1924b; pnp; minp; lns; Wisconsin
“cottid” (Pearse 1924b; pnp; minp; lns; Wisconsin
Ambloplites rupestris: Pearse 1924b; pnp; minp; lns; Wisconsin
Perca flavescens: Pearse 1924b; pnp; minp; lns; Wisconsin

Larval/Immature Cestoda (Cestodes)

Amphicotyliidae Ariola, 1899

Eubothrium salvelini (Schrank, 1790) Nybelin, 1922

Synonym: None

Site of Infection: Pyloric ceca, anterior intestine

Host:

Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; 8%; 2; Ludington, Michigan

Oncorhynchus kisutch: Muzzall 1989; July-September 1986; 14%; 4; Ludington, Michigan; 43°57'19"/-86°27'9"

Oncorhynchus mykiss: Muzzall 1989; 17%; 1; Ludington, Michigan

Oncorhynchus tshawytscha: Muzzall 1989; 5%; 2; Ludington, and Manistee, Michigan; 44°14'40"/-86°19'27"

Salmo trutta: Muzzall 1989; 50%; 1, Ludington, Michigan

Myoxocephalus thompsonii: Muzzall et al. 1997; 1995; 20%; 1; Ludington, Michigan; 43°57'19"/-86°27'9"

Eubothrium sp.

Site of Infection: Posterior intestine, rectum

Host:

Petromyzon marinus: Guilford 1954; 1951-1952; 3%; minp; Hibbards Creek, Door County; llnk; or Kewaunee River, Kewaunee County; 44°27'27"/-87°29'28"; or Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

Osmerus mordax: Muzzall and Peebles 1988; 1984, 1985, 1986; 1%; 1; Michigan City, Indiana; 41°42'27"/-86°53'42"

Cyathocephalidae Nybelin, 1922

Cyathocephalus truncatus (Pallas, 1781) Kessler, 1868

Synonym: *Cyathocephalus americanus* Cooper, 1917

Site of Infection: Pyloric ceca, anterior intestine

Host: *Myoxocephalus thompsonii*: Muzzall et al. 1997; 1995; 1%; 1; Ludington, Michigan; 43°57'19"/-86°27'9"

Table 3, continued.

Diphyllobothriidae Luhe, 1910

Diphyllobothrium oblongatum Thomas, 1946

Synonym: None

Site of Infection: [Viscera]

Host: *Coregonus artedii*: Thomas 1947; cdnp; pnp; minp; Beaver Island; 47°54'27"/-89°10'12"; Straits of Mackinaw; llnk; Cheboygan, Michigan; 45°39'52"/-84°26'8"

Diphyllobothrium sp.

Site of Infection: Encysted around pyloric cecum

Host:

Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; <1%; 1; Ludington, Michigan; 43°57'19"/-86°27'9")

Coregonus hoyi: DeGiusti 1965; April-September 1964; 51% (combined prevalence for *Diphyllobothrium* sp., *Cyathocephalus truncatus*, *Proteocephalus* sp.); minp; Saugatuck, Michigan; 42°39'18"/-86°12'7"

Coregonus hoyi: Olson 1973; January-September 1973; 23%; overall minp; intensity analyzed by host age, sex, and season; Racine, Wisconsin; 42°44'58"/-88°4'30"

Oncorhynchus kisutch: Muzzall 1989; July-September 1986; 29%; 1; Ludington, Michigan; 43°57'19"/-86°27'9"

Oncorhynchus kisutch: Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; 50%; 3; Scottville, Michigan; 43°57'17"/-86°16'48"

Oncorhynchus mykiss: Muzzall 1993; 4%; 1; Scottville, Michigan

Oncorhynchus tshawytscha: Muzzall 1989; 20%; 1; Ludington; 43°57'19"/-86°27'9"; and Manistee, Michigan; 44°14'40"/-86°19'27"

Oncorhynchus tshawytscha (age-0 and age-1 fish): Muzzall 1993; pnp; minp; Scottville, Michigan

Oncorhynchus tshawytscha: Muzzall 1993; 70%; 5; Scottville, Michigan

Ligula sp.

Site of Infection: [Body cavity]

Host: *Ameiurus* sp.: Cooper 1919; cdnp; pnp; minp; Charlevoix, Michigan; 45°19'5"/-85°15'30"

Schistocephalus thomasi Garoian, 1960

Synonym: None

Site of Infection: Body cavity

Host: Small fish (chiefly of the family Gasterosteidae): Garoian 1960; cdnp; pnp; minp; Pismire Island, 45°46'5"/-85°26'43"; Emmet County, Michigan; 45°32'0"/-84°55'0"

Schistocephalus sp.

Site of Infection: Body cavity

Host: *Cottus cognatus*: French and Muzzall 2008; September 2003; <1%; 1; northern Lake Michigan; 45°50'43"/-86°01'26"; Michigan

Table 3, continued.

Proteocephalidae La Rue, 1911

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Liver, peritoneum

Host:

Micropterus dolomieu: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk)

Perca flavescens: Pearse 1924b; p; minp; lns; Wisconsin

Proteocephalus sp.

Site of Infection: Intestine

Host:

Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; 1%; 1; Michigan City, Indiana; 41°42'27"/-86°53'42"; 2%; 1; Ludington, Michigan; 43°57'19"/-86°27'9"

Oncorhynchus kisutch: Muzzall 1989; July-September 1986; 14%; 74; Ludington, Michigan; 43°57'19"/-86°27'9"

Oncorhynchus kisutch: Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; 83%; 29; Scottville, Michigan; 43°57'17"/-86°16'48"

Oncorhynchus mykiss: Muzzall 1993; 4%; 1; Scottville, Michigan

Oncorhynchus tshawytscha: Muzzall 1989; 3%; 4; Ludington, and Manistee, Michigan; 44°14'40"/-86°19'27"

Oncorhynchus tshawytscha (age-0 and age-1 fish): Muzzall 1993; pnp; minp; Scottville, Michigan

Oncorhynchus tshawytscha: Muzzall 1993; 15%; 2; Scottville, Michigan

Salvelinus namaycush: Muzzall 1989; 7%; 3; Ludington and Manistee, Michigan

Triaenophoridae Loennberg, 1889

Triaenophorus crassus Forel, 1868

Synonyms: *Triaenophorus robustus* Olsson, 1893; *Triaenophorus tricuspispidatus morpha megadentatus* Wardle, 1932; *Triaenophorus tricuspispidatus* of Newton, 1932 (partim); *Triaenophorus* sp. type *robustus* of Cooper, 1919

Site of Infection: Intestine

Host: *Petromyzon marinus*: Guilford 1954; 1951-1952; 3%; minp; Hibbards Creek, Door County; 44°59'10"/-87°10'32"; or Kewaunee River, Kewaunee County; 44°27'27"/-87°29'28" or Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

Triaenophorus nodulosus (Pallas, 1760) Rudolphi, 1819

Synonym: *Triaenophorus* sp. type *nodulosus* of Cooper, 1919 (partim)

Site of Infection: Viscera

Table 3, continued.

Host:

Catostomus catostomus: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; lnk

Catostomus commersonii: Pearse 1924b; pnp; minp; lns; Wisconsin

Micropterus dolomieu: Pearse 1924b; pnp; minp; lns; Wisconsin

Perca flavescens: Pearse 1924b; pnp; minp; lns; Wisconsin

Triaenophorus sp.

Site of Infection: [Viscera]

Host: ?*Notropis delicatus*: Cooper 1919; cdnp; pnp; minp; Charlevoix, Michigan; 45°19'5"/-85°15'30"

Remarks: Reference of Cooper (1919) to *Notropis delicatus* probably refers to *Notropis atherinoides*.

Trypanorhyncha, gen. sp.?

Synonym: ?

Site of Infection: Viscera

Host: *Fundulus* sp.: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; lnk

Remarks: Members of this order have eversible tentacles, and known species are parasites of elasmobranchs; it is possible that Pearse (1924b) was referring to the genus *Haplobothrium* (Haplobothriidae) that has four protusible proboscides.

Adult Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Raphidascaris acus (Bloch, 1779) Railliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790; *Ascaris anguillae* Schrank, 1790; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris mucronata* Schrank, 1790 nec Froel, 1791; *Fusaria acus* (Bloch, 1779) Zeder, 1800; *Fusaria dentata* Zeder, 1800; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata* (Zeder, 1800) Rudolphi, 1809; *Ascaris labiata* Rudolphi, 1809; *Agamonema leucisci rutili* Diesing, 1851; *Trichodina cyprinorum* Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris gracillima* Linstow, 1890; *Ascaris lucii* Pearse, 1924a; *Hysterothylacium cayugensis* Wigdor, 1918; *Raphidascaris canadense* Smedley, 1933; *Raphidascaris cayugensis* (Wigdor, 1918) Yorke and Maplestone, 1926; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928; *Raphidascaris gracillima* (Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937; *Raphidascaris laurentianus* Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Intestine

Host:

Esox americanus: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin, lnk

Esox lucius: Pearse 1924a; cdnp; pnp; minp; Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

Table 3, continued.

Camallanidae Railliet and Henry, 1915

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host:

Perca flavescens: Carney and Dick 1999; cdnp; pnp; minp; Southern Green Bay; 43°55'31"/-88°46'45"; and Milwaukee; 43°2'20"/-87°54'23"; Wisconsin

Perca flavescens: Carney and Dick 2000; May-July 1992, May-July 1993; 2%; 2; southern Green Bay, Wisconsin

Capillariidae Neuve-Lemaire, 1936

Capillaria catostomi Pearse, 1924

Synonym: Moravec (1987) indicated that *Capillaria catostomi* is a synonym of *Pseudocapillaria tomentosa*; ?*Skrjabinocapillaria bakeri* (Mueller and Van Cleave, 1932) Skrjabin and Schikhobalova, 1954)

Site of Infection: Intestine

Host:

Catostomus commersonii: Pearse 1924a; cdnp; pnp; minp; Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

Catostomus commersonii: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin, llnk

Capillaria salvelini Polyanskii, 1952

Synonym: *Capillaria baicalensis* Ryzhikov and Sudarikov, 1953; *Capillaria coregoni* Shulman-Albova, 1953; *Capillaria curilica* Zhukov, 1960; *Capillaria brevispicula* sensu Moravec and Ergens, 1970, nec Linstow, 1873; *Capillaria bakeri* sensu Meyer, 1954, nec Mueller and Van Cleave, 1932

Site of Infection: Pyloric ceca

Host: *Oncorhynchus tshawytscha*: Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; 23%; 6; Scottville, Michigan; 43°57'17"/-86°16'48"

Cucullanidae Cobbold, 1864

Dichelyne cotylophora Ward and Magath, 1916

Synonym: *Dacnitoides cotylophora* Ward and Magath, 1916; *Cucullanellus cotylophora* (Ward and Magath, 1916) Petter, 1974

Site of Infection: Intestine

Host:

Catostomus commersonii: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Ameiurus melas: Pearse 1924b; pnp; minp; lns; Wisconsin

Perca flavescens: Amin 1977; 1973-1974; 9%; 2; Wisconsin-Illinois state line; llnk

Perca flavescens: Carney and Dick 1999; cdnp; pnp; minp; southern Green Bay; 43°55'31"/-88°46'45"; Wisconsin

Perca flavescens: Muzzall 1999; 1990, 1991, 1996; 47%; 5; Michigan City, Indiana; 41°42'27"/-86°53'42"; 19%; 4; Ludington, Michigan; 43°57'19"/-86°27'9"

Perca flavescens: Pearse 1924b; pnp; minp; lns; Wisconsin

Table 3, continued.

Cystidicolidae (as in Anderson et al. 1975)

Cystidicola farionis Fischer, 1798

Synonym: *Cystidicola canadensis* Skinker, 1930; *Cystidicola stigmatura* of Skinker (1931) *not* (Leidy, 1886); *Cystidicola stigmatura* of Ko and Anderson 1969 *not* (Leidy, 1886)

Site of Infection: Swim bladder

Host:

Coregonus artedi: Ward and Magath 1916; cdnp; pnp; minp; lns; Michigan; llnk

Coregonus clupeaformis: Ward and Magath 1916; pnp; minp; lns; Michigan

Oncorhynchus mykiss: Muzzall 1989; July-September, 1986; 17%; 4; Ludington, Michigan; 43°57'19"/-86°27'9"

Oncorhynchus mykiss: Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; 1%; 2; Scottville, Michigan; 43°57'17"/-86°16'48"

Oncorhynchus tshawytsch (age-0 and age-1 fish): Muzzall 1993; pnp; minp; Scottville, Michigan

Salvelinus namaycush: Ward and Magath 1916; pnp; minp; lns; Michigan

Remarks: The above record of *Cystidicola farionis* in *Salvelinus namaycush* by Ward and Magath (1916) may refer to *Cystidicola stigmatura*.

Cystidicola stigmatura (Leidy, 1886) Ward and Magath, 1916

Synonym: *Filaria stigmatura* Leidy, 1886; *Ancyracanthus cystidicola* of Wright 1879 *not* (Lamarck, 1801);

Cystidicola sp. of White 1940; *Cystidicola farionis* of Ward and Magath 1916 *not* (Fischer, 1798);

Cystidicola cristivomeri White, 1941

Site of Infection: Swim bladder

Host:

Coregonus spp. except *Coregonus alpenae*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Coregonus hoyi: Olson 1973; January-September 1973; 71%; overall minp, intensity analyzed by host age, sex, and season; Racine, Wisconsin; 42°44'58"/-88°4'30"

Remarks: Black (1983) reported that *Cystidicola stigmatura* is apparently absent from fish in the Great Lakes since 1925; the above record of *Cystidicola stigmatura* in *Coregonus* spp. may be erroneous since *Salvelinus* spp. are the only known host species of it in North America (Black 1983).

Cystidicola sp.

Site of Infection: Swim bladder

Host: *Coregonus hoyi*: DeGiusti 1965; April-September 1964; 40%; minp; Saugatuck, Michigan; 42°39'18"/-86°12'7"

Spinitectus gracilis Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host:

Oncorhynchus tshawytscha (age-0 and age-1 fish): Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; pnp; minp; Scottville, Michigan; 43°57'17"/-86°16'48"

Ambloplites rupestris: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Table 3, continued.

Lepomis gibbosus: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Perca flavescens: Carney and Dick 2000; May-July 1992, May-July 1993; 5%; 1; Milwaukee, Wisconsin; 43°2'20"/-87°54'23"

Philometridae Baylis and Daubney, 1926

Philometra cylindracea (Ward and Magath, 1916) Van Cleave and Mueller, 1934

Synonym: *Ichthyonema cylindraceum* Ward and Magath

Site of Infection: Viscera

Host: *Perca flavescens*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Rhabdochonidae Skrjabin, 1946

Rhabdochona ovifilamenta Weller, 1938

Synonym: *Rhabdochona laurentiana*, Lyster, 1940; *Rhabdochona fortunatowi* of Kussat, 1969;

Rhabdochona sp. of Arai and Kussat, 1967

Site of Infection: Intestine

Host: *Perca flavescens*: Weller 1938; 1936-1937; pnp; minp; Big Stone Bay; 45°44'58"/-84°54'13"; Straits of Mackinaw, Michigan; llnk

Unknown Family

"*Ascaris*" *angulata* Rudolphi

Synonym: ?

Site of Infection: Intestine

Host: *Lepomis gibbosus*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Remarks: Species of "*Ascaris*" were reported from North American fishes in the 1920s and 1930s, but belong to other genera.

Larval/Immature Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Contracaecum sp.

Site of Infection: Encysted in mesentery

Host: *Perca flavescens*: Muzzall 1999; 1990, 1991, 1996; 3%; 1; Michigan City; 41°42'27"/-86°53'42"; Indiana; 8%; 2; Ludington, Michigan; 43°57'19"/-86°27'9"

Remarks: Separating larval *Contracaecum* and larval *Hysterothylacium* is difficult.

Table 3, continued.

Raphidascaris acus (Bloch, 1779) Railliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790; *Ascaris anguillae* Schrank, 1790; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris mucronata* Schrank, 1790 nec Froel, 1791; *Fusaria acus* (Bloch, 1779) Zeder, 1800; *Fusaria dentata* Zeder, 1800; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata* (Zeder, 1800) Rudolphi, 1809; *Ascaris labiata* Rudolphi, 1809; *Agamonema leucisci rutili* Diesing, 1851; *Trichina cyprinorum* Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris gracillima* Linstow, 1890; *Ascaris lucii* Pearse, 1924a; *Hysterothylacium cayugensis* Wigdor, 1918; *Raphidascaris canadense* Smedley, 1933; *Raphidascaris cayugensis* (Wigdor, 1918) Yorke and Maplestone, 1926; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928; *Raphidascaris gracillima* (Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937; *Raphidascaris laurentianus* Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Liver, mesentery

Host: *Perca flavescens*: Carney and Dick 2000; May-July 1992, May-July 1993; 63%; 6; southern Green Bay, Wisconsin; 43°55'31"/-88°46'45"; 29%; 25; Milwaukee, Wisconsin; 43°2'20"/-87°54'23"

Capillaridae Neuve-Lemaire, 1936

Capillaria sp.

Site of Infection: Intestine

Host: *Oncorhynchus tshawytscha*: Muzzall 1989; July-September 1986; 1%; 1; Manistee, Michigan; 44°14'40"/-86°19'27"

Cucullanidae Cobbold, 1864

Dichelyne cotylophora Ward and Magath, 1916

Synonym: *Dacnitoides cotylophora* (Ward and Magath, 1916); *Cucullanellus cotylophora* (Ward and Magath, 1916) Petter, 1974

Site of Infection: Viscera

Host:

Coregonus johanna: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Perca flavescens: Carney and Dick 1999; cdnp; pnp; minp; southern Green Bay; 43°55'31"/-88°46'45"; Wisconsin

Cystidicolidae (as in Anderson et al. 1975)

Cystidicola stigmatura (Leidy, 1886) Ward and Magath, 1916

Synonym: *Filaria stigmatura* Leidy, 1886; *Ancyracanthus cystidicola* of Wright, 1879 *not* (Lamarck, 1801); *Cystidicola* sp. of White, 1940; *Cystidicola farionis* of Ward and Magath 1917 *not* (Fischer, 1798); *Cystidicola cristivomeri* White, 1941

Site of Infection: Digestive tract

Host: *Petromyzon marinus*: Guilford 1954; 1951-1952; 1%; 10; Sturgeon Bay; 44°51'14"/-87°23'40"; or Hibbards Creek, Door County; llnk; or Kewaunee River, Kewaunee County, Wisconsin; 44°27'27"/-87°29'28"

Table 3, continued.

Remarks: Guilford (1954) suggested *Petromyzon marinus* became infected when it ingested the infected swim bladder of a coregonid fish; Black (1983) suggested that *Cystidicola stigmatura* is apparently absent from the Great Lakes since 1925; the above record of *Cystidicola stigmatura* in *Petromyzon marinus* maybe erroneous since *Salvelinus* spp. are the only hosts of it in North America (Black 1983).

Cystidicola sp.

Site of Infection: Swim bladder

Host: *Osmerus mordax*: Muzzall and Peebles 1988; 1984, 1985, 1986; 2%; 2; Michigan City, Indiana; 41°42'27"/-86°53'42"

Spinitectus sp.

Site of Infection: Intestine

Host: *Oncorhynchus mykiss*: Muzzall 1989; July-September 1986; 17%; 7; Manistee, Michigan; 44°14'40"/-86°19'27"

Diectophymidae Railliet, 1915

Eustrongylides tubifex (Nitzsch, 1819) Jagerskiold, 1909

Synonym: None

Site of Infection: Encysted in mesentery on surface of ovaries, testes, liver, spleen, and gastrointestinal tract, and free in the body cavity, viscera, and muscle

Host: *Perca flavescens*: Allison 1966; cdnp; 2%; 1; Little Bay de Noc, Michigan; 45°45'59"/-87°0'45"; 1%; 1; Leland, Michigan; 45°1'22"/-85°45'35"

Perca flavescens: Muzzall 1999; 1990, 1991, 1996; 3%; 1; Michigan City, Indiana; 41°42'27"/-86°53'42"

Remarks: Allison (1966) misidentified *Eustrongylides tubifex* as *Philometra cylindracea*.

Eustrongylides sp.

Site of Infection: Encysted in mesentery and on intestine

Host:

Perca flavescens: Carney and Dick 2000; May-July 1992, May-July 1993; 7%; 2; southern Green Bay, Wisconsin; 43°55'31"/-88°46'45"

Apollonia melanostoma: Camp et al. 1999; June-October 1995; 1%; 1; <1*; Calumet Harbor, Indiana; 41°44'2"/-87°31'26"; 2%; 1; <1*; Hammond Marina, Indiana; 41°35'0"/-87°30'0"

Philometridae Baylis and Daubney, 1926

Philometra cylindracea (Ward and Magath, 1916) Van Cleave and Mueller, 1934

Synonym: *Ichthyonema cylindraceum* Ward and Magath 1916

Site of Infection: Liver, peritoneum

Host:

Pimephales notatus: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Lepomis gibbosus: Pearse 1924b; pnp; minp; lns; Wisconsin

Etheostoma exile: Pearse 1924b; pnp; minp; lns; Wisconsin

Etheostoma nigrum: Pearse 1924b; pnp; minp; lns; Wisconsin

Table 3, continued.

Quimperiidae Baylis, 1930

Synonym: Haplonematidae Sudarikova and Ryzikov, 1952

Haplonema hamulatum Moulton, 1931

Synonym: None

Site of Infection: Small intestine

Host:

Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; 1%; 1; Ludington, Michigan; 43°57'19"/-86°27'9"

Oncorhynchus tshawytscha: Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; 3%; 1; Scottville, Michigan; 43°57'17"/-86°16'48"

Unknown Family

Agamonema sp.

Synonym: ?

Site of Infection: Intestine

Host: *Perca flavescens*: Carney and Dick 2000; May-July 1992, May-July 1993; 21%; 4; southern Green Bay, Wisconsin; 43°55'31"/-86°46'45"

Remarks: Yorke and Maplestone (1926) define *Agamonema* as a collective group for immature nematodes in fishes.

Adult Acanthocephala (Acanthocephalans)

Echinorhynchidae Cobbold, 1876

Acanthocephalus dirus (Van Cleave, 1931) Van Cleave and Townsend, 1936

Synonym: *Echinorhynchus dirus* Van Cleave, 1931; *Acanthocephalus jacksoni* Bullock, 1962;

Acanthocephalus parksidei Amin, 1975, 1977

Site of Infection: Pyloric ceca, intestine

Host:

Alosa pseudoharengus: Amin 1977; 1973-1974; <1%; minp; Wisconsin-Illinois state line; llnk

Cyprinus carpio: Amin 1977; 33%; minp; Wisconsin-Illinois state line

Catostomus commersonii: Amin 1977; 20%; minp; Wisconsin-Illinois state line

Osmerus mordax: Amin 1977; 5%; minp; Wisconsin-Illinois state line

Coregonus hoyi: Amin 1977; 1%; minp; Wisconsin-Illinois state line

Oncorhynchus kisutch: Amin 1977; 7%; minp; Wisconsin-Illinois state line

Oncorhynchus kisutch: Amin 1985; July 1980, July 1981; pnp; minp; Racine Harbor; llnk; Racine County, southeast Wisconsin; 42°44'58"/-88°4'30"

Oncorhynchus mykiss: Amin 1977; 13%; minp; Wisconsin-Illinois state line

Oncorhynchus tshawytscha: Amin 1977; 5%; minp; Wisconsin-Illinois state line

Oncorhynchus tshawytscha: Amin 1985; pnp; minp; Racine Harbor, Racine County, southeast Wisconsin

Oncorhynchus tshawytscha: Muzzall 1989; July-September 1986; 6%; 2; Ludington; 43°57'19"/-86°27'9"; and Manistee, Michigan; 44°14'40"/-86°19'27"

Table 3, continued.

Oncorhynchus tshawytscha (age-0 and age-1 fish): Muzzall 1993; May, August, September 1983, July, August, 1989, May-October 1990; pnp; minp; Scottville, Michigan; 43°57'17"/-86°16'48"

Salmo trutta: Amin 1977; 6%; minp; Wisconsin-Illinois state line

Salvelinus namaycush: Amin 1977; 14%; minp; Wisconsin-Illinois state line

Salvelinus namaycush: Amin 1985; pnp; minp; Racine Harbor, Racine County, southeast Wisconsin

Salvelinus namaycush: Muzzall 1989; 9%; 3; Manistee, Michigan

Lota lota: Amin 1977; 100%; minp; Wisconsin-Illinois state line

Cottus cognatus: Amin 1977; 38%; minp; Wisconsin-Illinois state line

Apollonia melanostoma: Camp et al. 1999; June-October 1995; 2%; 1; <1*; Calumet Harbor, Indiana; 41°44'2"/-87°31'26"; 5%; 1; <1*; Hammond Marina, Indiana; 41°35'0"/-87°30'0"

Echinorhynchus leidy (Van Cleave, 1924) Golvan, 1969

Synonym: *Echinorhynchus salvelini* Linkins in Ward and Whipple, 1918; *Metechinorhynchus leidy* (Van Cleave, 1924) Golvan, 1969

Site of Infection: Intestine

Host:

Petromyzon marinus: Guilford 1954; 1951-1952; 5%; minp; Hibbards Creek, Door County; llnk; Kewaunee River, Kewaunee County; 44°27'27"/-87°29'28"; Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

Coregonus spp.: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Salvelinus namaycush: Pearse 1924b; pnp; minp; lns; Wisconsin

Micropterus dolomieu: Pearse 1924b; pnp; minp; lns; Wisconsin

Perca flavescens: Pearse 1924b; pnp; minp; lns; Wisconsin

Echinorhynchus salmonis (Muller, 1784) Petrochenko, 1956

Synonym: *Echinorhynchus coregoni* Linkins in Van Cleave, 1919; *Echinorhynchus pachysomus*, *Echinorhynchus phoenix*, *Echinorhynchus inflatus*, *Echinorhynchus maraenae*, *Echinorhynchus murenae*, *Metechinorhynchus alpinus*, *Metechinorhynchus salmonis* (Muller, 1784) Petrochenko, 1956

Site of Infection: Pyloric ceca, intestine

Host:

Petromyzon marinus: Guilford 1954; 1951-1952; 9%; minp; Hibbards Creek, Door County; llnk; Kewaunee River, Kewaunee County; 44°27'27"/-87°29'28"; Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

Alosa pseudoharengus: Amin and Burrows 1977; November 1973-October 1974; 13%; <1*; Wisconsin-Illinois state line; llnk

Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; 29%; 4; Michigan City, Indiana; 41°42'27"/-86°53'42"; 48%; 8; Ludington, Michigan

Notropis hudsonius: Amin and Burrows 1977; 67%; minp; Wisconsin-Illinois state line

Catostomus catostomus: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Catostomus commersonii: Amin and Burrows 1977; 42%; 1*; Wisconsin-Illinois state line

Catostomus commersonii: Pearse 1924b; pnp; minp; lns; Wisconsin

Esox americanus: Pearse 1924b; pnp; minp; lns; Wisconsin

Table 3, continued.

Osmerus mordax: Amin and Burrows 1977; 75%; 3*; Wisconsin-Illinois state line
Osmerus mordax: Muzzall and Peebles 1988; 1984, 1985, 1986; 59%; 4; Michigan City, Indiana; 41°42'27"/-86°53'42"

Coregonus clupeaformis: Amin and Burrows 1977; 100%; 22*; Wisconsin-Illinois state line
Coregonus clupeaformis: Pearse 1924b; pnp; minp; lns; Wisconsin
Coregonus hoyi: Amin and Burrows 1977; 96%; 13*; Wisconsin-Illinois state line
Coregonus hoyi: DeGiusti 1965; April-September 1964; 99%; minp; Saugatuck, Michigan; 42°39'18"/-86°12'7"

Coregonus hoyi: Olson 1973; January-September 1973; 95%; overall minp; intensity analyzed by host age, sex, and season; Racine, Wisconsin 42°44'58"/-88°4'30"

Coregonus spp. "ciscoes": Pearse 1924b; pnp; minp; lns; Wisconsin

Oncorhynchus kisutch: Amin 1985; July 1980, July 1981; 95%; 109*; Racine Harbor; llnk; Racine County, southeast Wisconsin; 42°44'58"/-88°4'30"

Oncorhynchus kisutch: Amin and Burrows 1977; 100%; 140*; Wisconsin-Illinois state line
Oncorhynchus kisutch: Hnath 1969; cdnp; pnp; minp; lns; llnk
Oncorhynchus kisutch: Muzzall 1989; July-September 1986; 100%; 96; Ludington; 43°57'19"/-86°27'9"; Michigan

Oncorhynchus kisutch: Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; 100%; 91; Scottville, Michigan; 43°57'17"/-86°16'48"

Oncorhynchus mykiss: Amin and Burrows 1977; 75%; 38*; Wisconsin-Illinois state line
Oncorhynchus mykiss: Muzzall 1989; 100%; 42; Ludington and Manistee, Michigan
Oncorhynchus mykiss: Muzzall 1993; 96%; 28; Scottville, Michigan

Oncorhynchus tshawytscha: Amin 1985; 97%; 79*; Racine Harbor; Racine County, southeast Wisconsin
Oncorhynchus tshawytscha: Amin and Burrows 1977; 100%; 53*; Wisconsin-Illinois state line
Oncorhynchus tshawytscha: Muzzall 1989; 100%; 237; Ludington and Manistee, Michigan; 45°57'27"/-86°14'46"

Oncorhynchus tshawytscha: Muzzall 1993; 100%; 303; Scottville, Michigan
Oncorhynchus tshawytscha (age-0 and age-1 fish): Muzzall 1993; pnp; minp; Scottville, Michigan

Salmo trutta: Amin and Burrows 1977; 100%; 16*; Wisconsin-Illinois state line
Salmo trutta: Muzzall 1989; 100%; 38; Ludington and Manistee, Michigan

Salvelinus namaycush: Amin 1985; 93%; 67*; Racine Harbor, Racine County, southeast Wisconsin
Salvelinus namaycush: Amin and Burrows 1977; 100%; 82*; Wisconsin-Illinois state line
Salvelinus namaycush: Hnath 1969; cdnp; pnp; minp; lns; llnk
Salvelinus namaycush: Muzzall 1989; 100%; 97; Ludington and Manistee, Michigan
Salvelinus namaycush: Pearse 1924b; pnp; minp; lns; Wisconsin

Lota lota: Amin and Burrows 1977; 100%; 18*; Wisconsin-Illinois state line
Lota lota: Pearse 1924b; pnp; minp; lns; Wisconsin

Cottus cognatus: Amin and Burrows 1977; 73%; 9*; Wisconsin-Illinois state line
Perca flavescens: Amin and Burrows 1977; 45%; 1*; Wisconsin-Illinois state line
Perca flavescens: Carney and Dick 1999; cdnp; pnp; minp; southern Green Bay; 43°55'31"/-88°46'45"; Wisconsin

Table 3, continued.

Perca flavescens: Carney and Dick 2000; May-July 1992, May-July 1993; 4%; 2; southern Green Bay, Wisconsin; 82%; 9; Milwaukee, Wisconsin; 43°2'20"/-87°54'23"

Perca flavescens: Pearse 1924b; pnp; minp; lns; Wisconsin

Neoechinorhynchidae Ward, 1917

Synonym: Hebesomidae Van Cleave, 1928; Hebesomatidae Yamaguti, 1963

Neoechinorhynchus crassus Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host: *Catostomus commersonii*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Neoechinorhynchus cylindratus (Van Cleave, 1913) Van Cleave, 1919

Synonym: *Neorhynchus cylindratus* Van Cleave, 1913; *Eorhynchus cylindratus* (Van Cleave, 1913) Van Cleave, 1914

Site of Infection: Intestine

Host:

Petromyzon marinus: Guilford 1954; 1951-1952; 1%; 1; Hibbards Creek, Door County; llnk; Kewaunee River, Kewaunee County; 44°27'27"/-87°29'28"; Sturgeon Bay, Wisconsin; 44°51'14"/-87°23'40"

Catostomus commersonii: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Neoechinorhynchus sp.

Site of Infection: Intestine

Host: *Perca flavescens*: Carney and Dick 2000; May-July 1992, May-July 1993; 3%; 1; Milwaukee, Wisconsin; 43°2'20"/-87°54'23"

Octospinifer macilentus Van Cleave, 1919

Synonym: *Octospinifer* sp. of Mudry and Arai, 1973; *Octospinifer* sp. of Mudry and Anderson, 1976

Site of Infection: Intestine

Host: *Catostomus commersonii*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host:

Catostomus commersonii: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Ameiurus melas: Pearse 1924b; pnp; minp; lns; Wisconsin

Etheostoma exile: Pearse 1924b; pnp; minp; lns; Wisconsin

Table 3, continued.

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Pyloric ceca, intestine

Host:

Ameiurus nebulosus: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Perca flavescens: Pearse 1924b; pnp; minp; lns; Wisconsin

Immature Acanthocephala (Acanthocephalans)

Echinorhynchidae Cobbold, 1876

Acanthocephalus dirus: Van Cleave, 1931) Van Cleave and Townsend, 1936

Synonym: *Echinorhynchus dirus* Van Cleave 1931; *Acanthocephalus jacksoni* Bullock 1962;

Acanthocephalus parksidei Amin, 1975, 1977

Site of Infection: Non-intestinal infections, enclosed within envelopes of undetermined origin

Host: *Osmerus mordax*: Amin and Burrows 1977; November 1973-October 1974; pnp; minp; Wisconsin-Illinois state line; llnk

Echinorhynchus salmonis Muller, 1784

Synonym: *Echinorhynchus coregoni* Linkins in Van Cleave, 1919; *Echinorhynchus pachysomus*, *Echinorhynchus phoenix*, *Echinorhynchus inflatus*, *Echinorhynchus maraenae*, *Echinorhynchus murenae*, *Metechinorhynchus alpinus*, *Metechinorhynchus salmonis* (Muller 1784) Petrochenko 1956

Site of Infection: Stomach, intestine

Host: *Myoxocephalus thompsonii*: Muzzall et al. 1997; 1995; 92%; 4; Ludington, Michigan; 43°57'19"/-86°27'9"

Echinorhynchus salmonis Muller, 1784

Synonym: *Echinorhynchus coregoni* Linkins in Van Cleave, 1919; *Echinorhynchus pachysomus*, *Echinorhynchus phoenix*, *Echinorhynchus inflatus*, *Echinorhynchus maraenae*, *Echinorhynchus murenae*, *Metechinorhynchus alpinus*, *Metechinorhynchus salmonis* (Muller, 1784) Petrochenko 1956

Site of Infection: Non-intestinal infections, encapsulated in the mesentery of the digestive tract and on the outside of the liver, gonads, swim bladder, and enclosed within envelopes of undetermined origin in body cavity; some female worms were gravid

Host:

Osmerus mordax: Amin and Burrows 1977; November 1973-October 1974; pnp; minp; Wisconsin-Illinois state line; llnk

Osmerus mordax: Muzzall and Peebles 1988; 1984, 1985, 1986; 7%; 3; Michigan City, Indiana; 41°42'27"/-86°53'42"

Table 3, continued.

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Viscera

Host:

Catostomus commersonii: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Ameiurus nebulosus: Pearse 1924b; pnp; minp; lns; Wisconsin

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Viscera

Host:

Catostomus commersonii: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Ameiurus nebulosus: Pearse 1924b; pnp; minp; lns; Wisconsin

Perca flavescens: Pearse 1924b; pnp; minp; lns; Wisconsin

Hirudinea (Leeches)

Glossiphoniidae Vaillant, 1890

Desserobdella picta (Verrill, 1872)

Synonym: *Batracobdella picta* (Verrill, 1872), *Placobdella picta* (Verrill, 1872)

Site of Infection: [Body surface]

Host:

Catostomus commersonii: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Perca flavescens: Pearse 1924b; pnp; minp; lns; Wisconsin

Placobdella parasitica (Say, 1924) Moore, 1921

Synonym: *Glossosiphonia parasitica* Pinto, 1923; *Haementaria parasitica* Aytrum, 1936

Site of Infection: Fin

Host: *Oncorhynchus tshawytscha*: Amin 1977; 1973-1974; 17%; 1; Wisconsin-Illinois state line; llnk

Piscicolidae Johnston, 1865

Piscicola milneri (Verrill, 1872) Ryerson, 1915

Synonym: *Ichthyobdella milneri*

Site of Infection: [Body surface, fins]

Table 3, continued.

Host:

Coregonus clupeaformis: Meyer 1940; cdnp; pnp; minp; St. Joseph, Michigan; 42°6'35"/-86°28'48"

Coregonus clupeaformis: Meyer 1946; cdnp; pnp; minp; lns; llnk

Coregonus hoyi: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Lota lota: Pearse 1924b; pnp; minp; lns; Wisconsin

"Large numbers of fishes": Milner 1874, 1871 or 1872; pnp; minp; Kenosha, Wisconsin; 42°35'5"/-87°49'16"

Piscicola punctata (Verrill, 1871) Moore, 1912

Synonym: *Ichthyobdella punctata* (Verrill, 1871) Moore, 1912

Site of Infection: [Body surface]

Host: *Coregonus clupeaformis*: Meyer 1940; cdnp; pnp; minp; St. Joseph, Michigan; 42°6'35"/-86°28'48"

Piscicolaria sp.

Site of Infection: [Body surface]

Host:

Ambloplites rupestris: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Micropterus dolomieu: Pearse 1924b; pnp; minp; lns; Wisconsin

Unknown Family

Unidentified leeches

Synonym: ?

Site of Infection: ?

Host:

Coregonus hoyi: Olson 1973; January-September 1973; 1%; overall minp; intensity analyzed by host age, sex, and season; Racine Wisconsin; 42°44'58"/-88°4'30"

Salvelinus namaycush: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Lota lota: Pearse 1924b; pnp; minp; lns; Wisconsin

Copepoda (Copepods)

Ergasilidae Nordmann, 1832

Ergasilus caeruleus Wilson, 1911

Synonym: *Ergasilus confusus* Bere, 1931; *Ergasilus skrjabini* Mueller, 1937

Site of Infection: Gills

Host:

Catostomus commersonii: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Coregonus artedii: Pearse 1924b; pnp; minp; lns; Wisconsin

Ambloplites rupestris: Pearse 1924b; pnp; minp; lns; Wisconsin

Perca flavescens: Pearse 1924b; pnp; minp; lns; Wisconsin

Table 3, continued.

Remarks: Records of *Ergasilus caeruleus* on fish hosts before Roberts (1970) should be treated with caution.

Ergasilus centrarchidarum (Wright, 1882) Wilson, 1932

Synonym: None

Site of Infection: Gills

Host: *Ambloplites rupestris*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Ergasilus luciopercarum Henderson, 1926

Synonym: *Ergasilus confusus* Bere, 1931; *Ergasilus skryabini* Mueller, 1936; *Ergasilus caeruleus* Wilson in Mueller, 1936

Site of Infection: Gills

Host:

Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; 1%; 1; Michigan City, Indiana; 41°42'27"/-86°53'42"

Oncorhynchus mykiss: Buttner and Hamilton 1976; August 1973-August 1974; pnp; minp; Toben Road, Wisconsin; llnk; Zion, Illinois; 42°26'46"/-87°49'58"; Waukegan, Illinois; 42°21'49"/-87°50'41"; Winnetka, Illinois; 42°6'29"/-87°44'9"; Montrose Harbor, Chicago, Illinois; 41°57'41"/-87°38'17"; Belmont Harbor, Chicago, Illinois; 41°56'34"/-87°38'12"; Diversey Harbor, Chicago, Illinois; 41°55'47"/-87°38'0"; Jackson Park Harbor, Chicago, Illinois; llnk; Little Manistee River, Michigan; 44°12'42"/-86°16'40"

Oncorhynchus tshawytscha: Buttner and Hamilton 1976; 9%; 1; Toben Road, Wisconsin; Zion, Illinois; Waukegan, Illinois; Winnetka, Illinois; Montrose Harbor, Chicago, Illinois; Belmont Harbor, Chicago, Illinois; Diversey Harbor, Chicago, Illinois; Jackson Park Harbor, Chicago, Illinois; Little Manistee River, Michigan

Oncorhynchus tshawytscha (age-0 and age-1 fish): Muzzall 1993; May, August, September 1983, July, August 1989, May-October 1990; pnp; minp; Scottville, Michigan; 43°57'17"/-86°16'48"

Salmo trutta: Buttner and Hamilton 1976; pnp; minp; Toben Road, Wisconsin; Zion, Illinois; Waukegan, Illinois; Winnetka, Illinois; Montrose Harbor, Chicago, Illinois; Belmont Harbor, Chicago, Illinois; Diversey Harbor, Chicago, Illinois; Jackson Park Harbor, Chicago, Illinois; Little Manistee River, Michigan

Perca flavescens: Buttner and Hamilton 1976; 16%; 2; Montrose Harbor, Chicago, Illinois

Perca flavescens: Carney and Dick 2000; May-July 1992, May-July 1993; 73%; 4; southern Green Bay, Wisconsin; 43°55'31"/-86°46'45"; 37%; 2; Milwaukee, Wisconsin; 43°2'20"/-87°54'23"

Ergasilus nerkae Roberts, 1963

Synonym: *Ergasilus caeruleus* of Bangham and Adams, 1954 (partim); *Ergasilus* sp. of Bangham and Adams, 1954 (partim)

Site of Infection: Gills

Table 3, continued.

Host:

Oncorhynchus kisutch: Buttner and Hamilton 1976; August 1973-August 1974; 2%; minp; Toben Road, Wisconsin; llnk; Zion, Illinois; 42°26'46"/-87°49'58"; Waukegan, Illinois; 42°21'49"/-87°50'41"; Winnetka, Illinois; 42°6'29"/-87°44'9"; Montrose Harbor, Chicago, Illinois; 41°57'41"/-87°38'17"; Belmont Harbor, Chicago, Illinois; 41°56'34"/-87°38'12"; Diversey Harbor, Chicago, Illinois; 41°55'47"/-87°38'12"; Jackson Park Harbor, Chicago, Illinois; llnk; Little Manistee River, Michigan; 44°12'42"/-86°16'40"

Pungitius pungitius: Hudson et al. 1994; 1992; pnp; minp; lns; fish specimens examined are archived at the National Biological Survey, Great Lakes Center, and the Museum of Zoology, University of Michigan; llnk

Lernaeopodidae Olsson, 1869

Achtheres pimelodi Kroyer, 1863

Synonym: *Achtheres ambloplitis* Kellicott, 1880; *Achtheres micropteri* Wright, 1882

Site of Infection: Gills

Host:

Coregonus artedi: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Lota lota: Pearse 1924b; pnp; minp; lns; Wisconsin

Micropterus dolomieu: Pearse 1924b; pnp; minp; lns; Wisconsin

Achtheres sp.

Site of infection: Gill cavity

Host: *Coregonus hoyi*: Olson 1973; January-September 1973; 11%; overall minp, intensity analyzed by host age, sex, and season; Racine, Wisconsin; 42°44'58"/88°4'30"

Salmincola extensus (Kessler, 1868) Kabata, 1969

Synonym: *Achtheres coregoni* Baumann, 1911; *Lernaeopoda coregoni* Smith, 1874; *Lernaeopoda extensus* Kessler, 1868; *Lernaeopoda maraenae* Olsson, 1877; *Salmincola wisconsinensis* Tidd and Bangham, 1945

Site of Infection: Gills

Host: *Salvelinus namaycush*: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Salmincola extumescens (Gadd, 1901) Wilson, 1915

Synonym: *Achtheres corpulentus* Kellicott, 1880, *Salmincola corpulentus* (Kellicott, 1880), *Lernaeopoda extumescens* Gadd, 1901; *Lernaeopoda inermis* Wilson, 1911; *Salmincola inermis* (Wilson, 1911) Wilson, 1915; *Salmincola omuli* Messjatzeff, 1926

Site of Infection: Gills

Host:

Coregonus hoyi: Buttner and Hamilton 1976; August 1973-August 1974; pnp; minp; lns; llnk

Coregonus johanna: Pearse 1924b; cdnp; pnp; minp; lns; Wisconsin; llnk

Table 3, continued.

Salmincola sp.

Site of Infection: [Gills]

Host:

Coregonus hoyi: DeGiusti 1965; April-September 1964; 5%; minp; Saugatuck, Michigan; 42°39'18"/-86°12'7"

Coregonus hoyi: Olson 1973; January-September 1973; 3%; overall minp; intensity analyzed by host age, sex, and season; Racine, Wisconsin; 42°44'58"/-88°4'30"

Table 4. Number of studies performed on the parasites of fish from the Great Lakes and their connecting bodies of water by 10-yr period. Abbreviations for lakes and connecting bodies of water are LM (Lake Michigan), LS (Lake Superior), SMR (St. Marys River), LH (Lake Huron), SCS (St. Clair System), LE (Lake Erie), NR (Niagara River), and LO (Lake Ontario).

| Period | LM | LS | SMR | LH | SCS | LE | NR | LO | Totals |
|-----------|----|----|-----|----|-----|----|----|----|--------|
| 1870-1879 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 1880-1889 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1890-1899 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 1900-1909 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 1910-1919 | 4 | 3 | 1 | 3 | 2 | 4 | 0 | 0 | 17 |
| 1920-1929 | 3 | 0 | 0 | 3 | 0 | 4 | 0 | 0 | 10 |
| 1930-1939 | 1 | 0 | 0 | 2 | 0 | 7 | 1 | 6 | 17 |
| 1940-1949 | 3 | 4 | 0 | 2 | 0 | 5 | 0 | 2 | 16 |
| 1950-1959 | 1 | 2 | 0 | 4 | 0 | 1 | 0 | 0 | 8 |
| 1960-1969 | 6 | 3 | 0 | 5 | 0 | 6 | 0 | 7 | 27 |
| 1970-1979 | 4 | 3 | 0 | 11 | 0 | 26 | 1 | 19 | 64 |
| 1980-1989 | 4 | 7 | 2 | 12 | 0 | 11 | 1 | 3 | 40 |
| 1990-1999 | 9 | 6 | 0 | 8 | 5 | 1 | 0 | 0 | 29 |
| 2000-2010 | 5 | 2 | 2 | 10 | 4 | 4 | 0 | 2 | 29 |
| Totals | 41 | 35 | 6 | 60 | 12 | 69 | 3 | 39 | 265 |

Table 5. Fishes by family and species from Lake Michigan from which parasites have been reported during 1874-2010 using data from Table 3. References in parentheses following parasites refer to references for host records.

Petromyzontidae

***Petromyzon marinus* (sea lamprey)**

Ciliophora: *Trichodina* sp., (Guilford 1954)

Adult Cestoda: *Proteocephalus exiguus*, (Guilford 1954)

Larval/Immature Cestoda: *Eubothrium* sp., (Guilford 1954); *Triaenophorus crassus*, (Guilford 1954)

Larval/Immature Nematoda: *Cystidicola stigmatura*, (Guilford 1954)

Adult Acanthocephala: *Echinorhynchus leidy*, (Guilford 1954); *Echinorhynchus salmonis*, (Guilford 1954); *Neoechinorhynchus cylindratus*, (Guilford 1954)

Acipenseridae

***Acipenser fulvescens* (lake sturgeon)**

Larval/Immature Digenea: *Diplostomum* sp., (La Rue et al. 1926)

Clupeidae

***Alosa pseudoharengus* (alewife)**

Ciliophora: *Trichodina* sp., (Muzzall 1994)

Larval/Immature Digenea: *Diplostomum* sp., (Muzzall 1994); *Ichthyocotylurus* sp., (Muzzall 1994)

Adult Cestoda: *Cyathocephalus truncatus*, (Muzzall 1994)

Larval/Immature Cestoda: *Eubothrium salvelini*, (Muzzall 1994); *Diphyllobothrium* sp., (Muzzall 1994); *Proteocephalus* sp., (Muzzall 1994)

Larval/Immature Nematoda: *Haplonema hamulatum*, (Muzzall 1994)

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977); *Echinorhynchus salmonis*, (Amin and Burrows 1977; Muzzall 1994)

Copepoda: *Ergasilus luciopercarum*, (Muzzall 1994)

Cyprinidae

***Cyprinus carpio* (common carp)**

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977)

Table 5, continued.

?*Notropis delicatus*, correct name is probably *Notropis atherinoides* (emerald shiner)

Larval/Immature Cestoda: *Triaenophorus* sp., (Cooper 1919)

***Notropis hudsonius* (spottail shiner)**

Myxozoa: *Myxobolus bartai*, (Cone et al. 2004); *Myxobolus burti*, (Cone et al. 2004, Cone and Marcogliese 2010); *Myxobolus xiaoi*, (Cone et al. 2004); *Thelohanellus notatus*, (Cone et al. 2004); *Zschokkella* sp., (Cone et al. 2004); *Chloromyxum* sp., (Cone et al. 2004); *Sphaerospora* sp., (Cone et al. 2004)

Adult Digenea: *Centrovarium lobotes*, (Pearse 1924b)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Amin and Burrows 1977)

***Pimephales notatus* (bluntnose minnow)**

Larval/Immature Nematoda: *Philometra cylindracea*, (Pearse 1924b)

Catostomidae

***Catostomus catostomus* (longnose sucker)**

Adult Cestoda: *Glaridacris catostomi*, (Pearse 1924b)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Pearse 1924b)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Pearse 1924b)

***Catostomus commersonii* (white sucker)**

Adult Digenea: *Lissorchis attenuatus*, (Amin 1977)

Adult Cestoda: *Proteocephalus* sp., (Pearse 1924b); *Glaridacris catostomi*, (Amin 1977)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Pearse 1924b)

Adult Nematoda: *Capillaria catostomi*, (Pearse 1924a, 1924b); *Dichelyne cotylophora*, (Pearse 1924b)

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977); *Echinorhynchus salmonis*, (Amin and Burrows 1977; Pearse 1924b); *Neoechinorhynchus crassus*, (Pearse 1924b); *Neoechinorhynchus cylindricus*, (Pearse 1924b); *Octospinifer macilentus*, (Pearse 1924b); *Pomphorhynchus bulbocolli*, (Pearse 1924b)

Immature Acanthocephala: *Pomphorhynchus bulbocolli*, (Pearse 1924b); *Leptorhynchoides thecatus*, (Pearse 1924b)

Hirudinea: *Desserobdella picta*, (Pearse 1924b)

Copepoda: *Ergasilus caeruleus*, (Pearse 1924b)

Gobiidae

***Apollonia melanostoma* (round goby)**

Larval/Immature Digenea: *Diplostomum* sp., (Camp et al. 1999)

Larval/Immature Nematoda: *Eustrongylides* sp., (Camp et al. 1999)

Adult Acanthocephala: *Acanthocephalus dirus*, (Camp et al. 1999)

Table 5, continued.

Ictaluridae

***Ameiurus melas* (black bullhead)**

Myxozoa: *Henneguya exilis*, (Guilford 1965); *Henneguya limatula*, (Guilford 1965)
Adult Digenea: *Acetodextra amiuri*, (Pearse 1924b); *Phyllodistomum staffordi*, (Pearse 1924b)
Adult Nematoda: *Dichelyne cotylophora*, (Pearse 1924b)
Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Pearse 1924b)

***Ameiurus nebulosus* (brown bullhead)**

Adult Digenea: *Acetodextra amiuri*, (Pearse 1924b); *Phyllodistomum staffordi*, (Pearse 1924a, 1924b)
Adult Cestoda: *Corallobothrium* sp., (Pearse 1924b)
Adult Acanthocephala: *Leptorhynchoides thecatus*, (Pearse 1924b)
Immature Acanthocephala: *Leptorhynchoides thecatus*, (Pearse 1924b); *Pomphorhynchus bulbocolli*, (Pearse 1924b)

***Ameiurus* sp. (bullhead)**

Larval/Immature Cestoda: *Ligula* sp., (Cooper 1919)

***Noturus gyrinus* (tadpole madtom)**

Myxozoa: *Myxobilatus noturi*, (Guilford 1965)

Esocidae

***Esox americanus* (redfin pickerel)**

Adult Nematoda: *Raphidascaris acus*, (Pearse 1924b)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Pearse 1924b)

***Esox lucius* (northern pike)**

Myxozoa: *Myxidium lieberkuehni*, (Guilford 1965)
Adult Nematoda: *Raphidascaris acus*, (Pearse 1924a)

Umbridae

***Umbra limi* (central mudminnow)**

Myxozoa: *Henneguya umbri*, (Guilford 1965); *Myxidium umbri*, (Guilford 1965); *Myxidium* sp., (Guilford 1965)

Osmeridae

***Osmerus mordax* (rainbow smelt)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Muzzall and Peebles 1988)
Larval/Immature Cestoda: *Eubothrium* sp., (Muzzall and Peebles 1988)
Larval/Immature Nematoda: *Cystidicola* sp., (Muzzall and Peebles 1988)

Table 5, continued.

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977); *Echinorhynchus salmonis*, (Amin and Burrows 1977; Muzzall and Peebles 1988)
Immature Acanthocephala: *Acanthocephalus dirus*, (Amin and Burrows 1977); *Echinorhynchus salmonis*, (Amin and Burrows 1977; Muzzall and Peebles 1988)

Salmonidae

***Coregonus artedi* (lake herring/cisco)**

Adult Cestoda: *Proteocephalus exiguus*, (La Rue 1911, 1914)
Larval/Immature Cestoda: *Diphyllobothrium oblongatum*, (Thomas 1947)
Adult Nematoda: *Cystidicola farionis*, (Ward and Magath 1916)
Copepoda: *Ergasilus caeruleus*, (Pearse 1924b); *Achtheres pimelodi*, (Pearse 1924b)

***Coregonus clupeaformis* (lake whitefish)**

Adult Cestoda: *Cyathocephalus truncatus*, (Amin 1977; Cooper 1919); *Proteocephalus exiguus*, (Amin 1977)
Adult Nematoda: *Cystidicola farionis*, (Ward and Magath 1916)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Amin and Burrows 1977; Pearse 1924b)
Hirudinea: *Piscicola milneri*, (Meyer 1940, 1946); *Piscicola punctata*, (Meyer 1940)

***Coregonus hoyi* (bloater)**

Adult Digenea: *Crepidostomum farionis*, (DeGiusti 1965); *Crepidostomum* sp., (DeGiusti 1965)
Monogenea: ?Octocotyliidae, (DeGiusti 1965)
Adult Cestoda: *Eubothrium salvelini*, (Amin 1977); *Cyathocephalus truncatus*, (DeGiusti 1965; Olson 1973; Pearse 1924b); *Proteocephalus* sp., (DeGiusti 1965)
Larval/Immature Cestoda: *Diphyllobothrium* sp., (DeGiusti 1965; Olson 1973)
Adult Nematoda: *Cystidicola stigmatura*, (Olson 1973); *Cystidicola* sp., (DeGiusti 1965)
Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977); *Echinorhynchus salmonis*, (Amin and Burrows 1977; DeGiusti 1965; Olson 1973)
Hirudinea: *Piscicola milneri*, (Pearse 1924b); leech (Olson 1973)
Copepoda: *Actheres* sp. (Olson 1973); *Salmincola extumescens*, (Buttner and Hamilton 1976); *Salmincola* sp., (DeGiusti 1965)
Remarks: Note the misspelling of *Actheres* by Olson (1973).

***Coregonus johanna* (deepwater cisco)**

Larval/Immature Nematoda: *Dichelyne cotylophora*, (Pearse 1924b)
Copepoda: *Salmincola extumescens*, (Pearse 1924b)

***Coregonus nigripinnis* (blackfin cisco)**

Adult Cestoda: *Proteocephalus exiguus*, (La Rue 1911, 1914)

***Coregonus prognathus* (longjaw whitefish)**

Adult Cestoda: *Proteocephalus exiguus*, (La Rue 1911, 1914)

Table 5, continued.

Coregonus spp. (coregonines)

Adult Cestoda: *Proteocephalus exiguus*, (Pearse 1924b); *Proteocephalus* sp., (Pearse 1924b)

Adult Nematoda: *Cystidicola farionis*, (Pearse 1924b)

Adult Acanthocephala: *Echinorhynchus leidy*, (Pearse 1924b); *Echinorhynchus salmonis*, (Pearse 1924b)

Oncorhynchus kisutch (coho salmon)

Adult Cestoda: *Eubothrium salvelini*, (Muzzall 1993)

Larval/Immature Cestoda: *Eubothrium salvelini*, (Muzzall 1989); *Diphyllobothrium* sp., (Muzzall 1989, 1993); *Proteocephalus* sp., (Muzzall 1989, 1993)

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977, 1985); *Echinorhynchus salmonis*, (Amin 1985; Amin and Burrows 1977; Hnath 1969; Muzzall 1989, 1993)

Copepoda: *Ergasilus nerkae*, (Buttner and Hamilton 1976)

Oncorhynchus mykiss (rainbow trout)

Adult Cestoda: *Eubothrium salvelini*, (Amin 1977; Muzzall 1993)

Larval/Immature Cestoda: *Eubothrium salvelini*, (Muzzall 1989); *Diphyllobothrium* sp., (Muzzall 1993)

Adult Nematoda: *Cystidicola farionis*, (Muzzall 1989, 1993)

Larval/Immature Nematoda: *Spinitectus* sp., (Muzzall 1989)

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977); *Echinorhynchus salmonis*, (Amin and Burrows 1977; Muzzall 1989, 1993)

Copepoda: *Ergasilus luciopercarum*, (Buttner and Hamilton 1976)

Oncorhynchus tshawytscha (Chinook salmon)

Ciliophora: *Trichodina* sp., (Muzzall 1993); *Capriniana* sp., (Muzzall 1993)

Adult Cestoda: *Eubothrium salvelini*, (Muzzall 1993); *Cyathocephalus truncatus*, (Muzzall 1993)

Larval/Immature Cestoda: *Eubothrium salvelini*, (Muzzall 1989); *Diphyllobothrium* sp., (Muzzall 1989, 1993); *Proteocephalus* sp., (Muzzall 1989, 1993)

Adult Nematoda: *Capillaria salvelini*, (Muzzall 1993); *Cystidicola farionis*, (Muzzall 1993); *Spinitectus gracilis*, (Muzzall 1993)

Larval/Immature Nematoda: *Capillaria* sp., (Muzzall 1989); *Haplonema hamulatum*, (Muzzall 1993)

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977, 1985; Muzzall 1989, 1993); *Echinorhynchus salmonis*, (Amin 1985; Amin and Burrows 1977; Muzzall 1989, 1993)

Hirudinea: *Placobdella parasitica*, (Amin 1977)

Copepoda: *Ergasilus luciopercarum*, (Buttner and Hamilton 1976; Muzzall 1993)

Salmo trutta (brown trout)

Adult Cestoda: *Eubothrium salvelini*, (Amin 1977)

Larval/Immature Cestoda: *Eubothrium salvelini*, (Muzzall 1989)

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977); *Echinorhynchus salmonis*, (Amin and Burrows 1977; Muzzall 1989)

Copepoda: *Ergasilus luciopercarum*, (Buttner and Hamilton 1976)

Table 5, continued.

***Salvelinus namaycush* (lake trout)**

Adult Cestoda: *Eubothrium crassum*, (Cooper 1919; Pearse 1924b); *Eubothrium salvelini*, (Amin 1977; Muzzall 1989)

Larval/Immature Cestoda: *Proteocephalus* sp., (Muzzall 1989)

Adult Nematoda: *Cystidicola farionis*, (Ward and Magath 1916)

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977, 1985; Muzzall 1989); *Echinorhynchus leidyi*, (Pearse 1924b); *Echinorhynchus salmonis*, (Amin 1985; Amin and Burrows 1977; Hnath 1969; Muzzall 1989; Pearse 1924b)

Hirudinea: Unidentified leeches, (Pearse 1924b)

Copepoda: *Salmincola extensus*, (Pearse 1924b)

Percopsidae

***Percopsis omiscomaycus* (trout-perch)**

Myxozoa: *Myxobolus procercum*, (Guilford 1965)

Gadidae

***Lota lota* (burbot)**

Adult Cestoda: *Eubothrium crassum*, (Cooper 1919; Pearse 1924b); *Proteocephalus* sp., (Pearse 1924b)

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977); *Echinorhynchus salmonis*, (Amin and Burrows 1977; Pearse 1924b)

Hirudinea: *Piscicola milneri*, (Pearse 1924b); unidentified leeches, (Pearse 1924b)

Copepoda: *Achtheres pimelodi*, (Pearse 1924b)

Fundulidae

***Fundulus* sp. (killifish/topminnow)**

Larval/Immature Cestoda: Order Trypanorhyncha gen. sp., (*Haplobothrium* sp.?); (Pearse 1924b)

Gasterosteidae

***Culaea inconstans* (brook stickleback)**

Myxozoa: *Myxobolus eucalia*, (Guilford 1965); *Myxobilatus* sp., (Guilford 1965)

***Pungitius pungitius* (ninespine stickleback)**

Copepoda: *Ergasilus nerkae*, (Hudson et al. 1994)

Small fish in the Gasterosteidae

Larval/Immature Cestoda: *Schistocephalus thomasi*, (Garoian 1960)

Table 5, continued.

Cottidae

***Cottus bairdii* (mottled sculpin)**

Mastigophora: *Trypanosoma* sp., (Yeo 1985)

Myxozoa: *Myxobilatus cotti*, (Guilford 1965)

***Cottus cognatus* (slimy sculpin)**

Mastigophora: *Trypanosoma* sp., (Yeo 1985)

Myxozoa: *Myxobolus cognati*, (Cone et al. 1996)

Adult Cestoda: *Cyathocephalus truncatus*, (Amin 1977)

Larval/Immature Cestoda: *Schistocephalus* sp., (French and Muzzall 2008)

Adult Acanthocephala: *Acanthocephalus dirus*, (Amin 1977); *Echinorhynchus salmonis*, (Amin and Burrows 1977)

***Myoxocephalus thompsonii* (deepwater sculpin)**

Ciliophora: *Trichodina* sp., (Muzzall et al. 1997)

Microspora: *Pleistophora* sp., (Muzzall et al. 1997)

Larval/Immature Cestoda: *Eubothrium salvelini*, (Muzzall et al. 1997); *Cyathocephalus truncatus*, (Muzzall et al. 1997)

Immature Acanthocephala: *Echinorhynchus salmonis*, (Muzzall et al. 1997)

“Cottid”

Adult Cestoda: *Proteocephalus* sp., (Pearse 1924b)

Centrarchidae

***Ambloplites rupestris* (rock bass)**

Adult Digenea: *Caecinicola parvulus*, (Pearse 1924b); *Cryptogonimus chili*, (Pearse 1924b)

Larval/Immature Digenea: *Diplostomum* sp., (Pearse 1924b)

Adult Cestoda: *Proteocephalus* sp., (Pearse 1924b)

Adult Nematoda: *Spinitectus gracilis*, (Pearse 1924b)

Hirudinea: *Piscicolaria* sp., (Pearse 1924b)

Copepoda: *Ergasilus caeruleus*, (Pearse 1924b); *Ergasilus centrarchidarum*, (Pearse 1924b)

***Lepomis gibbosus* (pumpkinseed)**

Adult Digenea: *Cryptogonimus chili*, (Pearse 1924b)

Larval/Immature Digenea: *Diplostomum* sp., (Pearse 1924b)

Adult Nematoda: *Ascaris* (?) *angulata*, (Pearse 1924b); *Spinitectus gracilis*, (Pearse 1924b)

Larval/Immature Nematoda: *Philometra cylindracea*, (Pearse 1924b)

Table 5, continued.

***Micropterus dolomieu* (smallmouth bass)**

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Pearse 1924b); *Triaenophorus nodulosus*, (Pearse 1924b)

Adult Acanthocephala: *Echinorhynchus leidy*, (Pearse 1924b)

Hirudinea: *Piscicola* sp., (Pearse 1924b)

Copepoda: *Achtheres ambloplitis*, (Pearse 1924b)

“Bream” This is one or more species of centrarchid.

Adult Digenea: *Phyllodistomum superbum*, (Pearse 1924a)

Percidae

***Etheostoma exile* (Iowa darter)**

Larval/Immature Nematoda: *Philometra cylindracea*, (Pearse 1924b)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Pearse 1924b)

***Etheostoma nigrum* (Johnny darter)**

Myxozoa: *Myxobolus neurophilus*, (Guilford 1963)

Larval/Immature Nematoda: *Philometra cylindracea*, (Pearse 1924b)

***Perca flavescens* (yellow perch)**

Myxozoa: *Henneguya doori*, (Guilford 1963); *Myxobolus neurophilus*, (Guilford 1963); *Myxobolus scleroperca*, (Guilford 1963; Muzzall 1995)

Adult Digenea: *Crepidostomum cooperi*, (Carney and Dick 1999); *Bunodera sacculata*, (Muzzall 2002); *Stephanophiala farionis* (?*Crepidostomum farionis*), (Pearse 1924b); *Azygia* sp., (Pearse 1924b);

Phyllodistomum superbum, (Pearse 1924a, 1924b)

Larval/Immature Digenea: *Clinostomum complanatum*, (Pearse 1924b); *Diplostomum* sp., (Carney and Dick 2000; Pearse 1924b); *Apophallus* sp., (Carney and Dick 2000)

Monogenea: *Urocleidus adspectus*, (Carney and Dick 2000)

Adult Cestoda: *Proteocephalus* sp., (Pearse 1924b); *Bothriocephalus cuspidatus*, (Carney and Dick 1999); *Cyathocephalus truncatus*, (Carney and Dick 1999, 2000); *Proteocephalus pearsei*, (Carney and Dick 1999, 2000; Pearse 1924b)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Pearse 1924b); *Triaenophorus nodulosus*, (Pearse 1924b)

Adult Nematoda: *Philometra cylindracea*, (gravid individuals?, Pearse 1924b); *Camallanus oxycephalus*, (Carney and Dick 1999, Carney and Dick 2000); *Dichelyne cotylophora*, (Amin 1977; Carney and Dick 1999, 2000; Muzzall 1999); *Rhabdochona ovifilamenta*, (Weller 1938); *Spinitectus gracilis*, (Carney and Dick 2000)

Larval/Immature Nematoda: *Contraecum* sp., (Muzzall 1999); *Dichelyne cotylophora*, (Carney and Dick 1999); *Eustrongylides tubifex*, (Allison 1966; Muzzall 1999); *Eustrongylides* sp., (Carney and Dick 2000); *Raphidascaris acus*, (Carney and Dick 2000); *Agamonema* sp., (Carney and Dick 2000)

Adult Acanthocephala: *Echinorhynchus leidy*, (Pearse 1924b); *Echinorhynchus salmonis*, (Amin and Burrows 1977; Carney and Dick 2000; Pearse 1924b); *Neoechinorhynchus* sp., (Carney and Dick 2000); *Leptorhynchoides thecatus*, (Pearse 1924b)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Pearse 1924b)

Table 5, continued.

Hirudinea: *Desserobdella picta*, (Pearse 1924b)
 Copepoda: *Ergasilus caeruleus*, (Pearse 1924b); *Ergasilus luciopercarum*, (Buttner and Hamilton 1976; Carney and Dick 2000)

***Percina caprodes* (logperch)**

Myxozoa: *Myxobolus scleroperca*, (Guilford 1963)
 Larval/Immature Digenea: *Diplostomum* sp., (Pearse 1924b)

Sciaenidae

***Aplodinotus grunniens* (freshwater drum)**

Adult Digenea: *Homalometron armatum*, (Pearse 1924b)

Unspecified Fishes

Large numbers of fishes

Hirudinea: *Piscicola milneri*, (Milner 1874)

Table 6. Numbers and percentages (in parentheses) of parasite species in each major parasite group reported for each of five major fish families from Lake Michigan, 1874-2010. Parasite group abbreviations are Ci (Ciliophora), My (Myxozoa), Dt (Digenea), Mo (Monogenea), Ce (Cestoda), Ne (Nematoda), Ac (Acanthocephala), Hi (Hirudinea), and Co (Copepoda).

| Fish family | Parasite group | | | | | | | | | Total |
|---------------|----------------|-----------|--------|-------|--------|--------|--------|--------|--------|-------|
| | Ci | My | Dt | Mo | Ce | Ne | Ac | Hi | Co | |
| Cyprinidae | 0 | 7 (58) | 1 (8) | 0 | 1 (8) | 1 (8) | 2 (7) | 0 | 0 | 12 |
| Catostomidae | 0 | 0 | 1 (6) | 0 | 3 (20) | 2 (13) | 7 (47) | 1 (7) | 1 (7) | 15 |
| Centrarchidae | 0 | 0 | 4 (31) | 0 | 2 (15) | 2 (15) | 1 (8) | 1 (8) | 3 (23) | 13 |
| Percidae | 0 | 3 (9) | 8 (24) | 1 (3) | 5 (15) | 8 (24) | 5 (15) | 1 (3) | 2 (6) | 33 |
| Salmonidae | 2 (7) | 0 | 2 (7) | 1 (4) | 5 (19) | 5 (19) | 3 (11) | 3 (11) | 6 (22) | 27 |

Table 7. Jaccard coefficients of parasite-community similarity based on the presence of parasites reported for five fish families from Lake Michigan during 1874-2010.

| Fish family | Cyprinidae | Catostomidae | Salmonidae | Centrarchidae |
|---------------|------------|--------------|------------|---------------|
| Cyprinidae | 1.0000 | 0.1250 | 0.0256 | 0.0416 |
| Catostomidae | 0.1250 | 1.0000 | 0.1714 | 0.1153 |
| Salmonidae | 0.0256 | 0.1714 | 1.0000 | 0.1081 |
| Centrarchidae | 0.0416 | 0.1153 | 0.1081 | 1.0000 |
| Percidae | 0.0434 | 0.2000 | 0.1851 | 0.1951 |

LAKE SUPERIOR

Results

Parasite Species

Thirty-five studies conducted during 1871-2010 have reported a parasite species infecting 1 or more fish species in Lake Superior. Most studies were conducted during 1980-1999 (Table 4). A total of 148 parasite species (4 Mastigophora, 5 Ciliophora, 8 Myxozoa, 19 adult Digenea, 12 larval/immature Digenea, 26 Monogenea, 18 adult Cestoda (not including *Dibothrium infundibuliforme*), 6 larval/immature Cestoda, 18 adult Nematoda, 3 larval/immature Nematoda, 13 adult Acanthocephala, 4 Hirudinea, 11 Copepoda, 1 Mollusca) have been reported from Lake Superior fish (Table 2). Although *Bucephalus elegans*, *Bothriocephalus* sp., *Proteocephalus* sp., *Triaenophorus crassus*, *T. nodulosus*, *Hysterothylacium brachyurum*, *Camallanus oxycephalus*, *Cystidicola farionis*, *Echinorhynchus* sp., *Neoechinorhynchus tumidus*, *Pomphorhynchus bulbocolli*, and *Leptorhynchoides thecatus* were represented in both adult and larval/immature groups, they are listed in the adult category and only counted once. The parasites by taxonomic group and family, infecting fish from Lake Superior, are listed in Table 8.

Protozoans

Only one genus of mastigophoran, *Trypanosoma*, possibly representing three or more species, was found in the blood of *Gymnocephalus cernuus* and *Cottus* spp. Three species of ciliophorans (*Ichthyophthirius multifiliis*, *Scyphidia* sp., *Tetrahymena* sp.) have been reported from *G. cernuus*. *Trichodina urinaria* and *Trichodina* sp. infected *Perca flavescens* and *Ambloplites rupestris*, respectively. Seven species of myxozoans in the Myxobolidae have been reported, with most species occurring in one fish species or in one family. *Thelohanellus notatus* was found in three species of cyprinids. All protozoans occurred in non-intestinal sites.

Digenetic Trematodes

This parasite group was the most represented with the largest number of species (31) and eight families. Individual families were represented by only one species, except for the Allocreadiidae and Gorgoderidae. The family Allocreadiidae had eight species represented, with *Crepidostomum farionis* reported from seven fish species. Five species of *Crepidostomum* and four species of *Phyllodistomum* were documented. Individuals of most digenean species occurred only in the intestine, except for *Crepidostomum farionis* (also gall bladder), *Phyllodistomum farionis* and *Phyllodistomum coregoni* (ureters), and *Sanguinicola occidentalis* (blood). Individuals of six families were represented by larval/immature digenetic trematodes mostly infecting non-intestinal sites. *Ichthyocotylurus erraticus* was associated with the heart of five fish species. Seven species are in the Diplostomidae, with *Diplostomum spathaceum* reported from 16 fish species.

Monogeneans

Twenty-six species representing seven families of monogeneans were reported. Nine and seven species were in the Ancyrocephalidae and Dactylogyridae, respectively. The genera *Urocleidus* and *Dactylogyrus* were each represented by five species. Most species occurred on the gills, except for *Lyrodiscus rupestris* and *Pellucidhaptor catostomi* (fins, nares, nasal cavity), *Acolpenteron catostomi* (ureters), *Gyrodactylus bairdi* (also fins) and *Gyrodactylus dechtiara* (fins). Most monogenean species were host-specific to one fish species or one fish family, but *Discocotyle sagittata* was found on the gills of five salmonid species.

Cestodes

Adult cestodes in seven families have been reported. Four species of caryophyllids occurred in catostomids, *Eubothrium crassum* and *E. salvelini* only infected salmonids, and *Eubothrium rugosum* was only found in *Lota lota*. *Eubothrium salvelini* and *Cyathocephalus truncatus* infected six and five fish species, respectively. Seven species are in the Proteocephalidae with six of these species in the genus *Proteocephalus*. Many species in this family are host-specific to one fish species or family. *Triaenophorus crassus* and *T. nodulosus* are host-specific to *Esox lucius*.

Larval/immature cestodes from four families were found. Five species (*Diphyllobothrium ditremum*, *D. laruei*, *D. latum*, *D. oblongatum*, *Ligula intestinalis*) are in the Diphyllbothriidae. *Diphyllobothrium ditremum*, *D. laruei*, and *D. oblongatum* only infected coregonids. *Diphyllobothrium latum* has only been reported from *Esox lucius* and *Lota lota*. Species in this family and *Triaenophorus* spp. were found in a variety of non-intestinal sites. Larvae of *Triaenophorus crassus* occurred in coregonids and salmonids. Only *Bothriocephalus* sp., *Proteocephalus ambloplitis*, and *Proteocephalus* sp. were solely represented as immature individuals, and these occurred in the intestine.

Nematodes

Adult nematodes representing eight families were reported. All individuals occurred in the digestive tract, except for *Cystidicola* spp. (swimbladder), *Philometroides nodulosus* (cheek galleries), and *Philonema oncorhynchi* (body cavity). Five nematode species were from the family Cystidicolidae. *Capillaria salvelini* has been reported from 4 species of *Oncorhynchus* and 2 species of whitefish, *Cystidicola farionis* from 13 fish species, *C. stigmatura* from 4 species, *Cystidicoloides ephemeridarum* from 5 species, and *Spinitectus gracilis* from 7 fish species. Four species in the Rhabdochonidae have been identified. Of the seven larval/immature nematode species found, *Contraecaecum* sp., *Hysterothylacium brachyurum*, *Raphidascaris acus*, and *Spiroxys* sp. occurred in non-intestinal sites and *Camallanus oxycephalus*, *C. farionis*, and *Haplonema* sp. were reported from the intestine.

Acanthocephalans

Adult acanthocephalan species representing four families were found. Neoechinorhynchidae was represented by eight species with the genus *Neoechinorhynchus* most common. *Neoechinorhynchus crassus*, *N. cristatus*, and *Octospinifer macilentus* infected primarily catostomids. *Echinorhynchus salmonis* infected 17 fish species. *Acanthocephalus dirus* and *Pomphorhynchus bulbocolli* infected nine and seven species, respectively. Three of the four species of immature acanthocephalans were found in the intestine—only *Leptorhynchoides thecatus* occurred in non-intestinal sites.

Leeches

Four species of leeches (*Actinobdella inequiannulata*, *Myzobdella lugubris*, *Piscicola milneri*, *P. punctata*) in two families were infrequently found on fish.

Crustaceans

Two families of parasitic copepods were documented—Ergasilidae (5 species) and Lernaepodidae (6 species). *Ergasilus caeruleus* and *E. nerkae* were found on four and five fish species, respectively. Other copepod species (*E. centrarchidarum*, *E. cotti*, *E. luciopercarum*, *Achtheres pimelodi*, *Salmincola extensus*, *S. extumescens*, *S. inermis*, *S. lotae*) are host-specific to one fish species or one fish family.

Molluscs

Unidentified glochidia occurred on *Pungitius pungitius*, *Percopsis omiscomaycus*, and *Perca flavescens*.

Fish Species—Parasite Analyses

Thirty-seven fish species (44%) of the 85 established fish species in 14 families were examined for parasites from Lake Superior (Table 9). Of these 37 fish species, 20 (54%) species have had some aspect of their parasites studied only once. The most fish species examined were in Salmonidae (15) and Cyprinidae (4). Among individual fishes, parasite species-richness was highest in *Coregonus artedi* (28), *Catostomus commersonii* (25), and *Notropis hudsonius* (21). Only one parasitic study was reported for nineteen fish species (*Acipenser fulvescens*, *Alosa pseudoharengus*, *Luxilus cornutus*, *Pimephales notatus*, *Rhinichthys cataractae*, *Ameiurus nebulosus*, *Coregonus alpena*, *C. clupeaformis*, *C. hoyi*, *C. kiyi*, *C. zenithecus*, *Prosopium coulteri*, *Salmo trutta*, *Cottus bairdii*, *C. ricei*, *Ambloplitis rupestris*, *Micropterus dolomieu*, *Perca flavescens*, *Sander vitreus*) and only two studies were reported for seven fish species (*Catostomus catostomus*, *C. commersonii*, *Esox lucius*, *Salvelinus fontinalis*, *Percopsis omiscomaycus*, *Cottus cognatus*, *Gymnocephalus cernuus*). *Notropis hudsonius*, *Pungitius pungitius*, and *Oncorhynchus tshawytscha* each had three studies on their parasites, and *Oncorhynchus kisutch* and *Onocorhynchus mykiss* four studies. *Oncorhynchus gorbuscha*, *Prosopium cylindraceum*, *Osmerus mordax* and *Lota lota* each had 5 studies, *Salvelinus namaycush* 9 studies, and *Coregonus artedi* 13 studies.

Fifty fish species plus one hybrid (*Salvelinus namaycush* x *Salvelinus fontinalis*) from Lake Superior that have not had information published on their parasites are: *Ichthyomyzon fossor*, *I. unicuspis*, *Lampetra appendix*, *Petromyzon marinus*, *Lepisosteus osseus*, *Dorosoma cepedianum*, *Couesius plumbeus*, *Cyprinus carpio*, *Hybognathus hankinsoni*, *Margariscus margarita*, *Nocomis biguttatus*, *Notemigonus crysoleucas*, *Notropis atherinoides*, *N. heterodon*, *N. heterolepis*, *N. volucellus*, *N. stramineus*, *Opsopoeodus emiliae*, *Phoxinus eos*, *P. neogaeus*, *Pimephales promelas*, *Rhinichthys obtusus*, *Semotilus atromaculatus*, *Moxostoma anisurum*, *M. macrolepidotum*, *M. valenciennesi*, *Ameiurus melas*, *A. natalis*, *Ictalurus punctatus*, *Noturus flavus*, *N. gyrinus*, *Esox masquinongy*, *Umbra limi*, *Apeltes quadracus*, *Culaea inconstans*, *Gasterosteus aculeatus*, *Myoxocephalus thompsonii*, *Morone americana*, *M. chrysops*, *Lepomis gibbosus*, *L. macrochirus*, *Micropterus salmoides*, *Pomoxis nigromaculatus*, *Etheostoma exile*, *E. flabellare*, *E. microperca*, *E. nigrum*, *Percina caprodes*, *Sander canadensis*, and *Aplodinotus grunniens*.

Fish Families—Parasite Species-Richness, Parasite Analyses

The values for parasite species-richness and number of fish species examined (in parentheses) for each of the five major fish families were Centrarchidae (24, 2), Cyprinidae (29, 4), Catostomidae (32, 2), Percidae (38, 3), and Salmonidae (45, 15). The correlation coefficient between parasite species-richness and number of fish species examined for each family using these values for all five families was nonsignificant ($r_s = 0.615$).

Parasites only found in centrarchids were adult digenetic trematodes (*Proterometra macrostoma*), larval digenetic trematodes (*Uvulifer ambloplitis*), monogeneans (*Lyrodiscus rupestris*), larval/immature nematodes (*Camallanus oxycephalus*), adult acanthocephalans (*Leptorhynchoides thecatus*), immature acanthocephalans (*Leptorhynchoides thecatus*), leeches (*Myzobdella lugubris*), and copepods (*Achtheres pimelodi*, *Ergasilus centrarchidarum*). Parasite species only found in cyprinids were protozoans (*Myxobolus algonquiensis*, *M. burti*, *M. grandis*, *Thelohanellus notatus*, *Zschokkella* sp.), larval/immature digenetic trematodes (*Centrovarium lobotes*, *Crassiphiala bulboglossa*, *Tylodelphys scheuringi*), monogeneans (*Dactylogyrus banghami*, *D. bifurcatus*, *D. cornutus*, *Gyrodactylus dechtiara*, *Octomacrum microconfibula*), adult nematodes (*Rhabdochona decaturensis*), and adult acanthocephalans (*Neoechinorhynchus notemigoni*). Parasites only found in catostomids were protozoans (*Myxobolus bibullatum*), adult digenetic trematodes (*Lissorchis attenuatus*, *Phyllodistomum lysteri*, *Plagiocirrus* sp.), monogeneans (*Acolpenteron catostomi*, *Anonchohaptor anomalus*, *Octomacrum lanceatum*), adult cestodes (*Glaridacris catostomi*, *G. laruei*, *Isoglaridacris bulbocirrus*, *Monobothrium hunteri*), larval cestodes (*Ligula intestinalis*), adult nematodes (*Capillaria catostomi*, *Philometroides nodulosa*), adult acanthocephalans (*Neoechinorhynchus cristatus*, *Octospinifer macilentus*), leeches (*Actinobdella inequiannulata*), and copepods (*Ergasilus caeruleus*, *E. nerkae*). Parasites only found in percids were protozoans (*Trypanosoma acerinae*, *Trichodina urinaria*, *Ichthyophthirius multifiliis*, *Scyphidia* sp., *Tetrahymena* sp.), adult digenetic trematodes (*Acanthostomum* sp., *Bucephalus elegans*, *Bunodera sacculata*, *Crepidostomum cooperi*, *Phyllodistomum superbum*, *Sanguinicola occidentalis*), larval digenetic trematodes (*Apophallus brevis*, *Bucephalus elegans*, *Neascus brevicaudatus*), monogeneans (*Dactylogyrus amphibothrium*, *D. hemiamphibothrium*), adult nematodes (*Camallanus oxycephalus*, *Dichelyne cotylophora*, *Rhabdochona ovifilamenta*, *Spinitectus carolini*), larval/immature nematodes (*Hysterothylacium brachyurum*), copepods (*Ergasilus centrarchidarum*), and mollusks (unidentified glochidia). Parasites only found in salmonids were protozoans (*Chloromyxum* sp., *Henneguya zschokkei*, *Henneguya* sp.), adult digenetic trematodes (*Crepidostomum farionis*, *C. isostomum*, *Phyllodistomum coregoni*), monogeneans (*Discocotyle sagittata*), adult cestodes (*Eubothrium crassum*, *E. salvelini*, *Proteocephalus exiguus*, *P. laruei*, *P. parallacticus*, *P. salvelini*), larval cestodes (*Diphyllbothrium ditremum*, *D. laruei*, *D. oblongatum*, *Diphyllbothrium* sp., *Triaenophorus crassus*), adult nematodes (*Capillaria salvelini*, *Cystidicoloides ephemeridarum*, *Cystidicoloides* sp., *Philonema oncorhynchi*), immature nematodes (*Haplonema* sp.), adult acanthocephalans (*Neoechinorhynchus tumidus*), leeches (*Piscicola milneri*), and copepods (*Salmincola extensus*, *S. extumescens*, *S. inermis*, *S. siscowet*). The parasite group(s) (in parentheses) most common in each fish family were Cyprinidae (digenetic trematodes), Catostomidae (digenetic trematodes and cestodes), Centrarchidae (digenetic trematodes followed by monogeneans), Percidae (digenetic trematodes followed by nematodes), and Salmonidae (cestodes followed by nematodes) (Table 10).

The numbers and percentages of autogenic and allogenic helminth species (in parentheses) for each fish family, respectively, were Centrarchidae (10 species, 71%, 4 species, 29%), Cyprinidae (9 species, 50%, 9 species, 50%), Catostomidae (19 species, 86%, 3 species, 14%), Percidae (20 species, 77%, 6 species, 23%), and Salmonidae (28 species, 82%, 6 species, 18%).

Jaccard Coefficients of Parasite Communities—Fish Families

Jaccard coefficients of parasite-community similarity were calculated for the following fish families and species: Centrarchidae (*Ambloplites rupestris*, *Micropterus dolomieu*), Cyprinidae (*Luxilus cornutus*, *Notropis hudsonius*, *Pimephales notatus*, *Rhinichthys cataractae*), Catostomidae (*Catostomus catostomus*, *C. commersonii*), Percidae (*Gymnocephalus cernuus*, *Perca flavescens*, *Sander vitreus*), and Salmonidae (*Coregonus alpenae*, *C. artedi*, *C. clupeaformis*, *C. hoyi*, *C. kiyi*, *C. zenithicus*, *Oncorhynchus gorbusha*, *O. kisutch*, *O. mykiss*, *O. tshawytscha*, *Prosopium coulteri*, *P. cylindraceum*, *Salmo trutta*, *Salvelinus fontinalis*, *S. namaycush*). The coefficients were very low and ranged from 0.0377 (Catostomidae and Centrarchidae) to 0.0923 (Salmonidae and Centrarchidae) and indicate that few parasite species are shared among fish species in these fish families (Table 11).

Species or a specific genus of each major parasite group reported for two or more of the five fish families (in parentheses) are: adult digenetic trematodes—*Allocreadium lobatum* (2), *Crepidostomum cornutum* (2), *Azygia angusticauda* (2), larval/immature digenetic trematodes—*Clinostomum complanatum* (4), *Diplostomum spathaceum* (10), *Posthodiplostomum minimum* (2), *Ichthyocotylurus erraticus* (2), *Ichthyocotylurus pileatus* (2), adult cestodes—*Cyathocephalus truncatus* (2), larval/immature cestodes—*Bothriocephalus* sp. (2), *Diphyllobothrium latum* (2), *Ligula intestinalis* (3), *Proteocephalus ambloplitis* (2), *Triaenophorus nodulosus* (2), adult nematodes—*Hysterothylacium brachyurum* (4), *Cystidicola farionis* (2), *Cystidicola stigmatura* (2), *Rhabdochona canadensis* (2), *Spinitectus gracilis* (4), larval/immature nematodes—*Raphidascaris acus* (2), adult acanthocephalans—*Acanthocephalus dirus* (8), *Echinorhynchus lateralis* (2), *Echinorhynchus salmonis* (8), *Neoechinorhynchus crassus* (2), *Neoechinorhynchus cylindratus* (2), *Neoechinorhynchus rutili* (2), *Neoechinorhynchus tenellus* (2), *Pomphorhynchus bulbocolli* (5), and *Leptorhynchoides thecatus* (3).

Discussion

Lake Superior is the largest and deepest of the Great Lakes with an approximate length and width of 563 km and 257 km, respectively (Herdendorf, 1982). Its surface area is approximately 82,100 km² and has a mean depth (maximum) of 149 m (405 m). The waters of Lake Superior flow into Lake Huron through the St. Marys River.

Cudmore-Vokey and Crossman (2000) listed a total of 85 established fish species in Lake Superior. Thirty-seven fish species (44%) of the established fish species representing 14 families were examined for parasites (Table 5). The primary survey done on the parasites of Lake Superior fish was by Dechtiar and Lawrie (1988) who examined 27 fish species and found 122 parasite species (not including agnaths). The numbers (in parentheses) found by them in each main parasite group were Protozoa (7), Digenetic Trematoda (28), Monogenea (26), Cestoda (17), Nematoda (18), Acanthocephala (12), Crustacea (8), Hirudinea (5), and Mollusca (1). The number of parasitic species in each group reported in this synopsis was similar to that reported by Dechtiar and Lawrie (1988), except for protozoans (+10 species) and cestodes (+7 species).

Pathogenic Parasites

Protozoans

The effect of *Trypanosoma* spp. in the blood of infected fish is difficult to measure based on the small number studies performed. Some ciliophorans (*Ichthyophthirius multifiliis*, *Trichodina urinaria*, *Tetrahymena* sp.) and myxozoans (*Henneguya* spp., *Myxobolus* spp., *Thelohanellus notatus*) can infect a variety of non-intestinal sites damaging the skin, muscle, internal organs, and gills causing weight loss to their fish hosts as well as mortalities (Elser 1955; Dogiel et al. 1958; Reichenbach-Klinke and Elkan 1965; Reichenbach-Klinke 1973; Hoffman et al. 1975).

Digenetic Trematodes

Of the adult digenetic trematodes found, it is possible that *Crepidostomum farionis* in the gall bladder (D. Mitchum, Wyoming Game and Fish Department, personal communication, 1966; Hoffman (1999)), *Phyllodistomum* spp. in the ureters (Gleason et al. 1983), and *Sanguinicola* sp. in the blood can cause pathology to their hosts (Wales 1958a). Larval digenetic trematodes (called metacercariae; typically encysted) that are known to cause pathology and mortalities of fish, especially young ones, are: *Clinostomum complanatum*, *Centrovarium lobotes*, *Crassiphiala bulboglossa*, *Diplostomum spathaceum*, *Diplostomum* sp., *Neascus* sp., *Posthodiplostomum minimum*, *Ichthyocotylurus erraticus*, and *Ichthyocotylurus pileatus* (see Meyer 1958; Kozicka 1958; Bychovaskaya-Pavlovskaya and Petrushevski 1963; Dukes 1975).

Monogeneans

Several species of monogeneans are considered potentially harmful to fish, particularly for young fish, and three of these species, *Discocotyle sagittata*, *Tetraonchus monenteron*, and *T. variabilis*, were documented in Lake Superior (Mizelle 1938; Tripathi 1959; Dogiel et al. 1958; Lester and Adams 1974). When abundant, these species can cause mechanical damage at their attachment site, including gill lesions, epithelial hyperplasia, fusion of lamellae and filaments, and filament clubbing (Williams and Jones 1994).

Cestodes

Eubothrium crassum, *E. rugosum*, *E. salvelini*, *Cyathocephalus truncatus*, *Triaenophorus crassus*, and *T. nodulosus* are adult cestodes that have been reported to cause pathology to fish (Vik 1954, 1958; Smith and Margolis 1970; Boyce 1979). Larval cestodes (plerocercoids) of *Diphyllobothrium* spp., *Ligula intestinalis*, *Proteocephalus ambloplitis*, *Triaenophorus crassus*, *T. nodulosus*, and *Triaenophorus* sp. can cause various pathology and problems to fish, including destruction of ovary and oogenic tissue, sterility, haemorrhage caused by moving plerocercoids, poor condition and stunting (Esch and Huffines 1973; Hoffman and Dunbar 1961; McCormick and Stokes 1982). It is also possible that the occurrence of *Triaenophorus crassus* and *Triaenophorus* sp. in the muscle of salmonids may cause difficulties in marketing these fish (Hoffman 1941; Miller 1945, 1952; Welch 1950, 1952; Warren 1952). Problems associated with muscle of fish infected with *Triaenophorus* include tissue reduced to homogenous mass as well as haemorrhage and lesions caused by moving plerocercoids, and encapsulation of plerocercoids, accompanied by inflammation (Pronina 1977; Davydov 1981; Rosen and Dick 1984).

Nematodes

Wright (1879) was the first study on a parasite infecting a fish from Lake Superior and that parasite was the nematode *Cystidicola stigmatura* in the swim bladder of *Salvelinus namaycush*. *Cystidicola farionis* infects the swim bladder of coregonines, salmonines and *Osmerus mordax*, and *C. stigmatura* occurs in the swim bladder of *Salvelinus* spp. Black (1984) reported on swim bladder lesions in *S. namaycush* that may have been caused by adult *C. stigmatura*. The larval stages of *Contraecaecum* sp., *Hysterothylacium brachyurum*, and *Raphidascaris acus* occurring in the viscera, including the liver, can cause inflammation, damage, and fibrosis in a variety of fishes, including salmonids (Williams 1967). Dick et al. (1987) believed that efforts to establish an *Oncorhynchus mykiss* population in an inland lake failed because of high intensities of *Contraecaecum* spp.

Acanthocephalans

Of the adult acanthocephalans, *Acanthocephalus dirus*, *Echinorhynchus lateralis*, and *Echinorhynchus salmonis* are the most-important species causing inflammation of the intestinal tract, thus reducing the amount of surface area for nutrient absorption in their fish hosts (Bullock 1963; Pippy and Sandeman 1967; Schmidt et al. 1974). *Pomphorhynchus bulbocolli* caused erosion of the epithelium, marked cellular reaction, and the formation of a fibrous capsule around its proboscis when it penetrated the intestinal wall (McDonough and Gleason 1981).

Leeches

The first report of a parasitic organism from Lake Superior was Verrill (1871) who commented on the occurrence of the leech *Piscicola punctata*, but did not document it infecting a fish. Leeches occasionally cause fish mortalities (Rupp and Meyer 1954). However, leeches are not important pathogens of fish in Lake Superior to date, except for *Actinobdella inequiannulata* that can damage the gills and operculum of catostomids by eroding the epithelium and causing

hyperplasia of the surrounding epithelium and an intense inflammatory response (Dechtiar and Lawrie 1988).

Crustaceans

Several species of *Ergasilus* infect a variety of fish species in Lake Superior. These can cause mechanical damage when attached to the gills, fins, and other areas producing hemorrhaging and epithelial hyperplasia in heavy infections (Kabata 1970; Dechtiar and Lawrie 1988). Several species of *Salmincola* infect cold-water fish species in the Great Lakes, including Lakes Michigan and Superior, causing hyperplasia of gill filaments and growth inhibition of infected gill filaments (Piasecki and Avenant-Oldewage 2008).

Parasite Host Specificity—Jaccard Coefficients

Only 29 helminth species, 20% of all fish parasites reported in Lake Superior, infected fish in two or more fish families. All these parasite species have indirect life cycles involving intermediate hosts. Of these, most species were acanthocephalans (31%) and digenetic trematodes (28%). There were 117 parasite species that were host-specific to one fish species or one fish family in Lake Superior. There was no protozoan, monogenean, leech, copepod, or mollusc species shared by fish in the five different families surveyed.

Jaccards coefficients of parasite-community similarity for fish among the five fish-family comparisons were very low indicating fish in these families shared few parasite species. The highest coefficient (0.0923) involved the Salmonidae (Salmoniformes) and Centrarchidae (Perciformes) followed by the Cyprinidae (Cypriniformes) and Centrarchidae. Furthermore, only one parasite species was shared between the Centrarchidae and Cottidae. These low coefficients involving fish species among these fish families indicate they do not occupy the same habitats or the habitats do not overlap much, and the diets of the fish species do not typically overlap either by food items or spatially in foraging areas. Fish in the Centrarchidae, Cyprinidae, and Percidae can be considered cool-water species, individuals in the Catostomidae as temperature generalists, and fish in the Salmonidae as cold-water species. There is no pattern for these coefficients of parasite-community similarity in relationship to fish phylogeny or temperature preferences. Furthermore, the low Jaccard coefficients for parasite-community similarity among the centrarchids, catostomids, cyprinids, percids, and salmonids indicate that each fish family has its own characteristic parasite fauna in Lake Superior.

Fish Families—Parasite Communities

Digenetic trematodes dominated the parasite communities of fish in the Cyprinidae, Catostomidae, Centrarchidae, and Percidae (see Dechtiar and Lawrie 1988 for similar results). Cestodes that utilize copepods as first intermediate hosts, was the most-common group of parasite found in the Salmonidae.

Most fish species examined for parasites from Lake Superior were salmonids (15 species). Only 2-4 fish species were examined in the other families. Salmonids had the richest parasite fauna (45 parasite species) followed by percids (39 parasite species). Only one study was performed on the parasites of *Perca flavescens* (see Dechtair and Lawrie 1988). Of the 34 helminth species found in salmonids, 82% were autogenic, and 77% of the helminth species found in percids were autogenic. Catostomids had the highest percentage of autogenic helminth species (86%). Cyprinids were infected with 30 parasite species and had the highest percentage of allogenic species (50%). Fish in all the families, except the Cyprinidae are dominated by autogenic helminth species. Twenty-four parasite species were reported from only two fish species examined in the Centrarchidae. Based on the available literature from a fish family and parasite perspective, salmonids and their autogenic parasites, and *Perca flavescens* and its autogenic parasites are prominent in Lake Superior, similar to the findings in Lake Michigan.

The autogenic helminth species reported for Lake Superior that mature in fish include the larval/immature digenetic trematodes (*Bucephalus elegans*, *Bucephalus* sp., *Centrovarium lobotes*), larval/immature cestodes (*Bothriocephalus* sp., *Proteocephalus ambloplitis*, *Proteocephalus* sp., *Triaenophorus crassus*, *T. nodulosus*, *Triaenophorus* sp.), larval/immature nematodes (*Hysterothylacium brachyurum*, *Raphidascaris acus*, *Camallanus oxycephalus*, *Cystidicola farionis*, *Haplonema* sp.), and the immature acanthocephalans (*Echinorhynchus* sp., *Neoechinorhynchus tumidus*, *Neoechinorhynchus* sp., *Pomphorhynchus bulbocolli*, *Leptorhynchoides thecatus*). Of the allogenic helminth species found, larvae of the digenetic trematodes of *Clinostomum complanatum*, *Crassiphiala bulboglossa*, *Diplostomum spathaceum*, *Diplostomum* sp., *Neascus brevicaudatus*, *Neascus* sp., *Posthodiplostomum minimum*, *Tylodelphys scheuringi*, *Uvulifer ambloplitis*, *Apophallus brevis*, *Ichthyocotylurus erraticus*, and *I. pileatus*, *Ichthyocotylurus* sp. mature in piscivorous birds; larvae of the cestodes of *Diphyllobothrium ditremum*, *D. oblongatum*, and *Ligula intestinalis* mature in piscivorous birds; larvae of the cestodes of *Diphyllobothrium laruei* and *D. latum* mature in mammals; larvae of the nematode of *Contracaecum* sp. mature in birds, and the larval nematode, *Spiroxyis* sp. matures in turtles.

Table 8. Parasites reported in fishes from Lake Superior during 1871-2010. Host documentation, in order, consists of references; when observed (cdnp = collection data not provided); prevalence defined as the percentage (%) of fish infected (pnp = prevalence not provided); mean intensity defined as the mean number of parasites per infected fish (minp = mean intensity not provided); mean abundance defined as the mean number of parasites per examined fish and noted with an asterisk; intensity of infection (L = light, 1-9 parasites per host; M = medium, 10-49 parasites per host; and H = heavy, >50 parasites per host) from Dechtiar and Lawrie (1988); location (lns = location not specified); latitude and longitude (lnk = latitude and longitude not known).

Mastigophora (Flagellates)

Trypanosomatidae Doflein, 1911

Trypanosoma acerinae Brumpt, 1906

Synonym: None

Site of Infection: Blood

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; 1989-1991, 1992; 10%; minp; Pokegama Bay, Wisconsin; 46°41'25"/-92°10'1"

Remarks: *Trypanosoma acerinae* is an exotic species.

Trypanosoma sp. I

Site of Infection: Blood

Host: *Cottus ricei*: Pronina et al. 1999; August-September 1994; 22%; minp; Chequamegon Bay, Apostle Islands, Wisconsin; 46°39'0"/-90°50'49"

Trypanosoma sp. II

Site of Infection: Blood

Host:

Cottus cognatus: Pronina et al. 1999; August-September 1994; 20%; minp; Chequamegon Bay, Apostle Islands, Wisconsin; 46°39'0"/-90°50'49"

Cottus ricei: Pronina et al. 1999; 11%; minp; Chequamegon Bay, Apostle Islands, Wisconsin

Trypanosoma sp. III

Site of Infection: Blood

Host: *Cottus cognatus*: Pronina et al. 1999; August-September 1994; 20%; minp; Chequamegon Bay, Apostle Islands, Wisconsin; 46°39'0"/-90°50'49"

Table 8, continued.

Ciliophora (Ciliates)

Ichthyophthiriidae Kent, 1881

Ichthyophthirius multifiliis (Fouquet, 1876)

Synonym: None

Site of Infection: [External surface]

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; 1989-1991, 1992; 5%; minp; Pokegama Bay, Minnesota; 46°41'25"/-92°10'1"

Scyphiidae Kahl, 1933

Scyphidia sp.

Site of Infection: [Gills]

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; 1989-1991, 1992; 10%; minp; Pokegama Bay, Minnesota; 46°41'25"/-92°10'1"

Tetrahymenidae Corliss, 1952

Tetrahymena sp.

Site of Infection: [Skin, muscle, viscera]

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; August-September 1994; 15%; minp; Pokegama Bay, Wisconsin; 46°41'25"/-92°10'1"

Trichodinidae Raabe, 1959

Trichodina urinaria Dogiel, 1940

Synonym: *Trichodina algonquinensis* Li and Desser, 1983

Site of Infection: Ureters

Host: *Perca flavescens*: Dechtiar and Lawrie 1988; 1969-1975; 29%; L; lns; Ontario; llnk

Trichodina sp.

Site of Infection: Gills

Host: *Ambloplites rupestris*: Dechtiar and Lawrie 1988; 1969-1975; 16%; H; lns; Ontario; llnk

Table 8, continued.

Myxozoa (Myxozoans)

Chloromyxidae Thelohan, 1892

Chloromyxum sp.

Site of Infection: [Gall bladder]

Host: *Coregonus artedi*: Hoff et al. 1997; 1994 and 1996; 38%; minp; Port Wing; 46°46'28"/-91°23'11"; Basswood Island; 46°51'0"/-90°44'46"; Outer Island; 47°2'6"/-90°25'51"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin; 54%; minp; Knife River, Minnesota; 45°54'28"/-93°17'54"

Myxobolidae Thelohan, 1892

Henneguya zschokkei (Gurley, 1893) Doflein, 1901

Synonym: *Henneguya salmincola* Ward, 1919 according to Shulman (1966)

Site of Infection: [Gills]

Host: *Coregonus artedi*: Hoff et al. 1997; 1994 and 1996; 1%; <1*; Port Wing, Wisconsin; 46°46'28"/-91°23'11"

Henneguya sp.

Site of Infection: Gills

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1965-1975; 14%; H; lns; Ontario; llnk

Coregonus artedi: Hoff et al. 1997; 1994 and 1996; 39%; 2*; Knife River, Minnesota; 45°54'28"/-93°17'54")

Coregonus hoyi: Dechtiar and Lawrie 1988; 38%; M; lns; Ontario

Myxobolus algonquinensis Xiao and Dessler, 1997

Synonym: None

Site of Infection: Connective tissue of ovary

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 13%; minp; Duluth Harbor, Minnesota; 46°45'52"/-92°5'40"

Myxobolus bibullatum (Kudo, 1934) Landsberg and Lom, 1991

Synonym: *Myxosoma bibullatum* Kudo, 1934

Site of Infection: Gills

Host:

Catostomus catostomus: Dechtiar and Lawrie 1988; 1969-1975; 6%; M; lns; Ontario; llnk

Catostomus commersonii: Dechtiar and Lawrie 1988; 17%; M; lns; Ontario

Table 8, continued.

Myxobolus burti Cone and Marcogliese 2010

Synonym: *Myxobolus* sp. of Cone et al. 2004

Site of infection: Intracellular in striated muscle

Host:

Notropis hudsonius: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 40%; minp; Duluth Harbor, Minnesota; 46°45'52"/- 92°5'40"

Notropis hudsonius: Cone and Marcogliese 2010, same infection data and information as in Cone et al. 2004

Myxobolus grandis (Kudo, 1934) Lom and Noble, 1984

Synonym: *Myxosoma grandis* Kudo, 1934; *Myxosoma grandis* Fantham, Porter and Richardson, 1939

Site of Infection: Liver

Host: *Notropis hudsonius*: Dechtiar and Lawrie 1988; 1969-1975; 9%; M; lns; Ontario; llnk

Myxobolus sp.

Site of Infection: Gills, heart

Host:

Lota lota: Dechtiar and Lawrie 1988; 3%; 1969-1975; H; lns; Ontario; llnk

Gymnocephalus cernuus: Pronin et al. 1998; 1989-1991 and 1992; 5%; minp; Pokegama Bay, Wisconsin; 46°41'25"/-92°10'1"

Perca flavescens: Dechtiar and Lawrie 1988; 13%; H; lns; Ontario

Thelohanellus notatus (Mavor, 1916) Kudo, 1929

Synonym: None

Site of Infection: Muscle

Host:

Luxilus cornutus: Dechtiar and Lawrie 1988; 1969-1975; 36%; M; lns; Ontario

Notropis hudsonius: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 33%; minp; Duluth Harbor, Minnesota; 46°45'52"/- 92°5'40"

Pimephales notatus: Dechtiar and Lawrie 1988; 21%; M; lns; Ontario

Zschokkella sp.

Site of Infection: Bile ducts of liver

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 20%; minp; Duluth Harbor, Minnesota; 46°45'52"/- 92°5'40"

Table 8, continued.

Adult Digenea (Digenetic Trematodes)

Allocreadiidae (Looss, 1899) Stossich, 1903

Allocreadium lobatum Wallin, 1909

Synonym: *Allocreadium isoporum* (Looss, 1894) of Canadian authors

Site of Infection: Intestine

Host:

Notropis hudsonius: Dechtiar and Lawrie 1988; 1969-1975; 6%; L; lns; Ontario; llnk

Rhinichthys cataractae: Dechtiar and Lawrie 1988; 13%; L; lns; Ontario

Catostomus commersonii: Hogue et al. 1993; November 1984-May 1986; 14%; 52; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Bunodera sacculata (Van Cleave and Mueller, 1932) Yamaguti, 1958

Synonym: ?*Bunoderina sacculata*

Site of Infection: [Intestine]

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; August-September 1994; 15%; 1; Allouez Bay, Wisconsin; 46°41'26"/-92°0'9"

Crepidostomum cooperi Hopkins, 1931

Synonym: *Crepidostomum ambloplitis* Hopkins, 1931; *Crepidostomum solidum* Van Cleave and Mueller, 1932; *Crepidostomum fausti* Hunninen and Hunter, 1933; *Crepidostomum laureatum* of Stafford (1904) and Cooper (1915) (partim); *Bunodera nodulosa* of Stafford (1904) (partim); *Crepidostomum cornutum* of Cooper (1915) (partim)

Site of Infection: [Intestine]

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; August-September 1994; 5%; <1; Allouez Bay; 46°41'26"/-92°0'9"; 10%; <1; Pokegama Bay, Wisconsin; 46°41'25"/-92°10'1"

Crepidostomum cornutum (Osborn, 1903) Stafford, 1904

Synonym: None

Site of Infection: Intestine

Host:

Ambloplites rupestris: Dechtiar and Lawrie 1988; 1969-1975; 74%; M; lns; Ontario; llnk

Perca flavescens: Dechtiar and Lawrie 1988; 25%; L; lns; Ontario

Crepidostomum farionis (Muller, 1784) Nicoll, 1909

Synonym: *Crepidostomum laureatum* Cooper, 1915; ?*Stephanophiala farionis* Mueller

Site of Infection: Intestine, gall bladder

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1969-1975; 28%; H; lns; Ontario; llnk

Coregonus artedi: Warren 1952; cdnp; 1%; minp; north shore, Sucker River area, Minnesota; llnk

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 26%; L-M; lns; Ontario

Table 8, continued.

Coregonus hoyi: Dechtiar and Lawrie 1988; 63%; M; lns; Ontario
Oncorhynchus gorbuscha: Dechtiar and Lawrie 1988; 28%; M; lns; Ontario
Oncorhynchus gorbuscha: Muzzall and Peebles 1986; September-October 1983 and 1984; 4%; 3; Carp River; 46°46'4"/-89°53'8"; Harlow Creek; 46°38'8"/-87°28'6"; Marquette County, Michigan
Prosopium cylindraceum: Dechtiar and Lawrie 1988; 27%; M; lns; Ontario
Salvelinus fontinalis: Dechtiar and Lawrie 1988; 64%; M; lns; Ontario
Salvelinus namaycush: Dechtiar and Lawrie 1988; 5%; L; lns; Ontario

Crepidostomum isostomum Hopkins, 1931

Synonym: *Crepidostomum laureatum* of Cooper (1915) (partim); *Crepidostomum canadense* Hopkins, 1931

Site of Infection: Intestine

Host: *Percopsis omiscomaycus*: Dechtiar and Lawrie 1988; 1969-1975; 62%; M; lns; Ontario; llnk

Crepidostomum lintoni (Pratt and Linton, 1901) Hopkins, 1933

Synonym: *Crepidostomum petalosum* Lander

Site of Infection: Intestine

Host: *Acipenser fulvescens*: Dechtiar and Lawrie 1988; 1969-1973; 100%; H; lns; Ontario; llnk

Plagiocirrus sp.

Site of Infection: Intestine

Host: *Catostomus catostomus*: Hogue et al. 1993; November 1984-May 1986; 2%; 1; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Azygiidae Luhe, 1909

Azygia angusticauda (Stafford, 1904) Manter, 1926

Synonym: *Mimodistomum angusticaudum* Stafford, 1904; *Azygia loossi* Marshall and Gilbert, 1905;

Ptychogonimus fontanus, Lyster, 1939

Site of Infection: Intestine

Host:

Lota lota: Dechtiar and Lawrie 1988; 1969-1975; 7%; L; lns; Ontario; llnk

Micropterus dolomieu: Dechtiar and Lawrie 1988; 50%; lns; Ontario

Proterometra macrostoma (Faust, 1918) Horsfall, 1933

Synonym: None

Site of Infection: Intestine

Host: *Ambloplites rupestris*: Dechtiar and Lawrie 1988; 1969-1975; 37%; L; lns; Ontario; llnk

Table 8, continued.

Bucephalidae Poche, 1907

Bucephalus elegans Woodhead, 1930

Synonym: None

Site of Infection: [Pyloric ceca]

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; August-September 1994; 5%; <1; Allouez Bay, Wisconsin; 46°41'26"/-92°0'9"

Cryptogonimidae (Ward, 1917) Ciurea, 1933

Acanthostomum sp.

Site of Infection: Intestine

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; August-September 1994; 100%; 32; Allouez Bay, Wisconsin; 46°41'26"/-92°0'9"; 100%; 20; Pokegama Bay, Wisconsin; 46°41'25"/-92°10'1"

Deropristiidae (Skrjabin, 1958) Peters, 1961

Skrjabinopsolus manteri (Cable, 1952) Cable, 1955

Synonym: None

Site of Infection: Intestine

Host: *Acipenser fulvescens*: Dechtiar and Lawrie 1988; 1969-1975; 67%; L; lns; Ontario; llnk

Gorgoderidae Looss, 1901

Phyllodistomum coregoni Dechtiar, 1966

Synonym: None

Site of Infection: Ureters

Host: *Coregonus clupeaformis*: Dechtiar and Lawrie 1988; 1969-1975; 35%; L-M; lns; Ontario; llnk

Phyllodistomum lysteri Miller, 1940

Synonym: None

Site of Infection: Ureters

Host: *Catostomus commersonii*: Dechtiar and Lawrie 1988; 1969-1975; 26%; L; lns; Ontario; llnk

Phyllodistomum staffordi Pearse, 1924

Synonym: *Phyllodistomum folium* (Olfers, 1816) (partim) of Stafford (1902); *Phyllodistomum superbum* Stafford, 1904 (partim); ?*Phyllodistomum carolini* Holl, 1929; *Phyllodistomum lacustri* of Dechtiar (1972a) and Dechtiar and Nepszy (1988); *Phyllodistomum hunteri* Arnold, 1934

Site of Infection: Ureters

Host: *Ameiurus nebulosus*: Dechtiar and Lawrie 1988; 1969-1975; 50%; L; lns; Ontario; llnk

Table 8, continued.

Phyllodistomum superbum Stafford, 1904

Synonym: *Phyllodistomum fausti* Pearse 1924; *Phyllodistomum pearsei*, Holl 1929; *Phyllodistomum lohrenzi* (Loewen, 1935) Bhalerao, 1937

Site of Infection: Ureters

Host: *Perca flavescens*: Dechtiar and Lawrie 1988; 1969-1975; 25%; L; lns; Ontario; llnk

Phyllodistomum sp.

Site of Infection: Ureters

Host: *Prosopium cylindraceum*: Dechtiar and Lawrie 1988; 1969-1975; 18%; M; lns; Ontario; llnk

Lissorchiidae (Poche, 1926) Yamaguti, 1971

Lissorchis attenuatus (Mueller and Van Cleave, 1932) Krygier and Macy, 1969

Synonym: *Triganodistomum attenuatum* Mueller and Van Cleave, 1932

Site of Infection: Intestine

Host:

Catostomus catostomus: Dechtiar and Lawrie 1988; 1969-1975; 6%; L; lns; Ontario; llnk

Catostomus commersonii: Dechtiar and Lawrie 1988; 17%; L; lns; Ontario

Catostomus commersonii: Hogue et al. 1993; November 1984-May 1986; 1%; 2; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Sanguinicolidae Graaff, 1907

Sanguinicola occidentalis Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Blood

Host: *Sander vitreus*: Dechtiar and Lawrie 1988; 1969-1975; 40%; L; lns; Ontario; llnk

Sanguinicola sp.

Site of Infection: Blood

Host:

Notropis hudsonius: Dechtiar and Lawrie 1988; 1969-1975; 9%; L; lns; Ontario; llnk

Catostomus catostomus: Dechtiar and Lawrie 1988; 28%; L; lns; Ontario

Table 8, continued.

Larval/Immature Digenea (Digenetic Trematodes)

Bucephalidae Poche, 1907

Bucephalus elegans Woodhead, 1930

Synonym: None

Site of Infection: [Gills]

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; August-September 1994; 5%; <1; Allouez Bay, Wisconsin; 46°41'26"/-92°0'9"

Bucephalus sp.

Site of Infection: Gills

Host: *Catostomus catostomus*: Dechtiar and Lawrie 1988; 1969-1975; 11%; M; lns; Ontario; llnk

Clinostomidae Luhe, 1901

Clinostomum complanatum (Rudolphi, 1814) Braun, 1899

Synonym: *Clinostomum marginatum* (Rudolphi, 1819) Braun, 1899; ?*Clinostomum gracile* of Stafford (1904); ?*Distomum gracile* of Wright (1879)

Site of Infection: Muscle

Host:

Notropis hudsonius: Dechtiar and Lawrie 1988; 1969-1975; 3%; L; lns; Ontario; llnk

Coregonus artedi: Hoff et al. 1997; 1994 and 1996; 1%; <1*; Basswood Island; 46°51'0"/-90°44'46"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin

Ambloplites rupestris: Dechtiar and Lawrie 1988; 47%; L; lns; Ontario; llnk

Gymnocephalus cernuus: Pronin et al. 1998; August-September 1994; 10%; <1; Pokegama Bay, Wisconsin; 46°41'25"/-92°10'1"

Remarks: Dzikowski et al. (2004) stated *Clinostomum complanatum* and *Clinostomum marginatum* are distinct species based on differences in ribosomal DNA.

Cryptogonimidae (Ward, 1917) Ciurea, 1933

Centrovarium lobotes (MacCallum, 1895) Stafford, 1904

Synonym: None

Site of Infection: Muscle

Host: *Notropis hudsonius*: Dechtiar and Lawrie 1988; 1969-1975; 29%; L; lns; Ontario; llnk

Diplostomidae Poirier, 1886

Crassiphiala bulboglossa Van Haitsma, 1925

Synonym: *Neascus bulboglossa* (Van Haitsma, 1925)

Site of Infection: Fins, skin

Table 8, continued.

Host:

Luxilus cornutus: Dechtiar and Lawrie 1988; 1969-1975; 91%; L; Ins; Ontario; lnk

Notropis hudsonius: Dechtiar and Lawrie 1988; 12%; L; Ins; Ontario

Rhinichthys cataractae: Dechtiar and Lawrie 1988; 83%; M; Ins; Ontario

Remarks: Referred to as black-spot or the *Neascus* of *Crassiphiala bulboglossa*.

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Synonym: *Diplostomulum spathaceum* (Rudolphi, 1819); *Diplostomum volvens* Nordmann, 1832;

Diplostomum volvens Nordmann, 1833 of Cooper (1915); probably *Diplostomum emarginatae* Olivier, 1942; *Diplostomum flexicaudum* (Cort and Brooks, 1928); *Diplostomum indistinctum*, *Diplostomum gigas*

Site of Infection: Eye

Host:

Acipenser fulvescens: Dechtiar and Lawrie 1988; 1969-1975; 67%; L; Ins; Ontario; lnk

Alosa pseudoharengus: Dechtiar and Lawrie 1988; 42%; L; Ins; Ontario

Luxilus cornutus: Dechtiar and Lawrie 1988; 54%; L; Ins; Ontario

Notropis hudsonius: Dechtiar and Lawrie 1988; 15%; L; Ins; Ontario

Pimephales notatus: Dechtiar and Lawrie 1988; 36%; L; Ins; Ontario

Catostomus catostomus: Dechtiar and Lawrie 1988; 42%; L; Ins; Ontario

Catostomus commersonii: Dechtiar and Lawrie 1988; 68%; L; Ins; Ontario

Osmerus mordax: Dechtiar and Lawrie 1988; 31%; L; Ins; Ontario

Coregonus artedi: Dechtiar and Lawrie 1988; 14%; L; Ins; Ontario

Oncorhynchus kisutch: Dechtiar and Lawrie 1988; 29%; L; Ins; Ontario

Oncorhynchus mykiss: Dechtiar and Lawrie 1988; 44%; L; Ins; Ontario

Prosopium cylindraceum: Dechtiar and Lawrie 1988; 73%; L; Ins; Ontario

Percopsis omiscomaycus: Dechtiar and Lawrie 1988; 62%; L; Ins; Ontario

Lota lota: Dechtiar and Lawrie 1988; 30%; L; Ins; Ontario

Cottus bairdii: Dechtiar and Lawrie 1988; 17%; L; Ins; Ontario

Perca flavescens: Dechtiar and Lawrie 1988; 21%; L; Ins; Ontario

Table 8, continued.

Diplostomum sp.

Site of Infection: [Eye]

Host:

Notropis hudsonius: Fischthal 1952; 1946; 100%; minp; Douglas County, Wisconsin; 46°25'59"/-91°54'0"

Catostomus commersonii: Fischthal 1952; 60%; minp; Douglas County, Wisconsin

Osmerus mordax: Fischthal 1952; 38%; minp; Douglas County, Wisconsin

Coregonus artedii: Hoff et al. 1997; 1994 and 1996; 2%; <1*; Basswood Island; 46°51'0"/-90°44'46"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin

Pungitius pungitius: Fischthal 1952; 71%; minp; Douglas County, Wisconsin

Gymnocephalus cernuus: Pronin et al. 1998; 1989-1991, 1992; 5%; <1; Pokegama Bay, Wisconsin; 46°41'25"/-92°10'1"

Neascus brevicaudatus von Nordmann, 1832

Synonym: None

Site of Infection: ?

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; 1989-1991 and 1992; 5%; <1; Pokegama Bay, Wisconsin; 46°41'25"/-92°10'1"

Remarks: *Neascus brevicaudatus* is an exotic species.

Neascus sp.

Site of Infection: [Mesentery, skin]

Host: *Notropis hudsonius*: Fischthal 1952; 1946; 100%; minp; Douglas County, Wisconsin; 46°25'59"/-91°54'0"

Remarks: In general, *Neascus* refers to a larval trematode in the family Diplostomidae whose genus and/or species is not known.

Posthodiplostomum minimum (MacCallum, 1921) Dubois, 1936

Synonym: *Neascus vancalevi* (Agersborg, 1926); *Diplostomum cuticola* (Nordmann, 1832) Diesing, 1850 of Stafford (1904) and Cooper (1915); *Posthodiplostomum cuticola* (Nordmann, 1832) Dubois, 1936 of Margolis and Arthur (1979)

Site of Infection: Intestine, liver

Host:

Notropis hudsonius: Dechtiar and Lawrie 1988; 1969-1975; 26%; M; Ins; Ontario; llnk

Notropis hudsonius: Fischthal 1952; 1946; 50%; minp; Douglas County, Wisconsin; 46°25'59"/-91°54'0"

Rhinichthys cataractae: Dechtiar and Lawrie 1988; 83%; M; Ins; Ontario

Ambloplites rupestris: Dechtiar and Lawrie 1988; 74%; M; Ins; Ontario

Table 8, continued.

Tylodelphys scheuringi (Hughes, 1929) Dubois, 1938

Synonym: *Diplostomulum scheuringi* Hughes, 1929; *Diplostomum scheuringi* (Hughes, 1929) Bangham and Hunter, 1939

Site of Infection: Eye

Host: *Luxilus cornutus*: Dechtiar and Lawrie 1988; 1969-1975; 64%; L; Ins; Ontario; lnk

Uvulifer ambloplitis (Hughes, 1927) Dubois, 1938

Synonym: *Neascus ambloplitis* Hughes, 1927; *Crassiphiala ambloplitis* (Hughes, 1927) Hunter and Hunter, 1931; *Neascus wardi* Hunter, 1928

Site of Infection: Fins, skin

Host: *Ambloplites rupestris*: Dechtiar and Lawrie 1988; 1969-1975; 32%; L-M; Ins; Ontario; lnk

Heterophyidae Odhner, 1914

Apophallus brevis Ransom, 1920

Synonym: *Apophallus americanus* Van Cleave and Mueller, 1932; *Apophallus itascaensis* Warren, 1953; *Distomum* sp. larva of Cooper (1915)

Site of Infection: Muscle

Host: *Perca flavescens*: Dechtiar and Lawrie 1988; 1969-1975; 75%; L-M; Ins; Ontario; lnk

Strigeidae Railliet, 1919

Ichthyocotylurus erraticus (Rudolphi, 1809) Odening, 1969

Synonym: *Tetracotyle intermedia* Hughes, 1928; *Cotylurus erraticus* (Rudolphi, 1809) Szidat, 1928

Site of Infection: Heart

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1969-1975; 22%; M; Ins; Ontario; lnk

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 39%; L-M; Ins; Ontario

Oncorhynchus mykiss: Dechtiar and Lawrie 1988; 44%; L; Ins; Ontario

Prosopium cylindraceum: Dechtiar and Lawrie 1988; 36%; L; Ins; Ontario

Gymnocephalus cernuus: Pronin et al. 1998; 1989-1991 and 1992; 15%; <1, Allouez Bay, Wisconsin; 46°41'26"/-92°0'9"

Ichthyocotylurus pileatus (Rudolphi, 1802) Odening, 1969

Synonym: *Tetracotyle diminuta* Hughes, 1928

Site of Infection: Kidney, mesentery

Host:

Gymnocephalus cernuus: Pronin et al. 1998; 1989-1991 and 1992; 45%; 2; Allouez Bay, Wisconsin; 46°41'26"/-92°0'9"

Perca flavescens: Dechtiar and Lawrie 1988; 1969-1975; 50%; M; Ins; Ontario; lnk

Sander vitreus: Dechtiar and Lawrie 1988; 47%; M; Ins; Ontario

Table 8, continued.

Ichthyocotylurus sp.

Site of Infection: Kidney, mesentery

Host:

Notropis hudsonius: Dechtiar and Lawrie 1988; 1969-1975; 15%; M; Ins; Ontario; llnk

Catostomus commersonii: Dechtiar and Lawrie 1988; 6%; L; Ins; Ontario

Coregonus artedi: Hoff et al. 1997; 1994 and 1996; 6%; <1*; Basswood Island; 46°51'0"/-90°44'46"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin; 23%; <1*; Knife River, Minnesota; 45°54'28"/-93°17'54"

Percopsis omiscomaycus: Dechtiar and Lawrie 1988; 62%; M; Ins; Ontario

Lota lota: Dechtiar and Lawrie 1988; 22%; L; Ins; Ontario

Pungitius pungitius: Fischthal 1952; 1946; 14%; minp; Douglas County, Wisconsin; 46°25'59"/-91°54'0"

Cottus bairdii: Dechtiar and Lawrie 1988; 67%; L-M; Ins; Ontario

Ambloplites rupestris: Dechtiar and Lawrie 1988; 63%; M; Ins; Ontario

Monogenea (Monogeneans)

Ancyrocephalidae Bykhovski and Nagibina, 1978

Ligictaluridus pricei (Mueller, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus pricei* Mueller, 1936; *Cleidodiscus mirabilis* Mueller, 1937

Site of Infection: Gills

Host: *Ameiurus nebulosus*: Dechtiar and Lawrie 1988; 1969-1975; 67%; M; Ins; Ontario; llnk

Lyrodiscus rupestris Dechtiar, 1973

Synonym: None

Site of Infection: Fins, nares

Host:

Ameiurus nebulosus: Dechtiar and Lawrie 1988; 1969-1975; 67%; M; Ins; Ontario; llnk

Ambloplites rupestris: Dechtiar and Lawrie 1988; 26%; L; Ins; Ontario

Tetracleidus banghami Mueller, 1936

Synonym: *Cleidodiscus banghami* (Mueller, 1936) Mizelle, 1940

Site of Infection: Gills

Host: *Micropterus dolomieu*: Dechtiar and Lawrie 1988; 1969-1975; 100%; M; Ins; Ontario; llnk

Tetracleidus stentor (Mueller, 1937) Beverley-Burton, 1984

Synonym: *Cleidodiscus stentor* Mueller, 1937

Site of Infection: Gills

Host: *Ambloplites rupestris*: Dechtiar and Lawrie 1988; 1969-1975; 76%; M; Ins; Ontario; llnk

Table 8, continued.

Urocleidus aculeatus (Van Cleave and Mueller, 1932) Mueller, 1934

Synonym: *Ancyrocephalus aculeatus* Van Cleave and Mueller, 1932; *Cleidodiscus aculeatus* (Van Cleave and Mueller, 1932) Mizelle and Regensberger, 1945

Site of Infection: Gills

Host: *Sander vitreus*: Dechtiar and Lawrie 1988; 1969-1975; 93%; M; lns; Ontario; llnk

Urocleidus adspectus (Mueller, 1936) Beverley-Burton, 1984

Synonym: None

Site of Infection: Gills

Host: *Perca flavescens*: Dechtiar and Lawrie 1988; 1969-1975; 83%; L-M; lns; Ontario; llnk

Urocleidus alatus (Mueller, 1938) Price, 1968

Synonym: *Cleidodiscus alatus* (Mueller, 1938)

Site of Infection: Gills

Host: *Ambloplites rupestris*: Dechtiar and Lawrie 1988; 1969-1975; 79%; M; lns; Ontario; llnk

Urocleidus baldwini (Dechtiar, 1974) Beverley-Burton, 1984

Synonym: *Cleidodiscus baldwini* Dechtiar, 1974

Site of Infection: Gills

Host: *Percopsis omiscomaycus*: Dechtiar and Lawrie 1988; 69%; M; lns; Ontario

Urocleidus ferox (Mueller, 1934) Mueller, 1936

Synonym: *Onchocleidus ferox* Mueller, 1934; *Onchocleidus nucronatus* Mizelle, 1936; *Cleidiodiscus ferox* (Mueller, 1934) Price and Mura, 1969

Site of Infection: Gills

Host: *Micropterus dolomieu*: Dechtiar and Lawrie 1988; 1969-1975; 100%; L; lns; Ontario; llnk

Dactylogyridae Bykhovski, 1933

Acolpenteron catostomi Fischthal and Allison, 1942

Synonym: None

Site of Infection: Ureters

Host:

Catostomus catostomus: Dechtiar and Lawrie 1988; 1969-1975; 8%; M; lns; Ontario; llnk

Catostomus commersonii: Dechtiar and Lawrie 1988; 26%; L; lns; Ontario

Table 8, continued.

Dactylogyrus amphibothrium Wagener, 1857

Synonym: None

Site of Infection: Gills

Host:

Gymnocephalus cernuus: Cone et al. 1994; July 1992; 80%; minp; Duluth Harbor; 46°45'52"/-92°5'40"; Minnesota and adjacent bays in Superior, Wisconsin; llnk

Gymnocephalus cernuus: Pronin et al. 1998; 1989-1991 and 1992; p and mi could not be determined; Allouez Bay; 46°41'26"/-92°0'9"; and/or Pokegama Bay, Wisconsin; 46°41'25"/-92°10'1"

Remarks: *Dactylogyrus amphibothrium* is an exotic species.

Dactylogyrus banghami Mizelle and Donahue, 1944

Synonym: None

Site of Infection: Gills

Host: *Rhinichthys cataractae*: Dechtiar and Lawrie 1988; 1969-1975; 83%; M; lns; Ontario; llnk

Dactylogyrus bifurcatus Mizelle, 1937

Synonym: *Neodactylogyrus bifurcatus* Price, 1938

Site of Infection: Gills

Host: *Pimephales notatus*: Dechtiar and Lawrie 1988; 1969-1975; 86%; L; lns; Ontario; llnk

Dactylogyrus cornutus Mueller, 1938

Synonym: *Neodactylogyrus cornutus* Price, 1938

Site of Infection: Gills

Host: *Luxilus cornutus*: Dechtiar and Lawrie 1988; 1969-1975; 91%; M; lns; Ontario; llnk

Dactylogyrus hemiamphibothrium Ergens, 1956

Synonym: None

Site of Infection: Gills

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; 1989-1991 and 1992; 15%; minp; Allouez Bay, Wisconsin; 46°41'26"/-92°0'9"

Remarks: *Dactylogyrus hemiamphibothrium* is an exotic species.

Dactylogyrus sp.

Site of Infection: Gills

Host: *Notropis hudsonius*: Dechtiar and Lawrie 1988; 1969-1975; 44%; L-M; lns; Ontario; llnk

Pellucidhaptor catostomi Dechtiar, 1969

Synonym: None

Site of Infection: Fins, nasal cavity

Host: *Catostomus catostomus*: Dechtiar and Lawrie 1988; 1969-1975; 8%; L; lns; Ontario; llnk

Table 8, continued.

Diclybothriidae Bykovskii and Gusev, 1950

Diclybothrium armatum Leuckart, 1835

Synonym: *Diplobothrium armatum* (Leuckart, 1835)

Site of Infection: Gills

Host: *Acipenser fulvescens*: Dechtiar and Lawrie 1988; 1969-1975; 67%; M; Ins; Ontario; llnk

Discocotylidae Price, 1936

Discocotyle sagittata (Leuckart, 1842) Diesing, 1850

Synonym: *Discocotyle salmonis* Schaffer, 1916

Site of Infection: Gills

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1969-1975; 83%; L-M; Ins; Ontario; llnk

Coregonus artedi: Hoff et al. 1997; 1984 and 1986; 2%; <1*; Basswood Island; 46°51'0"/-90°44'46"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; 15%; <1*; Knife River, Minnesota; 45°54'28"/-93°17'54"

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 43%; L-M; Ins; Ontario

Coregonus hoyi: Dechtiar and Lawrie 1988; 75%; L; Ins; Ontario

Prosopium cylindraceum: Dechtiar and Lawrie 1988; 21%; L; Ins; Ontario

Salvelinus namaycush: Dechtiar and Lawrie 1988; 50%; L; Ins; Ontario

Octomacrum lanceatum Mueller, 1934

Synonym: *Octobothrium sagittatum* Wright, 1879

Site of Infection: Gills

Host:

Catostomus catostomus: Dechtiar and Lawrie 1988; 1969-1975; 28%; L; Ins; Ontario; llnk

Catostomus catostomus: Hogue et al. 1993; November 1984-May 1986; 22%; 2; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Catostomus commersonii: Dechtiar and Lawrie 1988; 17%; L; Ins; Ontario

Catostomus commersonii: Hogue et al. 1993; 15%; 2; Apostle Islands, Wisconsin

Octomacrum microconfibula Hargis, 1952

Synonym: None

Site of Infection: Gills

Host: *Luxilus cornutus*: Dechtiar and Lawrie 1988; 1969-1975; 36%; L; Ins; Ontario; llnk

Gyrodactylidae Cobbold, 1864

Gyrodactylus bairdi Wood and Mizelle, 1957

Synonym: None

Site of Infection: Fins, gills

Host: *Cottus bairdii*: Dechtiar and Lawrie 1988; 1969-1975; 27%; L-M; Ins; Ontario; llnk

Table 8, continued.

Gyrodactylus dechtiari Hanek and Fernando, 1971

Synonym: None

Site of Infection: Fins

Host: *Rhinichthys cataractae*: Dechtiar and Lawrie 1988; 1969-1975; 80%; M; lns; Ontario; llnk

Gyrodactylus sp.

Site of Infection: Fins, gills

Host:

Luxilus cornutus: Dechtiar and Lawrie 1988; 1969-1975; 82%; M; lns; Ontario; llnk

Catostomus commersonii: Dechtiar and Lawrie 1988; 19%; M; lns; Ontario

Pseudomurraytreematidae (Kritsky, Mizelle, and Bilquees, 1978) Beverly-Burton, 1984

Anonchohaptor anomalus Mueller, 1938

Synonym: None

Site of Infection: Gills

Host: *Catostomus commersonii*: Dechtiar and Lawrie 1988; 1969-1975; 21%; L; lns; Ontario; llnk

Anonchohaptor sp.

Site of Infection: [Gills]

Host: *Catostomus commersonii*: Hogue et al. 1993; November 1984-May 1986; 3%; 1; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Pseudomurraytrema copulatum (Mueller, 1938) Bykhovski, 1957

Synonym: None

Site of Infection: Gills

Host:

Catostomus catostomus: Dechtiar and Lawrie 1988; 1969-1975; 25%; L; lns; Ontario; llnk

Catostomus commersonii: Dechtiar and Lawrie 1988; 19%; L; lns; Ontario

Tetraonchidae Bykhovski, 1937

Tetraonchus monenteron (Wagener, 1857) Diesing, 1858

Synonym: *Dactylogyrus monenteron* (Wagener, 1857); *Gyrodactylus cochlea* Wedl, 1857; *Monocoelium monenteron* (Wagener, 1857), Wegener, 1909; *Ancyrocephalus monenteron* Luhe, 1909

Site of Infection: Gills

Host:

Esox lucius: Dechtiar 1972b; cdnp; pnp; minp; lns; llnk

Esox lucius: Dechtiar and Lawrie 1988; 1969-1975; 92%; M; lns; Ontario; llnk

Table 8, continued.

Tetraonchus variabilis Mizelle and Webb, 1953

Synonym: None

Site of Infection: Gills

Host:

Prosopium cylindraceum: Dechtiar 1972b; cdnp; pnp; minp; lns; llnk

Prosopium cylindraceum: Dechtiar and Lawrie 1988; 1969-1975; 27%; M; lns; Ontario; llnk

Adult Cestoda (Cestodes)

Caryophyllaeidae Leuckhart, 1878

Glaridacris catostomi (Cooper, 1920) Mackiewicz, 1965

Synonym: *Caryophyllaeus terebrans* of Bangham and Adams 1954 (partim); *Glaridacris laruei* of Bangham and Venard, 1946

Site of Infection: Intestine

Host:

Catostomus catostomus: Dechtiar and Lawrie 1988; 1969-1975; 14%; L; lns; Ontario; llnk

Catostomus catostomus: Hogue et al. 1993; November 1984-May 1986; 10%; 2; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Catostomus commersonii: Hogue et al. 1993; 9%; 2; Apostle Islands, Wisconsin

Glaridacris laruei (Lamont, 1921) Hunter, 1927

Synonym: *Glaridacris intermedius* Lyster, 1940

Site of Infection: Intestine

Host: *Catostomus commersonii*: Hogue et al. 1993; November 1984-May 1986; 10%; 1; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Isoglaridacris bulbocirrus Mackiewicz, 1965

Synonym: None

Site of Infection: Intestine

Host: *Catostomus commersonii*: Hogue et al. 1993; November 1984-May 1986; 18%; 3; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Monobothrium hunteri Mackiewicz, 1963

Synonym: *Glaridacris catostomi* of Bangham and Adams, 1954 (partim)

Site of Infection: Intestine

Host: *Catostomus commersonii*: Hogue et al. 1993; November 1984-May 1986; 2%; 16; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Table 8, continued.

Amphicotyliidae Ariola, 1899

Eubothrium crassum (Bloch, 1779) Nybelin, 1922

Synonym: *Abothrium crassum* (Bloch, 1779); *Eubothrium oncorhynchi* Wardle, 1932

Site of Infection: Intestine

Host:

Coregonus artedi: Warren 1952; cdnp; 2%; minp; Sucker River area, Minnesota; llnk

Salvelinus namaycush: Cooper 1919; 1900; pnp; minp; Shoal Island, Wisconsin; llnk

Salvelinus namaycush: Cooper 1919; 1900; pnp; minp; Outer Island, Wisconsin; 47°2'6"/-90°25'51"

Eubothrium rugosum (Batsch, 1786) Nybelin, 1922

Synonym: None

Site of Infection: Intestine

Host: *Lota lota*: Dechtiar and Lawrie 1988; 1969-1975; 72%; L-M; lns; Ontario; llnk

Eubothrium salvelini (Schrank, 1790) Nybelin, 1922

Synonym: None

Site of Infection: Pyloric ceca, intestine

Host:

Coregonus artedi: Hoff et al. 1997; 1994 and 1996; 6%; <1*; Basswood Island; 46°51'0"/-90°44'46"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin; 8%; <1*; Knife River, Minnesota; 45°54'28"/-93°17'54"

Oncorhynchus gorbuscha: Muzzall and Peebles 1986; September-October 1983 and 1984; 79%; 29; Laughing Whitefish River, Alger County; 46°31'29"/-87°1'42"; Huron River, Baraga County; 46°54'35"/-88°2'12"; Carp River, Marquette County; 46°46'4"/-89°53'8"; Michigan

Oncorhynchus kisutch: Muzzall and Peebles 1986; 25%; 12; Huron River, Baraga County; Harlow Creek, Marquette County; 46°38'8"/-87°28'6"; Michigan

Prosopium cylindraceum: Dechtiar and Lawrie 1988; 1969-1975; 11%; M; lns; Ontario; llnk

Salvelinus fontinalis: Dechtiar and Lawrie 1988; 55%; M; lns; Ontario

Salvelinus namaycush: Dechtiar and Lawrie 1988; 75%; M; lns; Ontario

Bothriocephalidae Blanchard, 1849

Bothriocephalus cuspidatus Cooper, 1917

Synonym: *Bothriocephalus cuspidatus luciopercae* Wardle, 1932; *Bothriocephalus cuspidatus hiodontos* Wardle, 1932; *Bothriocephalus cuspidatus cuspidatus* Cooper, 1917

Site of Infection: Intestine

Host: *Sander vitreus*: Dechtiar and Lawrie 1988; 1969-1975; 93%; M-H; lns; Ontario; llnk

Cyathocephalidae Nybelin, 1922

Cyathocephalus truncatus (Pallas, 1781) Kessler, 1868

Synonym: *Cyathocephalus americanus* Cooper, 1917

Site of Infection: Pyloric ceca, intestine

Table 8, continued.

Host:

Catostomus catostomus: Hogue et al. 1993; November 1984-May 1986; 5%; 2; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Catostomus commersonii: Hogue et al. 1993; 16%; 6; Apostle Islands, Wisconsin

Coregonus artedi: Hoff et al. 1997; 1994 and 1996; 1%; <1*; Basswood Island; 46°51'0"/-90°44'46"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin; 69%; 2*; Knife River, Minnesota; 45°54'28"/-93°17'54"

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 1969-1975; 35%; M; Ins; Ontario; llnk

Coregonus clupeaformis: Linton 1898; July and August 1889; pnp; minp; Outer Island, Wisconsin; 47°2'6"/-90°25'51"

Coregonus clupeaformis: Linton 1898; 1898; pnp; minp; Ins; llnk

Oncorhynchus gorbusha: Muzzall and Peebles 1986; September-October 1983 and 1984; 68%; 16; Laughing Whitefish River, Alger County; 46°31'29"/-87°1'42"; Carp River; 46°46'4"/-89°53'8"; and Harlow Creek; 46°38'8"/-87°28'6"; Marquette County, Michigan

Diphyllobothriidae Luhe, 1910

Dibothrium infundibuliforme Rudolphi

Synonym: ?

Site of Infection: Intestine

Host: *Salvelinus namaycush*: Linton 1898; July and August 1889; pnp; minp; Outer Island; 47°2'6"/-90°25'51"; Wisconsin; Shoal Island; pnp; minp; Wisconsin; llnk

Remarks: The drawings (Plate XXX, Figs. 5, 6) in the article of Linton (1898) indicate that this genus could be *Bothriocephalus* or *Eubothrium*.

Proteocephalidae La Rue, 1911

Corallobothrium fimbriatum Essex, 1927

Synonym: None

Site of Infection: Intestine

Host: *Ameiurus nebulosus*: Dechtiar and Lawrie 1988; 1969-1975; 50%; L; Ins; Ontario; llnk

Proteocephalus exiguus La Rue, 1911

Synonym: *Ichthyotaenia laruei* (Faust, 1920)

Site of Infection: Intestine

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1969-1975; 64%; L-M; Ins; Ontario; llnk

Coregonus artedi: Warren 1952; cdnp; 77%; minp; north shore, Sucker River area, Minnesota; llnk

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 43%; L-M; Ins; Ontario

Coregonus hoyi: Dechtiar and Lawrie 1988; 50%; L; Ins; Ontario

Table 8, continued.

Proteocephalus laruei Faust, 1920

Synonym: *Ichthyotaenia laruei* (Faust, 1920)

Site of Infection: [Intestine]

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1969-1975; 78%; M-H; Ins; Ontario; llnk

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 83%; H; Ins; Ontario

Coregonus hoyi: Dechtiar and Lawrie 1988; 63%; M; Ins; Ontario

Proteocephalus laruei Faust, 1920 and *Proteocephalus exiguus* La Rue, 1911

Synonym: *Ichthyotaenia laruei* (Faust, 1920) for *P. laruei*

Site of Infection: Intestine

Host: *Coregonus artedi*: Hoff et al. 1997; 1994 and 1996; 98%; 97*; Basswood Island; 46°51'0"/-90°44'46"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin; 100%; 98*; Knife River, Minnesota; 45°54'28"/-93°17'54"

Remarks: Hoff et al. (1997) only reported mixed infection values.

Proteocephalus parallacticus MacLulich, 1943

Synonym: None

Site of Infection: Intestine

Host:

Oncorhynchus gorbuscha: Muzzall and Peebles 1986; September-October 1983 and 1984; 41%; 23; Laughing Whitefish River, Alger County; 46°31'29"/-87°1'42"; Carp River; 46°46'4"/-89°53'8"; and Harlow Creek; 46°38'8"/-87°28'6"; Marquette County, Michigan

Oncorhynchus kisutch: Muzzall and Peebles 1986; 38%; 5; Huron River; 46°54'35"/-88°2'12"; Baraga County; Harlow Creek; 46°38'8"/-87°28'6"; Marquette County, Michigan

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; 40%; 2; Laughing Whitefish River, Alger County, Michigan

Salvelinus namaycush: Dechtiar and Lawrie 1988; 1969-1975; 38%; L; Ins; Ontario; llnk

Proteocephalus pearsei La Rue, 1919

Synonym: None

Site of Infection: Intestine

Host: *Perca flavescens*: Dechtiar and Lawrie 1988; 1969; 1975; 29%; L; Ins; Ontario; llnk

Proteocephalus pinguis La Rue, 1911

Synonym: None

Site of Infection: Intestine

Host: *Esox lucius*: Dechtiar and Lawrie 1988; 1969-1975; 85%; M-H; Ins; Ontario; llnk

Table 8, continued.

Proteocephalus salvelini Linton, 1898

Synonym: *Taenia salvelini* Linton 1898

Site of Infection: [Intestine]

Host:

Salvelinus namaycush: La Rue 1914; cdnp; pnp; minp; Outer Island, Wisconsin; 47°2'6"/-91°23'11"

Salvelinus namaycush: Linton 1898; 1889; pnp; minp; Outer Island, Wisconsin; 47°2'6"/-90°25'51"

Proteocephalus sp.

Site of Infection: Intestine

Host: *Catostomus catostomus*: Dechtiar and Lawrie 1988; 1969-1975; 6%; L; Ins; Ontario; lnk

Triaenophoridae Loennberg, 1889

Triaenophorus crassus Forel, 1868

Synonym: *Triaenophorus robustus* Olsson, 1893; *Triaenophorus tricuspидatus morpha megadentatus* Wardle, 1932; *Triaenophorus tricuspидatus* of Newton, 1932 (partim); *Triaenophorus* sp. type *robustus* of Cooper, 1919

Site of Infection: Intestine

Host: *Esox lucius*: Dechtiar and Lawrie 1988; 1969-1975; 69%; L-M; Ins; Ontario; lnk

Triaenophorus nodulosus (Pallas, 1760) Rudolphi, 1819

Synonym: *Triaenophorus* sp. type *nodulosus* of Cooper, 1919 (partim)

Site of Infection: Intestine

Host: *Esox lucius*: Dechtiar and Lawrie 1988; 1969-1975; 77%; L-M; Ins; Ontario; lnk

Larval/Immature Cestoda (Cestodes)

Bothriocephalidae Blanchard, 1849

Bothriocephalus sp.

Site of Infection: [Intestine]

Host:

Osmerus mordax: Fischthal 1952; 1946; 38%; minp; Douglas County, S10, Wisconsin; 46°25'59"/-91°54'0"

Pungitius pungitius: Fischthal 1952; 43%; minp; Douglas County, Wisconsin

Table 8, continued.

Diphyllobothriidae Luhe, 1910

Diphyllobothrium ditremum (Creplin, 1825) Luhe, 1910

Synonym: *Diphyllobothrium osmeri* (von Linstow, 1878)

Site of Infection: Intestinal wall, stomach wall

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1969-1975; 22%; M; lns; Ontario; llnk

Coregonus artedi: Hoff et al. 1997; 1994 and 1996; 28%; <1*; Basswood Island; 46°51'0"/-90°44'46"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin; 31%; <1*; Knife River; 45°54'28"/-93°17'54"; Minnesota

Coregonus hoyi: Dechtiar and Lawrie 1988; 50%; M; lns; Ontario

Diphyllobothrium laruei Vergeer, 1942

Synonym: None

Site of Infection: Peritoneum, stomach wall, viscera

Host:

Coregonus artedi: Sutton 1969; ?cdnp; pnp; minp; north of Marquette Harbor, Michigan; ?45°58'0"/-84°25'30"

Coregonus artedi: Vergeer 1942; cdnp; pnp; minp; lns; llnk

Coregonus kiyi: Vergeer 1942; pnp; minp; lns

Coregonus zenithecus: Vergeer 1942; pnp; minp; lns

Diphyllobothrium latum (Linnaeus, 1758) Cobbold, 1858

Synonym: *Dibothriocephalus latus*

Site of Infection: [Musculature]

Host:

Esox lucius: Warthin 1912; cdnp; pnp; minp; Portage Lake entry, Michigan; llnk

Lota lota: Warthin 1912; pnp; minp; Portage Lake entry, Michigan; llnk; fish: Nickerson 1906; pnp; minp; lns; Great Lakes; llnk

Remarks: Nickerson (1906) is included with Lake Superior since this information is believed to be associated with Lake Superior waters of Minnesota.

Diphyllobothrium oblongatum Thomas, 1946

Synonym: None

Site of Infection: Stomach wall

Host: *Coregonus artedi*: Warren 1952; cdnp; 78%; minp; north shore; Sucker River area, Minnesota; llnk

Diphyllobothrium sp.

Site of Infection: Stomach wall, pyloric ceca, abdominal cavity, liver, gonads, swim bladder, spleen, adipose tissue, mesentery

Table 8, continued.

Host:

Coregonus artedi: Swanson and Pratt 1977; November-December 1975 and 1976; pnp; 13-38 for total viscera; 6-17 for stomach in 1973-1975; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Coregonus artedi: Swanson and Pratt 1977; pnp; 22 for total viscera; 11 for stomach in 1975-1976; Apostle Islands, Wisconsin

Coregonus artedi: Swanson and Pratt 1977; pnp; 8 for total viscera; 11 for stomach; Grand Portage, Minnesota; 47°57'49"/-89°41'5"

Coregonus artedi: Swanson and Pratt 1977; pnp; 18 for total viscera; 8 for stomach; Keweenaw Bay, Michigan; 48°51'57"/-88°25'18"

Coregonus artedi: Swanson and Pratt 1977; pnp; 11 for total viscera; 10 for stomach; Thunder Bay, Ontario; 48°28'0"/-89°0'0"

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 1969-1975; 30%; L-M; Ins; Ontario; lnk

Oncorhynchus gorboscha: Muzzall and Peebles 1986; September-October 1983 and 1984; 83%; 7; Laughing Whitefish River, Alger County; 46°31'29"/-87°1'42"; Carp River; 46°46'4"/-89°53'8"; Harlow Creek; 46°38'8"/-87°28'6"; Marquette County, Michigan

Oncorhynchus kisutch: Muzzall and Peebles 1986; 100%; 15; Laughing Whitefish River, Alger County; Huron River, Baraga County; Harlow Creek, Marquette County; 46°54'35"/-88°2'12"; Michigan

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; 80%; 12; Laughing Whitefish River, Alger County, Michigan

Salvelinus namaycush: Dechtiar and Lawrie 1988; 25%; L-M; Ins; Ontario

Ligula intestinalis (Linnaeus, 1758) Gmelin, 1790

Synonym: None

Site of Infection: Body cavity

Host:

Notropis hudsonius: Dechtiar and Lawrie 1988; 1969-1975; 12%; L; Ins; Ontario; lnk

Pungitius pungitius: Fischthal 1952; 1946; 100%; minp; Douglas County, Wisconsin; 46°25'59"/-91°54'0"

Catostomus catostomus: Dechtiar and Lawrie 1988; 14%; L; Ins; Ontario

Sparganum pseudosegmentatum

Synonym: ?*Diphyllobothrium* sp.

Site of Infection: Stomach wall, among intestinal ceca

Host: *Lota lota*: Vergeer 1942; cdnp; pnp; minp; Ins; lnk; Sutton 1969; cdnp; pnp; minp; Ins; lnk

Remarks: Mongrain (1967) reared larvae of *Sparganum pseudosegmentatum* in hamsters and identified adults belonging to the genus *Diphyllobothrium*.

Table 8, continued.

Proteocephalidae La Rue, 1911

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Intestine

Host:

Coregonus artedi: Hoff et al. 1997; 1994 and 1996; 1%; <1*; lns; Wisconsin; llnk

Gymnocephalus cernuus: Pronin et al. 1998; 1989-1991 and 1992; 5%; <1; Allouez Bay; 46°41'26"/-92°0'9"; Minnesota; 85%; 37; Pokegama Bay; 46°41'25"/-92°10'1"; Wisconsin

Remarks: Hoff et al. (1997) did not state if *Proteocephalus ambloplitis* was larval or adult.

Proteocephalus sp.

Site of Infection: Intestine

Host:

Salvelinus fontinalis: Dechtiar and Lawrie 1988; 1969-1975; 64%; M; lns; Ontario; llnk

Micropterus dolomieu: Dechtiar and Lawrie 1988; 50%; L; lns; Ontario

Gymnocephalus cernuus: Pronin et al. 1998; 1989-1991 and 1992; 10%; <1; Allouez Bay; 46°41'26"/-92°0'9"; Wisconsin; 15%; <1; Pokegama Bay; 46°41'25"/-92°10'1"; Wisconsin

Triaenophoridae Loennberg, 1889

Triaenophorus crassus Forel, 1868

Synonym: *Triaenophorus robustus* Olsson, 1893; *Triaenophorus tricuspидatus morpha megadentatus* Wardle, 1932; *Triaenophorus tricuspидatus* of Newton, 1932 (partim); *Triaenophorus* sp. type *robustus* of Cooper, 1919

Site of Infection: Muscle

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1969-1975; 22%; M; lns; Ontario; llnk

Coregonus artedi: Hoffman 1941; 1930s; pnp; minp; lns "north shore"; Minnesota; llnk

Coregonus artedi: Johnson 1946; November-December 1946; 10%; minp; Duluth, Minnesota; 46°45'52"/-92°5'40"

Coregonus artedi: Klick 1946; 1946; 6%; minp; Bayfield; 46°32'59"/-91°9'0"; and Cornucopia; 46°51'13"/-91°6'6"; Wisconsin

Coregonus artedi: Warren 1952; cdnp; 21%; minp; north shore, Sucker River area, Minnesota; llnk

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 26%; M; lns; Ontario

Coregonus clupeaformis: Hoffman 1941; pnp; minp; lns; "north shore," Minnesota

Coregonus hoyi: Dechtiar and Lawrie 1988; 38%; M; lns; Ontario

Oncorhynchus gorbusha: Dechtiar and Lawrie 1988; 6%; L-M; lns; Ontario

Salvelinus namaycush: Dechtiar and Lawrie 1988; 5%; L; lns; Ontario

Table 8, continued.

Triaenophorus nodulosus (Pallas, 1760) Rudolphi, 1819

Synonym: *Triaenophorus* sp. type *nodulosus* of Cooper, 1919 (partim)

Site of Infection: Liver

Host:

Oncorhynchus gorbuscha: Dechtiar and Lawrie 1988; 1969-1975; 6%; L; lns; Ontario; llnk

Rhinichthys cataractae: Dechtiar and Lawrie 1988; 13%; L; lns; Ontario

Triaenophorus sp.

Site of Infection: Dorsal muscle tissue close to skin

Host:

Coregonus artedi: Cooper 1919; cdnp; pnp; minp; lns; llnk

Coregonus artedi: Johnson 1946; November-December 1946; <10%; minp; Duluth, Wisconsin; 46°45'52"/-92°5'40"

Coregonus alpenae: Klick 1946; 1946; pnp; minp; Bayfield; 46°32'59"/-91°9'0"; and Cornucopia, Wisconsin; 46°51'13"/-91°6'6"

Coregonus artedi: Swanson and Pratt 1977; November-December 1975 and 1976; 3-7% in 1973-1975; minp; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Coregonus artedi: Swanson and Pratt 1977; 5% in 1975-1976; minp; Apostle Islands, Wisconsin

Coregonus artedi: Swanson and Pratt 1977; 6%; minp; Grand Portage, Minnesota; 47°57'49"/-89°41'5"

Coregonus artedi: Swanson and Pratt 1977; 14%; minp; Keweenaw Bay, Michigan; 48°51'57"/-88°25'18"

Coregonus artedi: Swanson and Pratt 1977; 12%; minp; Thunder Bay, Ontario; 48°28'0"/-89°0'0"

Adult Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Hysterothylacium brachyurum Ward and Magath, 1916

Synonym: *Contracaecum brachyurum* Van Cleave and Mueller, 1934; *Thynnascaris brachyurum* Margolis and Arthur, 1979

Site of Infection: Intestine

Host:

Esox lucius: Dechtiar and Lawrie 1988; 1969-1975; 62%; M; lns; Ontario; llnk

Salvelinus fontinalis: Dechtiar and Lawrie 1988; 27%; L; lns; Ontario

Lota lota: Dechtiar and Lawrie 1988; 51%; L-M; lns; Ontario

Ambloplites rupestris: Dechtiar and Lawrie 1988; 32%; L; lns; Ontario

Table 8, continued.

Camallanidae Railliet and Henry, 1915

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: [Intestine]

Host: *Gymnocephalus cernuus*: Pronin et al. 1998; 1989-1991 and 1992; 5%; <1; Allouez Bay; 46°41'26"/-92°0'9"; Wisconsin; 50%; 1; Pokegama Bay; 46°41'25"/-92°10'1"; Wisconsin

Capillariidae Neuve-Lemaire, 1936

Capillaria catostomi (Pearse, 1924)

Synonym: Moravec (1987) indicated that *Capillaria catostomi* is a synonym of *Pseudocapillaria tomentosa*; ?*Skrjabinocapillaria bakeri* (Mueller and Van Cleave, 1932) Skrjabin and Schikhobalova, 1954)

Site of Infection: Intestine

Host: *Catostomus commersonii*: Hogue et al. 1993; November 1984-May 1986; 11%; 9; Apostle Islands; 46°56'17"/-90°39'10"; Wisconsin

Capillaria salvelini Polyanskii, 1952

Synonym: *Capillaria baicalensis* Ryzhikov and Sudarikov, 1953; *Capillaria coregoni* Shulman-Albova, 1953; *Capillaria curilica* Zhukov, 1960; *Capillaria brevispicula* sensu Moravec and Ergens, 1970, nec Linstow, 1873; *Capillaria bakeri* sensu Meyer, 1954, nec Mueller and Van Cleave, 1932

Site of Infection: Stomach, intestine

Host:

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 1969-1975; 30%; L; Ins; Ontario; lnk

Oncorhynchus gorbuscha: Muzzall and Peebles 1986; September-October 1983 and 1984; 3%; 1; Laughing Whitefish River, Alger County; 46°31'29"/-87°1'42"; Carp River, Marquette County; 46°46'4"/-89°53'8"; Michigan

Oncorhynchus kisutch: Muzzall and Peebles 1986; 25%; 2; Laughing Whitefish River, Alger County; Huron River, Baraga County; 46°54'35"/-88°2'12"; Michigan

Oncorhynchus mykiss: Dechtiar and Lawrie 1988; 22%; L; Ins; Ontario

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; 40%; minp; Laughing Whitefish River, Alger County, Michigan

Prosopium cylindraceum: Dechtiar and Lawrie 1988; 16%; L; Ins; Ontario

Cucullanidae Cobbold, 1864

Dichelyne cotylophora Ward and Magath, 1916

Synonym: *Dacnitoides cotylophora* Ward and Magath, 1916; *Cucullanellus cotylophora* (Ward and Magath, 1916) Petter, 1974

Site of Infection: Intestine

Host: *Perca flavescens*: Dechtiar and Lawrie 1988; 1969-1975; 42%; L; Ins; Ontario; lnk

Table 8, continued.

Truttaedacnitis clitellarius (Ward and Magath, 1916) Petter, 1974

Synonym: *Cucullanus clitellarius* Ward and Magath, 1916

Site of Infection: Intestine

Host: *Acipenser fulvescens*: Dechtiar and Lawrie 1988; 1969-1975; M; 67%; Ins; Ontario; lnk

Cystidicolidae (as in Anderson et al. 1975)

Cystidicola farionis Fischer, 1798

Synonym: *Cystidicola canadensis* Skinker, 1930; *Cystidicola stigmatura* of Skinker 1931 *not* (Leidy, 1886); *Cystidicola stigmatura* of Ko and Anderson 1969 *not* (Leidy, 1886)

Site of Infection: Swim bladder

Host:

Osmerus mordax: Dechtiar and Lawrie 1988; 1969-1975; 47%; L-M; Ins; Ontario; lnk

Osmerus mordax: Lankester and Smith 1980; 1973-1978; 95%; 26; north shore east from Thunder Bay; 48°28'0"/-89°0'0"; Wawa, Ontario; 48°0'0"/-84°46'59"

Coregonus artedi: Dechtiar and Lawrie 1988; 69%; H; Ins; Ontario

Coregonus artedi: Dextrase 1987; cdnp; 64%; 39; Thunder Bay; 48°28'0"/-89°0'0"; Black Bay, Ontario; 48°40'0"/-88°30'0"

Coregonus artedi: Hoff et al. 1997; 1994-1996; 26%; 3*; Basswood Island; 46°51'0"/-91°23'11"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin; 100%; 54; Knife River, Minnesota; 45°54'28"/-93°17'54"

Coregonus artedi: Lankester and Smith 1980; 61%; 52; Thunder Bay and Black Bay, Ontario; 48°40'0"/-88°30'0"

Coregonus artedi: Smith 1978; 1973-1978; 60%; minp?; Thunder Bay; 48°28'0"/-89°0'0"; Black Bay, Ontario; 48°40'0"/-88°30'0"

Coregonus clupeaformis: Dextrase 1987; 43%; 1; Thunder Bay and Black Bay, Ontario

Coregonus clupeaformis: Lankester and Smith 1980; 58%; 16; north shore east from Thunder Bay to Wawa, Ontario; Black Bay

Coregonus hoyi: Dechtiar and Lawrie 1988; 75%; M; Ins; Ontario

Coregonus hoyi: Lankester and Smith 1980; 98%; 223; Thunder Bay and Black Bay, Ontario

Coregonus hoyi: Smith 1978; 98%; minp?; Thunder Bay and Black Bay, Ontario

Oncorhynchus gorbuscha: Dechtiar and Lawrie 1988; 83%; M; Ins; Ontario

Oncorhynchus gorbuscha: Dextrase 1987; 100%; 54; Blind Creek; lnk; Thunder Bay, Ontario

Oncorhynchus gorbuscha: Lankester and Smith 1980; 97%; 132; north shore east from Thunder Bay to Wawa, Ontario

Oncorhynchus gorbuscha: Muzzall and Peebles 1986; September-October 1983 and 1984; 92%; 89; Laughing Whitefish River; 46°31'29"/-87°1'42"; Alger County; Huron River; 46°54'35"/-88°2'12"; Baraga County; Carp River; 46°46'4"/-89°53'8"; Harlow Creek; 46°38'8"/-87°28'6"; Marquette County, Michigan

Oncorhynchus kisutch: Dechtiar and Lawrie 1988; 71%; M; Ins; Ontario

Table 8, continued.

Oncorhynchus kisutch: Dextrase 1987; 100%; 116; rivers of north shore from Thunder Bay to Terrace Bay; 48°46'59"/87°6'0" Ontario

Oncorhynchus kisutch: Lankester and Smith 1980; 92%; 198; north shore east from Thunder Bay to Wawa, Ontario

Oncorhynchus kisutch: Muzzall and Peebles 1986; 100%; 208; Laughing Whitefish River, Alger County; Huron River, Baraga County; Harlow Creek, Marquette County, Michigan

Oncorhynchus mykiss: Dechtiar and Lawrie 1988; 44%; L; Ins; Ontario

Oncorhynchus mykiss: Dextrase 1987; 63%; 37; rivers of north shore from Thunder Bay to Terrace Bay, Black Bay, Ontario

Oncorhynchus mykiss: Lankester and Smith 1980; 81%; 89; north shore east from Thunder Bay to Wawa, Ontario

Oncorhynchus mykiss: Smith 1978; 71%; minp?; north shore east to Thunder Bay to Wawa; 48°0'0"/-84°46'59"; Ontario

Oncorhynchus tshawytscha: Dextrase 1987; 100%; 14; Thunder Bay and Black Bay, Ontario

Oncorhynchus tshawytscha: Lankester and Smith 1980; 100%; 34; north shore east from Thunder Bay to Wawa, Ontario

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; 40%; 453; Laughing Whitefish River, Alger County, Michigan

Prosopium coulteri: Dextrase 1987; 20%; 1; Keweena Bay; 48°51'57"/-88°25'18"; and Quebec Harbor, Ontario; llnk

Prosopium cylindraceum: Dechtiar and Lawrie 1988; 59%; M; Ins; Ontario

Prosopium cylindraceum: Dextrase 1987; 25%; 7; Keweena Bay and Quebec Harbor, Ontario

Prosopium cylindraceum: Lankester and Smith 1980; 53%; 16; north shore east from Thunder Bay to Wawa, Ontario

Salmo trutta: Lankester and Smith 1980; 12%; 1; Brule River; 45°57'11"/-88°11'46"; Wisconsin; Brule River; 47°48'59"/-90°3'0"; Minnesota

Savelinus fontinalis: Lankester and Smith 1980; 39%; 3; north shore east from Thunder Bay to Wawa, Ontario

Salvelinus namaycush: Dextrase 1987; 100%; 9; Thunder Bay and Black Bay, Ontario

Salvelinus namaycush: Lankester and Smith 1980; 72%; 12; Thunder Bay

Cystidicola stigmatura (Leidy, 1886) Ward and Magath, 1916
Synonym: *Filaria stigmatura* Leidy, 1886; *Ancyracanthus cystidicola* of Wright 1879 not (Lamarck, 1801); *Cystidicola* sp. of White 1940; *Cystidicola farionis* of Ward and Magath 1916 not (Fischer, 1798); *Cystidicola cristivomeri* White, 1941
Site of Infection: Swim bladder
Host:
Osmerus mordax: Fischthal 1952; 1946; 100%; minp; Douglas County, Wisconsin; 46°25'59"/-91°54'0"
Osmerus mordax: Nordlie 1960; cdnp; pnp; minp; Ins; llnk
Coregonus alpenae: Klick 1946; 1946; 92%; minp; Bayfield; 46°32'59"/-91°9'0"; Cornucopia; 46°51'13"/-91°6'6"; Wisconsin
Coregonus artedi: Klick 1946; 8%; minp; Bayfield and Cornucopia, Wisconsin

Table 8, continued.

Coregonus artedi: Warren 1952; cdnp; 72%; minp; north shore; Sucker River area, Minnesota; llnk
Salvelinus namaycush: Black 1983; 1894; 27%; minp; southeast Lake Michigan; llnk; northern Lake Michigan; llnk
Salvelinus namaycush: Dechtiar and Lawrie 1988; 1969-1975; 75%; M-H; lns; Ontario; llnk
Salvelinus namaycush: Leidy 1886; cdnp; pnp; minp; lns; llnk
Salvelinus namaycush: Wright 1879; cdnp; could not obtain original article; pnp; minp; lns; llnk
Remarks: Black (1983) reported that *Cystidicola stigmatura* is apparently absent from the Great Lakes since 1925; the above reports of *Cystidicola stigmatura* in *Osmerus mordax* and *Coregonus* spp. are probably erroneous since Black (1983) reported that *Salvelinus* spp. are the known hosts for it in North America.

Cystidicola sp.

Site of Infection: Swim bladder

Host:

Coregonus artedi: Johnson 1946; November-December 1946; <10%; minp; Duluth, Wisconsin; 46°45'52"/-92°5'40"

Coregonus artedi: Swanson and Pratt 1977; November-December 1975 and 1976; 31-53% in 1973-1975; minp; Apostle Islands, Wisconsin; 46°56'17"/-90°34'10"

Coregonus artedi: Swanson and Pratt 1977; 38% in 1975-1976; minp; Apostle Islands, Wisconsin

Coregonus artedi: Swanson and Pratt 1977; 44%; minp; Grand Portage, Minnesota; 47°57'49"/-89°41'5"

Coregonus artedi: Swanson and Pratt 1977; 60%; minp; Keweenaw Bay, Michigan; 48°51'57"/-88°25'18"

Coregonus artedi: Swanson and Pratt 1977; 52%; minp; Thunder Bay, Ontario; 48°28'0"/-89°0'0"

Cystidicoloides ephemeridarum (Linstow, 1872) Moravec, 1981

Synonym: *Filaria ephemeridarum* Leidy, 1872; *Cystidicoloides tenuissima* (Zeder, 1800) Rasheed, 1965; *Sterliadochona tenuissima* (Zeder, 1800); *Metabronema salvelini* (Fujita, 1920), *Metabronema canadense* Skinker, 1931; *Cystidicoloides harwoodi* (Chandler, 1931)

Site of Infection: Stomach, intestine

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1969-1975; 19%; L; lns; Ontario; llnk

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 30%; M; lns; Ontario

Oncorhynchus gorbusha: Muzzall and Peebles 1986; September-October 1983 and 1984; 1%; 6; Laughing Whitefish River, Alger County, Michigan; 46°31'29"/-87°1'42"

Oncorhynchus kisutch: Dechtiar and Lawrie 1988; 43%; L; lns; Ontario

Oncorhynchus kisutch: Muzzall and Peebles 1986; 38%; 16; Laughing Whitefish River, Alger County; Harlow Creek, Marquette County, Michigan; 46°38'8"/-87°28'6"

Salvelinus namaycush: Dechtiar and Lawrie 1988; 20%; L; lns; Ontario

Table 8, continued.

Cystidicoloides sp.

Site of Infection: [Stomach]

Host: *Coregonus artedii*: Hoff et al. 1997; 1994 and 1996; 1%; <1*; lns; Wisconsin; llnk

Spinitectus carolini Holl, 1928

Synonym: None

Site of Infection: Intestine

Host:

Esox lucius: Dechtiar and Lawrie 1988; 1969-1976; 31%; L; lns; Ontario; llnk

Perca flavescens: Dechtiar and Lawrie 1988; 8%; L; lns; Ontario

Spinitectus gracilis Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host:

Acipenser fulvescens: Dechtiar and Lawrie 1988; 1969-1975; 67%; M; lns; Ontario; llnk

Oncorhynchus gorbusha: Muzzall and Peebles 1986; September-October 1983 and 1984; 1%; 3; Harlow Creek, Marquette County, Michigan; 46°38'8"/-87°28'6"

Oncorhynchus kisutch: Muzzall and Peebles 1986; 63%; 5; Laughing Whitefish River, Alger County, 46°51'29"/-87°1'42"; Huron River, Baraga County; 46°54'35"/-88°2'12"; Harlow Creek, Marquette County, Michigan

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; 20%; 21; Laughing Whitefish River, Alger County, Michigan

Prosopium cylindraceum: Dechtiar and Lawrie 1988; 18%; M; lns; Ontario

Percopsis omiscomaycus: Dechtiar and Lawrie 1988; 15%; L; lns; Ontario

Gymnocephalus cernuus: Pronin et al. 1998; 1989-1991 and 1992; 95%; 55; Allouez Bay; 46°41'26"/-92°0'9"; Wisconsin; 95%; 13; Pokegama Bay; 46°41'25"/-92°10'1"; Wisconsin

Philometridae Baylis and Daubney, 1926

Philometroides nodulosa (Thomas, 1929) Dailey, 1967

Synonym: *Philometra nodulosa* (Thomas, 1929)

Site of Infection: [Cheek galleries]

Host: *Catostomus commersonii*: Hogue et al. 1993; November 1984-May 1986; 1%; 10; Apostle Islands; 46°56'17"/-90°39'10"; Wisconsin

Table 8, continued.

Philonema oncorhynchi Kuitunen-Ekbaum, 1933

Synonym: *Philonema salvelini* Richardson, 1936

Site of Infection: Body cavity

Host: *Oncorhynchus gorbuscha*: Dechtiar and Lawrie 1988; 1969-1975; 28%; M; lns; Ontario; llnk

Remarks: This is the second report of *Philonema* infecting a fish from a Great Lake; the first report is Bangham (1972) in Lake Erie.

Quimperidae Baylis, 1930

Synonym: Haplonematidae Sudarikov and Ryzhikov, 1952

Haplonema hamulatum Moulton, 1931

Synonym: None

Site of Infection: Intestine

Host: *Lota lota*: Dechtiar and Lawrie 1988; 1969-1975; 59%; L-M; lns; Ontario; llnk

Rhabdochonidae Skrjabin, 1946

Rhabdochona canadensis Moravec and Arai, 1971

Synonym: None

Site of Infection: Intestine

Host:

Rhinichthys cataractae: Dechtiar and Lawrie 1988; 1969-1975; 33%; L; lns; Ontario; llnk

Oncorhynchus gorbuscha: Muzzall and Peebles 1986; September-October 1983 and 1984; 3%; 2; Laughing Whitefish River, Alger County; 46°31'29"/-87°1'42"; Carp River; 46°46'4"/-89°53'8"; Harlow Creek; 46°38'8"/-87°28'6"; Marquette County, Michigan

Oncorhynchus kisutch: Muzzall and Peebles 1986; 13%; 5; Harlow Creek, Marquette County, Michigan);

Rhabdochona cotti Gustafson, 1949

Synonym: None

Site of Infection: Intestine

Host: *Cottus bairdii*: Dechtiar and Lawrie 1988; 1969-1975; 50%; L-M; lns; Ontario; llnk

Rhabdochona decaturensis Gustafson, 1949

Synonym: None

Site of Infection: Intestine

Host:

Luxilus cornutus: Dechtiar and Lawrie 1988; 1969-1975; 36%; lns; Ontario; llnk

Notropis hudsonius: Dechtiar and Lawrie 1988; 44%; L; lns; Ontario

Table 8, continued.

Rhabdochona ovifilamenta Weller, 1938

Synonym: *Rhabdochona laurentiana* Lyster, 1940; *Rhabdochona fortunatowi* of Kussat, 1969; *Rhabdochona* sp. of Arai and Kussat, 1967

Site of Infection: Intestine

Host: *Perca flavescens*: Dechtiar and Lawrie 1988; 1969-1975; 8%; L; lns; Ontario; llnk

Rhabdochona sp.

Site of Infection: Intestine

Host: *Percopsis omiscomaycus*: Dechtiar and Lawrie 1988; 1969-1975; 23%; L; lns; Ontario; llnk

Larval/Immature Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Contracaecum sp.

Site of Infection: [Viscera]

Host: *Pungitius pungitius*: Fischthal 1952; 1946; 14%; minp; Douglas County; 46°25'59"/-91°54'0"; Wisconsin

Remark: Separating larval *Contracaecum* and larval *Hysterothylacium* is difficult.

Hysterothylacium brachyurum Ward and Magath, 1916

Synonym: *Contracaecum brachyurum* Van Cleave and Mueller, 1934; *Thynnascaris brachyurum* Margolis and Arthur, 1979

Site of Infection: Liver

Host: *Perca flavescens*: Dechtiar and Lawrie 1988; 1969-1975; 33%; L; lns; Ontario; llnk

Raphidascaris acus (Bloch, 1779) Railliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790; *Ascaris anguillae* Schrank, 1790; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris mucronata* Schrank, 1790 nec Froel., 1791; *Fusaria acus* (Bloch, 1779) Zeder, 1800; *Fusaria dentata* (Zeder, 1800) Rudolphi, 1809; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata* (Zeder, 1800) Rudolphi, 1809; *Ascaris labiata* Rudolphi, 1809; *Agamonema leucisci rutili* Diesing, 1851; *Trichina cyprinorum* Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris gracillima* Linstow, 1890; *Ascaris lucii* Pearse, 1924; *Hysterothylacium cayugensis* Wigdor, 1918; *Raphidascaris canadense* Smedley, 1933; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928; *Raphidascaris cayugensis* (Wigdor, 1918) Yorke and Maplestone, 1926; *Raphidascaris gracillima* (Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937; *Raphidascaris laurentianus* Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Liver

Table 8, continued.

Host

Ambloplites rupestris: Dechtiar and Lawrie 1988; 1969-1975; 32%; M; Ins; Ontario; llnk

Perca flavescens: Dechtiar and Lawrie 1988; 63%; M; Ins; Ontario

Camallanidae Railliet and Henry, 1913

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host: *Micropterus dolomieu*: Dechtiar and Lawrie 1988; 1969-1975; 50%; L; Ins; Ontario; llnk

Cystidicolidae (as in Anderson et al. 1975)

Cystidicola farionis Fischer, 1798

Synonym: See above for *Cystidicola farionis*

Site of Infection: Intestine

Host: *Osmerus mordax*: Dextrase 1987; cdnp; 75%, 4; rivers of north shore from Thunder Bay; 48°28'0"/-89°0'0"; Terrace Bay; 48°46'59"/-87°6'0"; Ontario

Gnathostomatidae Lane, 1923

Spiroxys sp.

Site of Infection: Mesentery

Host: *Rhinichthys cataractae*: Dechtiar and Lawrie 1988; 1969-1975; 10%; L; Ins; Ontario; llnk

Quimperidae Baylis, 1930

Synonym: Haplonematidae Sudarikov and Ryzhikov, 1952

Haplonema sp.

Site of Infection: Intestine

Host: *Oncorhynchus kisutch*: Muzzall and Peebles 1986; September-October 1983 and 1984; 25%; 1; Laughing Whitefish River, Alger County; 46°31'29"/-87°1'42"; Harlow Creek, Marquette County, 46°38'8"/-87°28'6"; Michigan

Adult Acanthocephala (Acanthocephalans)

Echinorhynchidae Cobbold, 1876

Acanthocephalus dirus (Van Cleave, 1931) Van Cleave and Townsend, 1936

Synonym: *Echinorhynchus dirus* Van Cleave, 1931; *Acanthocephalus jacksoni* Bullock, 1962,

Acanthocephalus parksidei Amin 1975, 1977

Site of Infection: Intestine

Table 8, continued.

Host:

Alosa pseudoharengus: Dechtiar and Lawrie 1988; 1969-1975; 25%; L; Ins; Ontario; llnk
Catostomus catostomus: Dechtiar and Lawrie 1988; 14%; L; Ins; Ontario
Catostomus commersonii: Hogue et al. 1993; November 1984-May 1986; 5%; 1; Apostle Islands, 46°56'17"/-90°39'10"; Wisconsin
Esox lucius: Dechtiar and Lawrie 1988; 23%; L; Ins; Ontario
Osmerus mordax: Dechtiar and Lawrie 1988; 18%; L; Ins; Ontario
Oncorhynchus mykiss: Dechtiar and Lawrie 1988; 67%; M; Ins; Ontario
Percopsis omiscomaycus: Dechtiar and Lawrie 1988; 23%; L; Ins; Ontario
Cottus bairdi: Dechtiar and Lawrie 1988; 17%; L; Ins; Ontario
Perca flavescens: Dechtiar and Lawrie 1988; 29%; L; Ins; Ontario

Echinorhynchus lateralis (Leidy, 1851) Golvan, 1969

Synonym: *Acanthocephalus lateralis* (Leidy, 1851) Petrochenko, 1956; *Metechinorhynchus lateralis* (Leidy, 1851) Golvan, 1969

Site of Infection: Intestine

Host:

Acipenser fulvescens: Dechtiar and Lawrie 1988; 1969-1975; 67%; M; Ins; Ontario; llnk
Coregonus artedii: Dechtiar and Lawrie 1988; 56%; H; Ins; Ontario
Coregonus artedii: Hoff et al. 1997; 1994 and 1996; 46%; 1*; Knife River, Minnesota; 45°54'28"/-93°17'54"
Oncorhynchus kisutch: Dechtiar and Lawrie 1988; 57%; L; Ins; Ontario
Oncorhynchus mykiss: Dechtiar and Lawrie 1988; 56%; L; Ins; Ontario
Prosopium cylindraceum: Dechtiar and Lawrie 1988; 34%; L; Ins; Ontario
Salvelinus namaycush: Dechtiar and Lawrie 1988; 63%; M-H; Ins; Ontario

Echinorhynchus salmonis (Muller, 1784) Petrochenko, 1956

Synonym: *Echinorhynchus coregoni* Linkins in Van Cleave, 1919; *Echinorhynchus pachysomus*, *Echinorhynchus phoenix*, *Echinorhynchus inflatus*, *Echinorhynchus maraenae*, *Echinorhynchus murenae*, *Metechinorhynchus alpinus*, *Metechinorhynchus salmonis* (Muller, 1784) Petrochenko, 1956

Site of Infection: Intestine

Host:

Acipenser fulvescens: Dechtiar and Lawrie 1988; 1969-1975; 100%; H; Ins; Ontario; llnk
Catostomus catostomus: Hogue et al. 1993; November 1984-May 1986; 34%; 3; Apostle Islands; 46°56'17"/-90°39'10"; Wisconsin
Catostomus commersonii: Hogue et al. 1993; 52%; 16; Apostle Islands; Wisconsin
Osmerus mordax: Dechtiar and Lawrie 1988; 43%; L; Ins; Ontario
Coregonus artedii: Dechtiar and Lawrie 1988; 42%; H; Ins; Ontario
Coregonus artedii: Hoff et al. 1997; 1994 and 1996; 14%; <1*; Basswood Island; 46°51'0"/-90°44'46"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°39'10"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin; 54%; 1*; Knife River, Minnesota; 45°54'28"/-93°17'54"

Table 8, continued.

Coregonus artedi: Warren 1952; cdnp; 30%; minp; north shore, Sucker River area, Minnesota; llnk
Coregonus clupeaformis: Dechtiar and Lawrie 1988; 87%; M-H; lns; Ontario
Coregonus hoyi: Dechtiar and Lawrie 1988; 50%; L; lns; Ontario
Oncorhynchus gorbusha: Dechtiar and Lawrie 1988; 26%; M-H; lns; Ontario
Oncorhynchus gorbusha: Muzzall and Peebles 1986; September-October 1983 and 1984; 98%; 41; Laughing Whitefish River; 46°31'29"/-87°1'42"; Alger County, Huron River; 46°54'35"/-88°2'12"; Baraga County, Carp River; 46°46'4"/-89°53'8"; Harlow Creek; 46°38'8"/-87°28'6"; Marquette County, Michigan
Oncorhynchus kisutch: Dechtiar and Lawrie 1988; 57%; M; lns; Ontario
Oncorhynchus kisutch: Muzzall and Peebles 1986; 100%; 301; Laughing Whitefish River, Alger County; Huron River, Baraga County, Michigan
Oncorhynchus tshawytscha: Muzzall and Peebles 1986; 100%; 343; Laughing Whitefish River, Alger County, Michigan
Prosopium cylindraceum: Dechtiar and Lawrie 1988; 41%; M; lns; Ontario
Salvelinus namaycush: Dechtiar and Lawrie 1988; 60%; H; lns; Ontario
Percopsis omiscomaycus: Dechtiar and Lawrie 1988; 62%; L; lns; Ontario
Cottus bairdi: Dechtiar and Lawrie 1988; 27%; L-M; lns; Ontario
Ambloplites rupestris: Dechtiar and Lawrie 1988; 16%; L; lns; Ontario
Perca flavescens: Dechtiar and Lawrie 1988; 50%; L; lns; Ontario
Sander vitreus: Dechtiar and Lawrie 1988; 53%; L; lns; Ontario

Echinorhynchus sp.

Site of Infection: [Intestine]

Host: *Osmerus mordax*: Nordlie 1960; cdnp; pnp; minp; lns; llnk)

Echinorhynchidae

Unidentified acanthocephalans (spiny-headed worm)

Synonym: None

Site of Infection: Intestine

Host: *Oncorhynchus gorbusha*: Nicolette and Spangler 1986; 1981 and 1982; 97%; minp, Cross River; 48°20'25"/-93°29'20"; Cascade River; 47°42'24"/-90°31'21"; Minnesota

Neoechinorhynchidae Ward, 1917

Synonym: Hebesomatidae Van Cleave, 1928; Hebesomatidae Yamaguti, 1963

Neoechinorhynchus crassus Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host:

Catostomus catostomus: Dechtiar and Lawrie 1988; 1969-1975; 25%; M; lns; Ontario; llnk

Catostomus catostomus: Hogue et al. 1993; November 1984-May 1986; 64%; 4; Apostle Islands; 46°56'17"/-90°39'10"; Wisconsin

Table 8, continued.

Catostomus commersonii: Fischthal 1952; 1946; 80%; minp; 46°25'59"/-91°54'0"; Wisconsin
Catostomus commersonii: Hogue et al. 1993; 84%; 10; Apostle Islands, Wisconsin
Coregonus artedi: Hoff et al. 1997; 1994 and 1996; 1%; <1; lns; llk; Wisconsin; 8%; <1*; Knife River; 45°54'28"/-93°17'54"; Minnesota

Neoechinorhynchus cristatus Lynch, 1936

Synonym: None

Site of Infection: Intestine

Host: *Catostomus commersonii*: Dechtiar and Lawrie 1988; 1969-1975; 32%; L-M; lns; Ontario; llk

Neoechinorhynchus cylindratus (Van Cleave, 1913) Van Cleave, 1919

Synonym: *Neorhynchus cylindratus* Van Cleave, 1913; *Eorhynchus cylindratus*, (Van Cleave, 1913) Van Cleave, 1914

Site of Infection: Intestine

Host:

Coregonus artedi: Warren 1952; cdnp; 1%; minp; north shore, Sucker River area, Minnesota; llk

Ambloplites rupestris: Dechtiar and Lawrie 1988; 1969; 74%; M; lns; Ontario; llk

Neoechinorhynchus notemigoni Dechtiar, 1967

Synonym: None

Site of Infection: Intestine

Host: *Notropis hudsonius*: Dechtiar and Lawrie 1988; 1969-1975; 9%; L; lns; Ontario; llk

Neoechinorhynchus rutili (Muller, 1780) Hamann, 1892

Synonym: *Echinorhynchus tuberosus* Zider, 1803

Site of Infection: Intestine

Host:

Notropis hudsonius: Dechtiar and Lawrie 1988; 1969-1975; 15%; L; lns; Ontario; llk

Pimephales notatus: Dechtiar and Lawrie 1988; 21%; L; lns; Ontario

Salvelinus fontinalis: Dechtiar and Lawrie 1988; 27%; L; lns; Ontario

Neoechinorhynchus tenellus (Van Cleave, 1913) Van Cleave, 1919

Synonym: *Neorhynchus tenellus* Van Cleave, 1913

Site of Infection: Intestine

Host:

Esox lucius: Dechtiar and Lawrie 1988; 1969-1975; 23%; H; lns; Ontario; llk

Sander vitreus: Dechtiar and Lawrie 1988; 67%; L-M; lns; Ontario

Table 8, continued.

Neoechinorhynchus tumidus Van Cleave and Bangham, 1949

Synonym: None

Site of Infection: Intestine

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1969-1975; 17%; L; lns; Ontario; llnk

Coregonus clupeaformis: Dechtiar and Lawrie 1988; 30%; L; lns; Ontario

Neoechinorhynchus sp.

Site of Infection: [Intestine]

Host: *Osmerus mordax*: Fischthal 1952; 1946; 8%; minp; Douglas County; 46°25'59"/-91°54'0"; Wisconsin

Octospinifer macilentus Van Cleave, 1919

Synonym: *Octospinifer* sp. of Mudry and Arai, 1973; *Octospinifer* sp. of Mudry and Anderson, 1976

Site of Infection: [Intestine]

Host:

Catostomus catostomus: Hogue et al. 1993; November 1984-May 1986; 2%; 5; Apostle Islands; 46°56'17"/-90°39'10"; Wisconsin

Catostomus commersonii: Hogue et al. 1993; 3%; 2; Apostle Islands, Wisconsin

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host:

Notropis hudsonius: Dechtiar and Lawrie 1988; 1969-1975; 12%; L; lns; Ontario; llnk

Rhinichthys cataractae: Dechtiar and Lawrie 1988; 27%; L; lns; Ontario

Catostomus catostomus: Dechtiar and Lawrie 1988; 8%; M; lns; Ontario

Catostomus commersonii: Dechtiar and Lawrie 1988; 60%; L-M; lns; Ontario

Catostomus commersonii: Hogue et al. 1993; November 1984-May 1986; 34%; 5; Apostle Islands; 46°56'17"/-90°39'10"; Wisconsin

Percopsis omiscomaycus: Dechtiar and Lawrie 1988; 23%; L; lns; Ontario

Lota lota: Dechtiar and Lawrie 1988; 4%; L; lns; Ontario

Ambloplites rupestris: Dechtiar and Lawrie 1988; 16%; L; lns; Ontario

Table 8, continued.

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Intestine

Host:

Osmerus mordax: Fischthal 1952; 1946; 54%; minp; Douglas County; 46°25'59"/-91°54'0"; Wisconsin

Pungitius pungitius: Fischthal 1952; 29%; minp; Douglas County, Wisconsin

Micropterus dolomieu: Dechtiar and Lawrie 1988; 1969-1975; 100%; M; lns; Ontario; llnk

Immature Acanthocephala (Acanthocephalans)

Echinorhynchidae Cobbold, 1876

Echinorhynchus sp.

Site of Infection: Intestine

Host:

Oncorhynchus gorbuscha: Muzzall and Peebles 1986; September-October 1983 and 1984; 1%; 1; Laughing Whitefish River, Alger County, Michigan; 46°31'29"/-87°1'42"

Oncorhynchus kisutch: Muzzall and Peebles 1986; 63%; 8; Laughing Whitefish River, Alger County; Harlow Creek, Marquette County, Michigan; 46°38'8"/-87°28'6"

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; 80%; 9; Laughing Whitefish River, Alger County, Michigan

Neoechinorhynchidae Ward, 1917

Synonym: Hebosomidae Van Cleave, 1928; Hebosomatidae Yamaguti, 1963

Neoechinorhynchus tumidus Van Cleave and Bangham, 1949

Synonym: None

Site of Infection: Intestine

Host:

Oncorhynchus gorbuscha: Muzzall and Peebles 1986; September-October 1983 and 1984; 1%; 1; Laughing Whitefish River, Alger County, Michigan; 46°31'29"/-87°1'42"

Oncorhynchus kisutch: Muzzall and Peebles 1986; 13%; 1; Harlow Creek, Marquette County, Michigan; 46°38'8"/-87°28'6"

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; 60%; minp; Laughing Whitefish River, Alger County, Michigan

Table 8, continued.

Neoechinorhynchus sp.

Site of Infection: [Intestine]

Host: *Catostomus commersonii*: Fischthal 1952; 1946; 20%; minp; Douglas County, Wisconsin; 46°25'59"/-91°54'0"

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host: *Prosopium cylindraceum*: Dechtiar and Lawrie 1988; 1969-1975; 41%; L; Ins; Ontario; lnk

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Liver, mesentery

Host: *Ambloplites rupestris*: Dechtiar and Lawrie 1988; 1969-1975; 74%; M; Ins; Ontario; lnk

Hirudinea (Leeches)

Glossiphoniidae Vaillant, 1890

Actinobdella inequiannulata Moore, 1901

Synonym: *Actinobdella triannulata* Moore, 1924; *Actinobdella triannulata* Daniels and Freeman, 1976

Site of Infection: Gill chambers

Host:

Catostomus catostomus: Dechtiar and Lawrie 1988; 1969-1975; 6%; L; Ins; Ontario; lnk

Catostomus commersonii: Dechtiar and Lawrie 1988; 11%; L; Ins; Ontario

Piscicolidae Johnston, 1865

Myzobdella lugubris Leidy, 1851

Synonym: *Cystobranchus virginicus* Paperna and Zwerner, 1974; *Ichthyobdella funduli* Verrill, 1872; *Ichthyobdella rapax* Wass, 1972; *Ichthyobdella richardsoni* Meyer, 1940; *Illinobdella alba* Meyer, 1940; *Illinobdella elongata* Meyer, 1940; *Illinobdella moorei* Meyer, 1940; *Myzobdella alba* Meyer, 1940; *Myzobdella lugubris* Pearse, 1948; *Myzobdella moorei* (Meyer, 1940) Meyer and Moore, 1954

Site of Infection: Fins

Host:

Lota lota: Dechtiar and Lawrie 1988; 1969-1975; 53%; L; Ins; Ontario; lnk

Ambloplites rupestris: Dechtiar and Lawrie 1988; 6%; L; Ins; Ontario

Table 8, continued.

Piscicola milneri (Verrill, 1874) Ryerson, 1915

Synonym: *Ichthyobdella milneri*

Site of Infection: Fins

Host: *Prosopium cylindraceum*: Dechtiar and Lawrie 1988; 1969-1975; 4%; L; Ins; Ontario; lnk

Piscicola punctata (Verrill, 1871) Moore, 1912

Synonym: *Ichthyobdella punctata* (Verrill, 1871) Moore, 1912

Site of Infection: Fins

Host:

Acipenser fulvescens: Dechtiar and Lawrie 1988; 1969-1975; 33%; L; Ins; Ontario; lnk

Not provided: Verrill 1871; cdnp; pnp; minp; Slate Islands; lnk

Remarks: The report of *Piscicola punctata* by Verrill (1871) is included here because it has been found on fish.

Copepoda (Copepods)

Ergasilidae Nordmann, 1832

Ergasilus caeruleus Wilson, 1911

Synonym: *Ergasilus confusus* Bere, 1931; *Ergasilus skrjabini* Mueller, 1937

Site of Infection: Gills

Host:

Catostomus catostomus: Dechtiar and Lawrie 1988; 1969-1975; 47%; L-M; Ins; Ontario; lnk

Catostomus commersonii: Dechtiar and Lawrie 1988; 6%; L; Ins; Ontario

Esox lucius: Dechtiar and Lawrie 1988; 23%; L; Ins; Ontario

Percopsis omiscomaycus: Dechtiar and Lawrie 1988; 54%; L-M; Ins; Ontario

Remarks: Records of *Ergasilus caeruleus* on fish hosts before Roberts (1970) should be treated with caution.

Ergasilus centrarchidarum (Wright, 1882) Wilson, 1932

Synonym: None

Site of Infection: [Gills]

Host:

Ambloplites rupestris: Dechtiar and Lawrie 1988; 1969-1975; 37%; L-M; Ins; Ontario; lnk

Micropterus dolomieu: Dechtiar and Lawrie 1988; 50%; L; Ins; Ontario

Remarks: Dechtiar and Lawrie (1988) reported that *E. centrarchidarum* was found in the intestine of *M. dolomieu*.

Table 8, continued.

Ergasilus cotti Kellicott, 1879

Synonym: None

Site of Infection: Gills

Host: *Cottus bairdii*: Dechtiar and Lawrie 1988; 1969-1975; 60%; L-M; lns; Ontario; llnk

Ergasilus luciopercarum Henderson, 1926

Synonym: *Ergasilus confusus* Bere, 1931; *Ergasilus skrjabini* Mueller, 1936; *Ergasilus caeruleus* Wilson in Mueller, 1936

Site of Infection: Gills

Host:

Perca flavescens: Dechtiar and Lawrie 1988; 1969-1975; 58%; L; lns; Ontario; llnk

Sander vitreus: Dechtiar and Lawrie 1988; 87%; L-M; lns; Ontario

Ergasilus nerkae Roberts, 1963

Synonym: *Ergasilus caeruleus* of Bangham and Adams, 1954 (partim); *Ergasilus* sp. of Bangham and Adams, 1954 (partim)

Site of Infection: Gills

Host:

Catostomus catostomus: Hogue et al. 1993; November 1984-May 1986; 64%; 15; Apostle Islands; 46°56'17"/-90°39'10"; Wisconsin

Catostomus commersonii: Hogue et al. 1993; 12%; 3; Apostle Islands, Wisconsin

Percopsis omiscomaycush: "Common"; D.R. Sutherland (unpublished data); Hogue et al. 1993

Pungitius pungitius: "Common"; D.R. Sutherland (unpublished data); Hogue et al. 1993

Pungitius pungitius: Hudson et al. 1994; 32%; minp; fish collected before 1960; Apostle Islands, 46°56'17"/-90°39'10"; Wisconsin; fish specimens examined were archived at the National Biological Survey, Great Lakes Center and the Museum of Zoology, University of Michigan

Cottus cognatus: "Common"; D.R. Sutherland (unpublished data); Hogue et al. 1993

Ergasilus sp.

Site of Infection: [Gills]

Host:

Notropis hudsonius: Dechtiar and Lawrie 1988; 1969-1975; 6%; L; lns; Ontario; llnk

Coregonus artedii: Hoff et al. 1997; 1994 and 1996; 1%; <1*; Basswood Island; 46°51'0"/-91°23'11"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin

Table 8, continued.

Lernaeopodidae Olsson, 1869

Achtheres pimelodi Kroyer, 1863

Synonym: *Achtheres ambloplitis* Kellicott, 1880; *Achtheres micropteri* Wright, 1882

Site of Infection: Gills

Host: *Ambloplites rupestris*: Dechtiar and Lawrie 1988; 1969-1975; 16%; L; lns; Ontario; llnk

Salmincola extensus (Kessler, 1868) Kabata, 1969

Synonym: *Achtheres coregoni* Baumann, 1911; *Lernaeopoda coregoni* Smith, 1874; *Lernaeopoda extensus* Kessler, 1868; *Lernaeopoda maraenae* Olsson, 1877; *Salmincola wisconsinensis* Tidd and Bangham, 1945

Site of Infection: Gills

Host: *Coregonus artedi*: Warren 1952; cdnp; 7%; minp; north shore, Sucker River area, Minnesota; llnk

Salmincola extumescens (Gadd, 1901) Wilson, 1915

Synonym: *Achtheres corpulentus* Kellicott, 1880; *Salmincola corpulentus* (Kellicott, 1880); *Lernaeopoda extumescens* Gadd, 1901; *Lernaeopoda inermis* Wilson, 1911; *Salmincola inermis* (Wilson, 1911) Wilson, 1915; *Salmincola omuli* Messjatzeff, 1926

Site of Infection: Gills

Host:

Coregonus artedi: Dechtiar and Lawrie 1988; 1969-1975; 17%; L; lns; Ontario; llnk

Coregonus artedi: Hoff et al. 1997; 1994 and 1996; 46%; <1*; Basswood Island; 46°51'0"/-90°44'46"; Oak Island; 46°56'13"/-90°43'41"; Outer Island; 47°2'6"/-90°25'51"; Port Wing; 46°46'28"/-91°23'11"; Sand Island; 46°58'44"/-90°56'54"; Wisconsin; 31%; <1*; Knife River, Minnesota; 45°54'28"/-93°17'54"

Coregonus hoyi: Dechtiar and Lawrie 1988; 38%; L; lns; Ontario

Prosopium cylindraceum: Dechtiar and Lawrie 1988; 63%; L; lns; Ontario

Salmincola inermis Wilson, 1911

Synonym: None

Site of Infection: Gill chamber

Host: *Coregonus artedi*: Warren 1952; cdnp; 65%; minp; north shore, Sucker River area, Minnesota; llnk)

Salmincola lotae Olsson, 1869

Synonym: None

Site of Infection: Oral cavity

Host:

Lota lota: Lasee et al. 1988; 1985; 36%; 4; Apostle Islands; 46°56'17"/-90°39'10"; Wisconsin

Remarks: Although the Lasee et al. (1988) report is listed as the first North American record in their article, *Salmincola lotae* was reported in North America earlier by Stewart and Bernier (1983).

Table 8, continued.

Salmincola siscowet (Smith, 1874) Wilson, 1915

Synonym: None

Site of Infection: Fins

Host: *Salvelinus namaycush*: Dechtiar and Lawrie 1988; 1969-1975; 18%; L; Ins; Ontario; lnk

Salmincola sp.

Site of Infection: [Body, fins]

Host:

Coregonus artedi: Swanson and Pratt 1977; November-December 1975 and 1976; 27-50% in 1973-1975; minp; Apostle Islands, Wisconsin; 46°56'17"/-90°39'10"

Coregonis artedi: Swanson and Pratt 1977; 40% in 1975-1976; minp; Apostle Islands, Wisconsin

Coregonus artedi: Swanson and Pratt 1977; 44%; minp; Grand Portage, Minnesota; 47°57'49"/-89°41'5"

Coregonus artedi: Swanson and Pratt 1977; 44%; minp; Keweenaw Bay, Michigan; 48°51'57"/-88°25'18"

Coregonus artedi: Swanson and Pratt 1977; 24%; minp; Thunder Bay, Ontario; 48°28'0"/-89°0'0"

Mollusca (Molluscs)

Unionidae Rafinesque, 1820

Unidentified glochidia

Synonym: ?

Site of Infection: Fins, gills

Host:

Percopsis omiscomaycus: Dechtiar and Lawrie 1988, 1969-1975, 38%, L, Ins, Ontario, lnk

Pungitius pungitius: Fischthal 1952, 1946, 14%, minp, Douglas County, Wisconsin, 46°25'59"/-91°54'0"

Perca flavescens: Dechtiar and Lawrie 1988, 13%, M, Ins, Ontario

Table 9. Fishes by family from Lake Superior from which parasites were reported during 1871-2010 using parasite data from Table 8. References in parentheses following parasites refer to references for host records.

Acipenseridae

***Acipenser fulvescens* (lake sturgeon)**

Adult Digenea: *Crepidostomum lintoni*, (Dechtiar and Lawrie 1988); *Skrjabinopsolus manteri*, (Dechtiar and Lawrie 1988).

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988)

Monogenea: *Diclybothrium armatum*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Truttaedacnitis clitellarius*, (Dechtiar and Lawrie 1988); *Spinitectus gracilis*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Echinorhynchus lateralis*, (Dechtiar and Lawrie 1988); *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988)

Hirudinea: *Piscicola punctata*, (Dechtiar and Lawrie 1988)

Clupeidae

***Alosa pseudoharengus* (alewife)**

Larval Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Lawrie 1988)

Cyprinidae

***Luxilus cornutus* (common shiner)**

Myxozoa: *Thelohanellus notatus*, (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar and Lawrie 1988); *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Tylodelphys scheuringi*, (Dechtiar and Lawrie 1988)

Monogenea: *Dactylogyrus cornutus*, (Dechtiar and Lawrie 1988); *Octomacrum microconfibula*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Rhabdochona decaturensis*, (Dechtiar and Lawrie 1988)

***Notropis hudsonius* (spottail shiner)**

Myxozoa: *Myxobolus algonquinensis*, (Cone et al. 2004); *Myxobolus burti*, (Cone et al. 2004, Cone and Marcogliese 2010); *Myxobolus grandis*, (Dechtiar and Lawrie 1988); *Thelohanellus notatus*, (Cone et al. 2004); *Zschokkella* sp., (Cone et al. 2004)

Adult Digenea: *Allocreadium lobatum*, (Dechtiar and Lawrie 1988); *Sanguinicola* sp., (Dechtiar and Lawrie 1988)

Table 9, continued.

Larval/Immature Digenea: *Clinostomum complanatum*, (Dechtiar and Lawrie 1988); *Centrovarium lobotes*, (Dechtiar and Lawrie 1988); *Crassiphiala bulboglossa*, (Dechtiar and Lawrie 1988); *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Diplostomum* sp., (Fischthal 1952); *Neascus* sp., (Fischthal 1952); *Posthodiplostomum minimum*, (Dechtiar and Lawrie 1988; Fischthal 1952); *Ichthyocotylurus* sp., (Dechtiar and Lawrie 1988)

Monogenea: *Dactylogyrus* sp., (Dechtiar and Lawrie 1988)

Larval/Immature Cestoda: *Ligula intestinalis*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Rhabdochona decaturensis*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Neoechinorhynchus notemigoni*, (Dechtiar and Lawrie 1988); *Neoechinorhynchus rutili*, (Dechtiar and Lawrie 1988); *Pomphorhynchus bulbocolli*, (Dechtiar and Lawrie 1988)

Copepoda: *Ergasilus* sp., (Dechtiar and Lawrie 1988)

***Pimephales notatus* (bluntnose minnow)**

Myxozoa: *Thelohanellus notatus*, (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988)

Monogenea: *Dactylogyrus bifurcatus*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Neoechinorhynchus rutili*, (Dechtiar and Lawrie 1988)

***Rhinichthys cataractae* (longnose dace)**

Adult Digenea: *Allocreadium lobatum*, (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar and Lawrie 1988); *Posthodiplostomum minimum*, (Dechtiar and Lawrie 1988)

Monogenea: *Dactylogyrus banghami*, (Dechtiar and Lawrie 1988); *Gyrodactylus dechtiari*, (Dechtiar and Lawrie 1988)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Rhabdochona canadensis*, (Dechtiar and Lawrie 1988)

Larval/Immature Nematoda: *Spiroxys* sp., (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar and Lawrie 1988)

Catostomidae

***Catostomus catostomus* (longnose sucker)**

Myxozoa: *Myxobolus bibullatum*, (Dechtiar and Lawrie 1988)

Adult Digenea: *Plagiocirrus* sp., (Hogue et al. 1993); *Lissorchis attenuatus*, (Dechtiar and Lawrie 1988); *Sanguinicola* sp., (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Bucephalus* sp., (Dechtiar and Lawrie 1988); *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988)

Monogenea: *Acolpenteron catostomi*, (Dechtiar and Lawrie 1988); *Pellucidhaptor catostomi*, (Dechtiar and Lawrie 1988); *Octomacrum lanceatum*, (Dechtiar and Lawrie 1988; Hogue et al. 1993); *Pseudomurraytrema copulatum*, (Dechtiar and Lawrie 1988)

Adult Cestoda: *Glaridacris catostomi*, (Dechtiar and Lawrie 1988; Hogue et al. 1993); *Cyathocephalus truncatus*, (Hogue et al. 1993); *Proteocephalus* sp., (Dechtiar and Lawrie 1988)

Table 9, continued.

Larval/Immature Cestoda: *Ligula intestinalis*, (Dechtiar and Lawrie 1988)
Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Lawrie 1988); *Echinorhynchus salmonis*, (Hogue et al. 1993); *Neoechinorhynchus crassus*, (Dechtiar and Lawrie 1988; Hogue et al. 1993); *Octospinifer macilentus*, (Hogue et al. 1993); *Pomphorhynchus bulbocolli*, (Dechtiar and Lawrie 1988)
Hirudinea: *Actinobdella inequiannulata*, (Dechtiar and Lawrie 1988)
Copepoda: *Ergasilus caeruleus*, (Dechtiar and Lawrie 1988)

***Catostomus commersonii* (white sucker)**

Myxozoa: *Myxobolus bibullatum*, (Dechtiar and Lawrie 1988)
Adult Digenea: *Phyllodistomum lysteri*, (Dechtiar and Lawrie 1988); *Lissorchis attenuatus*, (Dechtiar and Lawrie 1988; Hogue et al. 1993)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Diplostomum* sp., (Fischthal 1952); *Ichthyocotylurus* sp., (Dechtiar and Lawrie 1988)
Monogenea: *Acolpenteron catostomi*, (Dechtiar and Lawrie 1988); *Octomacrum lanceatum*, (Dechtiar and Lawrie 1988; Hogue et al. 1993); *Gyrodactylus* sp., (Dechtiar and Lawrie 1988); *Anonchhaptor anomalus*, (Dechtiar and Lawrie 1988); *Anonchhaptor* sp., (Hogue et al. 1993); *Pseudomurraytrema copulatum*, (Dechtiar and Lawrie 1988)
Adult Cestoda: *Glaridacris catostomi*, (Hogue et al. 1993); *Glaridacris laruei*, (Hogue et al. 1993); *Isoglaridacris bulbocirrus*, (Hogue et al. 1993); *Monobothrium hunteri*, (Hogue et al. 1993); *Cyathocephalus truncatus*, (Hogue et al. 1993)
Adult Nematoda: *Capillaria catostomi*, (Hogue et al. 1993); *Philometroides nodulosa*, (Hogue et al. 1993)
Adult Acanthocephala: *Acanthocephalus dirus*, (Hogue et al. 1993); *Echinorhynchus salmonis*, (Hogue et al. 1993); *Neoechinorhynchus crassus*, (Fischthal 1952; Hogue et al. 1993); *Neoechinorhynchus cristatus*, (Dechtiar and Lawrie 1988); *Octospinifer macilentus*, (Hogue et al. 1993); *Pomphorhynchus bulbocolli*, (Dechtiar and Lawrie 1988; Hogue et al. 1993)
Immature Acanthocephala: *Neoechinorhynchus* sp., (Fischthal 1952)
Hirudinea: *Actinobdella inequiannulata*, (Dechtiar and Lawrie 1988)
Copepoda: *Ergasilus nerkae*, (Hogue et al. 1993)

Ictaluridae

***Ameiurus nebulosus* (brown bullhead)**

Adult Digenea: *Phyllodistomum staffordi*, (Dechtiar and Lawrie 1988)
Monogenea: *Ligictaluridus pricei*, (Dechtiar and Lawrie 1988); *Lyrodiscus rupestris*, (Dechtiar and Lawrie 1988)
Adult Cestoda: *Corallobothrium fimbriatum*, (Dechtiar and Lawrie 1988)

Table 9, continued.

Esocidae

***Esox lucius* (northern pike)**

Monogenea: *Tetraonchus monenteron*, (Dechtiar 1972b; Dechtiar and Lawrie 1988)

Adult Cestoda: *Proteocephalus pinguis*, (Dechtiar and Lawrie 1988); *Triaenophorus crassus*, (Dechtiar and Lawrie 1988); *Triaenophorus nodulosus*, (Dechtiar and Lawrie 1988)

Larval/Immature Cestoda: *Diphyllobothrium latum*, (Warthin 1912)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Lawrie 1988); *Spinitectus carolini*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Lawrie 1988); *Neoechinorhynchus tenellus*, (Dechtiar and Lawrie 1988)

Copepoda: *Ergasilus caeruleus*, (Dechtiar and Lawrie 1988)

Osmeridae

***Osmerus mordax* (rainbow smelt)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Diplostomum* sp., (Fischthal 1952)

Adult Cestoda: *Bothriocephalus* sp., (Fischthal 1952)

Adult Nematoda: *Cystidicola farionis*, (Dechtiar and Lawrie 1988; Lankester and Smith 1980); *Cystidicola stigmatura*, (Fischthal 1952; Nordlie 1960)

Larval/Immature Nematoda: *Cystidicola farionis*, (Dextrase 1987)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Lawrie 1988); *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988); *Echinorhynchus* sp., (Nordlie 1960); *Neoechinorhynchus* sp., (Fischthal 1952); *Leptorhynchoides thecatus*, (Fischthal 1952)

Salmonidae

***Coregonus alpenae* (longjaw chub/cisco)**

Larval/Immature Cestoda: *Triaenophorus* sp., (Klick 1946)

Adult Nematoda: *Cystidicola stigmatura*, (Klick 1946)

***Coregonus artedii* (lake herring/cisco)**

Myxozoa: *Chloromyxum* sp., (Hoff et al. 1997); *Hennuguya zschokkei*, (Hoff et al. 1997); *Hennuguya* sp., (Dechtiar and Lawrie 1988; Hoff et al. 1997)

Adult Digenea: *Crepidostomum farionis*, (Dechtiar and Lawrie 1988; Warren 1952)

Larval/Immature Digenea: *Clinostomum complanatum*, (Hoff et al. 1997); *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Diplostomum* sp., (Hoff et al. 1997); *Ichthyocotylurus erraticus*, (Dechtiar and Lawrie 1988); *Ichthyocotylurus* sp., (Hoff et al. 1997)

Monogenea: *Discocotyle sagittata*, (Dechtiar and Lawrie 1988; Hoff et al. 1997)

Table 9, continued.

Adult Cestoda: *Eubothrium crassum*, (Warren 1952); *Eubothrium salvelini*, (Hoff et al. 1997); *Cyathocephalus truncatus*, (Hoff et al. 1997); *Proteocephalus exiguus*, (Dechtiar and Lawrie 1988; Warren 1952); *Proteocephalus laruei*, (Dechtiar and Lawrie 1988); *Protocephalus laruei* and *Proteocephalus exiguus* mixed infection, (Hoff et al. 1997)

Larval/Immature Cestoda: *Diphyllobothrium ditremum*, (Dechtiar and Lawrie 1988; Hoff et al. 1997); *Diphyllobothrium laruei*, (Sutton 1969; Vergeer 1942); *Diphyllobothrium oblongatum*, (Warren 1952); *Diphyllobothrium* sp., (Swanson and Pratt 1977); *Proteocephalus ambloplitis*, (Hoff et al. 1997); *Triaenophorus crassus*, (Hoffman 1941; Johnson 1946; Klick 1946; Warren 1952; Dechtiar and Lawrie 1988); *Triaenophorus* sp., (Cooper 1919; Johnson 1946; Swanson and Pratt 1977)

Adult Nematoda: *Cystidicola farionis*, (Dechtiar and Lawrie 1988; Dextrase 1987; Hoff et al. 1997; Lankester and Smith 1980; Smith 1978); *Cystidicola stigmatura*, (Klick 1946; Warren 1952); *Cystidicola* sp., (Johnson 1946; Swanson and Pratt 1977); *Cystidicoloides ephemeridarum*, (Dechtiar and Lawrie 1988); *Cystidicoloides* sp., (Hoff et al. 1997)

Adult Acanthocephala: *Echinorhynchus lateralis*, (Dechtiar and Lawrie 1988; Hoff et al. 1997); *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988; Hoff et al. 1997; Warren 1952); *Neoechinorhynchus crassus*, (Hoff et al. 1997); *Neoechinorhynchus cylindratus*, (Warren 1952)

Copepoda: *Salmincola extensus*, (Warren 1952); *Salmincola extumescens*, (Dechtiar and Lawrie 1988; Hoff et al. 1997); *Salmincola inermis*, (Warren 1952); *Salmincola* sp., (Swanson and Pratt 1977); *Ergasilus* sp., (Hoff et al. 1997)

***Coregonus clupeaformis* (lake whitefish)**

Adult Digenea: *Crepidostomum farionis*, (Dechtiar and Lawrie 1988); *Phyllodistomum coregoni*, (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Ichthyocotylurus erraticus*, (Dechtiar and Lawrie 1988)

Monogenea: *Discocotyle sagittata*, (Dechtiar and Lawrie 1988)

Adult Cestoda: *Cyathocephalus truncatus*, (Dechtiar and Lawrie 1988; Linton 1898); *Proteocephalus exiguus*, (Dechtiar and Lawrie 1988)

Larval/Immature Cestoda: *Diphyllobothrium* sp., (Dechtiar and Lawrie 1988); *Triaenophorus crassus*, (Hoffman 1941)

Adult Nematoda: *Capillaria salvelini*, (Dechtiar and Lawrie 1988); *Cystidicola farionis*, (Dextrase 1987; Lankester and Smith 1980); *Cystidicoloides ephemeridarum*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988); *Neoechinorhynchus tumidus*, (Dechtiar and Lawrie 1988)

***Coregonus hoyi* (bloater)**

Myxozoa: *Hennuguya* sp., (Dechtiar and Lawrie 1988)

Adult Digenea: *Crepidostomum farionis*, (Dechtiar and Lawrie 1988)

Monogenea: *Discocotyle sagittata*, (Dechtiar and Lawrie 1988)

Adult Cestoda: *Proteocephalus exiguus*, (Dechtiar and Lawrie 1988)

Larval/Immature Cestoda: *Diphyllobothrium ditremum*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Cystidicola farionis*, (Dechtiar and Lawrie 1988; Lankester and Smith 1980; Smith 1978)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988)

Copepoda: *Salmincola extumescens*, (Dechtiar and Lawrie 1988)

Table 9, continued.

***Coregonus kiyi* (kiyi)**

Larval/Immature Cestoda: *Diphyllbothrium laruei*, (Vergeer 1942)

***Coregonus zenithecus* (shortjaw cisco)**

Larval/Immature Cestoda: *Diphyllbothrium laruei*, (Vergeer 1942)

***Oncorhynchus gorbuscha* (pink salmon)**

Adult Digenea: *Crepidostomum farionis*, (Dechtiar and Lawrie 1988; Muzzall and Peebles 1986)

Adult Cestoda: *Eubothrium salvelini*, (Muzzall and Peebles 1986); *Cyathocephalus truncatus*, (Muzzall and Peebles 1986); *Proteocephalus parallacticus*, (Muzzall and Peebles 1986)

Larval/Immature Cestoda: *Diphyllbothrium* sp., (Muzzall and Peebles 1986); *Triaenophorus nodulosus*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Capillaria salvelini*, (Muzzall and Peebles 1986); *Cystidicola farionis*, (Dechtiar and Lawrie 1988; Dextrase 1987; Lankester and Smith 1980; Muzzall and Peebles 1986); *Cystidicoloides ephemeridarum*, (Muzzall and Peebles 1986); *Spinitectus gracilis*, (Muzzall and Peebles 1986); *Philonema oncorhynchi*, (Dechtiar and Lawrie 1988); *Rhabdochona canadensis*, (Muzzall and Peebles 1986)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988; Muzzall and Peebles 1986); unidentified Echinorhynchidae, (Nicolette and Spangler 1986)

Immature Acanthocephala: *Echinorhynchus* sp., (Muzzall and Peebles 1986); *Neoechinorhynchus tumidus*, (Muzzall and Peebles 1986)

***Oncorhynchus kisutch* (coho salmon)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988)

Adult Cestoda: *Eubothrium salvelini*, (Muzzall and Peebles 1986)

Larval/Immature Cestoda: *Diphyllbothrium* sp., (Muzzall and Peebles 1986)

Adult Nematoda: *Capillaria salvelini*, (Muzzall and Peebles 1986); *Cystidicola farionis*, (Dechtiar and Lawrie 1988; Dextrase 1987; Lankester and Smith 1980; Muzzall and Peebles 1986); *Cystidicoloides ephemeridarum*, (Dechtiar and Lawrie 1988; Muzzall and Peebles 1986); *Spinitectus gracilis*, (Muzzall and Peebles 1986); *Rhabdochona canadensis*, (Muzzall and Peebles 1986)

Larval/Immature Nematoda: *Haplonema* sp., (Muzzall and Peebles 1986)

Adult Acanthocephala: *Echinorhynchus lateralis*, (Dechtiar and Lawrie 1988); *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988, Muzzall and Peebles 1986)

Immature Acanthocephala: *Echinorhynchus* sp., (Muzzall and Peebles 1986); *Neoechinorhynchus tumidus*, (Muzzall and Peebles 1986)

Table 9, continued.

***Oncorhynchus mykiss* (rainbow trout)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Ichthyocotylurus erraticus*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Capillaria salvelini*, (Dechtiar and Lawrie 1988); *Cystidicola farionis*, (Dechtiar and Lawrie 1988; Dextrase 1987; Lankester and Smith 1980; Smith 1978)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Lawrie 1988); *Echinorhynchus lateralis*, (Dechtiar and Lawrie 1988)

***Oncorhynchus tshawytscha* (Chinook salmon)**

Adult Cestoda: *Proteocephalus parallacticus*, (Muzzall and Peebles 1986)

Larval/Immature Cestoda: *Diphyllobothrium* sp., (Muzzall and Peebles 1986)

Adult Nematoda: *Capillaria salvelini*, (Muzzall and Peebles 1986); *Cystidicola farionis*, (Dextrase 1987; Lankester and Smith 1980; Muzzall and Peebles 1986); *Spinitectus gracilis*, (Muzzall and Peebles 1986)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall and Peebles 1986)

Immature Acanthocephala: *Echinorhynchus* sp., (Muzzall and Peebles 1986); *Neoechinorhynchus tumidus*, (Muzzall and Peebles 1986)

***Prosopium coulteri* (pygmy whitefish)**

Adult Nematoda: *Cystidicola farionis*, (Dextrase 1987)

***Prosopium cylindraceum* (round whitefish)**

Adult Digenea: *Crepidostomum farionis*, (Dechtiar and Lawrie 1988); *Phyllodistomum* sp., (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Ichthyocotylurus erraticus*, (Dechtiar and Lawrie 1988)

Monogenea: *Discocotyle sagittata*, (Dechtiar and Lawrie 1988); *Tetraonchus variabilis*, (Dechtiar 1972b; Dechtiar and Lawrie 1988)

Adult Cestoda: *Eubothrium salvelini*, (Muzzall and Peebles 1986)

Adult Nematoda: *Capillaria salvelini*, (Dechtiar and Lawrie 1988); *Cystidicola farionis*, (Dechtiar and Lawrie 1988; Dextrase 1987; Lankester and Smith 1980); *Spinitectus gracilis*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Echinorhynchus lateralis*, (Dechtiar and Lawrie 1988); *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988)

Immature Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar and Lawrie 1988)

Hirudinea: *Piscicola milneri*, (Dechtiar and Lawrie 1988)

Copepoda: *Salmincola extumescens*, (Dechtiar and Lawrie 1988)

***Salmo trutta* (brown trout)**

Adult Nematoda: *Cystidicola farionis*, (Lankester and Smith 1980)

***Salvelinus fontinalis* (brook trout)**

Adult Digenea: *Crepidostomum farionis*, (Dechtiar and Lawrie 1988)

Adult Cestoda: *Eubothrium salvelini*, (Dechtiar and Lawrie 1988)

Table 9, continued.

Larval/Immature Cestoda: *Proteocephalus* sp., (Dechtiar and Lawrie 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Lawrie 1988); *Cystidicola farionis*, (Lankester and Smith 1980)

Adult Acanthocephala: *Neoechinorhynchus rutili*, (Dechtiar and Lawrie 1988)

***Salvelinus namaycush* (lake trout)**

Adult Digenea: *Crepidostomum farionis*, (Dechtiar and Lawrie 1988)

Monogenea: *Discocotyle sagittata*, (Dechtiar and Lawrie 1988)

Adult Cestoda: *Dibothrium infundibuliforme* (*Bothriocephalus?* or *Eubothrium?*); (Linton 1898); *Eubothrium crassum*, (Cooper 1919); *Eubothrium salvelini*, (Dechtiar and Lawrie 1988); *Proteocephalus parallacticus*, (Dechtiar and Lawrie 1988); *Proteocephalus salvelini*, (La Rue 1914; Linton 1898)

Larval/Immature Cestoda: *Diphyllobothrium* sp., (Dechtiar and Lawrie 1988); *Triaenophorus crassus*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Cystidicola farionis*, (Dextrase 1987; Lankester and Smith 1980); *Cystidicola stigmatura*, (Wright 1879; Black 1983; Dechtiar and Lawrie 1988; Leidy 1886); *Cystidicoloides ephemeridarum*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Echinorhynchus lateralis*, (Dechtiar and Lawrie 1988); *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988)

Copepoda: *Salmincola siscowet*, (Dechtiar and Lawrie 1988)

Percopsidae

***Percopsis omiscomaycus* (trout-perch)**

Adult Digenea: *Crepidostomum isostomum*, (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Ichthyocotylurus* sp., (Dechtiar and Lawrie 1988)

Monogenea: *Urocleidus baldwini*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Spinitectus gracilis*, (Dechtiar and Lawrie 1988); *Rhabdochona* sp., (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Lawrie 1988); *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988); *Pomphorhynchus bulbocolli*, (Dechtiar and Lawrie 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Lawrie 1988)

Copepoda: *Ergasilus caeruleus*, (Dechtiar and Lawrie 1988); *Ergasilus nerkae*, D.R. Sutherland, (unpublished data); Hogue et al. 1993

Gadidae

***Lota lota* (burbot)**

Myxozoa: *Myxobolus* sp., (Dechtiar and Lawrie 1988)

Adult Digenea: *Azygia angusticauda*, (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Ichthyocotylurus* sp., (Dechtiar and Lawrie 1988)

Table 9, continued.

Adult Cestoda: *Eubothrium rugosum*, (Dechtiar and Lawrie 1988)

Larval/Immature Cestoda: *Diphyllobothrium latum*, (Warthin 1912); *Sparganum pseudosegmentatum*, (Mongrain 1967; Sutton 1969; Vergeer 1942)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Lawrie 1988); *Haplonema hamulatum*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar and Lawrie 1988)

Hirudinea: *Myzobdella lugubris*, (Dechtiar and Lawrie 1988)

Copepoda: *Salmincola lotae*, (Lasee et al. 1988)

Gasterosteidae

***Pungitius pungitius* (ninespine stickleback)**

Larval/Immature Digenea: *Diplostomum* sp., (Fischthal 1952); *Ichthyocotylurus* sp., (Fischthal 1952)

Adult Cestoda: *Bothriocephalus* sp., (Fischthal 1952)

Larval/Immature Cestoda: *Ligula intestinalis*, (Fischthal 1952)

Larval/Immature Nematoda: *Contraecaecum* sp., (Fischthal 1952)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Fischthal 1952)

Mollusca: Unidentified glochidia, (Fischthal 1952)

Copepoda: *Ergasilus nerkae*, D.R. Sutherland (unpublished data); Hogue et al. 1993; Hudson et al. 1994

Cottidae

***Cottus bairdii* (mottled sculpin)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Ichthyocotylurus* sp., (Dechtiar and Lawrie 1988)

Monogenea: *Gyrodactylus bairdi*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Rhabdochona cotti*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Lawrie 1988); *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988)

Copepoda: *Ergasilus cotti*, (Dechtiar and Lawrie 1988)

***Cottus cognatus* (slimy sculpin)**

Mastigophora: *Trypanosoma* sp. II, (Pronina et al. 1999); *Trypanosoma* sp. III, (Pronina et al. 1999)

Copepoda: *Ergasilus nerkae*, D.R. Sutherland (unpublished data); Hogue et al. 1993

***Cottus ricei* (spoonhead sculpin)**

Mastigophora: *Trypanosoma* sp. I, (Pronina et al. 1999); *Trypanosoma* sp. II, (Pronina et al. 1999)

Table 9, continued.

Centrarchidae

***Ambloplites rupestris* (rock bass)**

Ciliophora: *Trichodina* sp., (Dechtiar and Lawrie 1988)

Adult Digenea: *Crepidostomum cornutum*, (Dechtiar and Lawrie 1988); *Proterometra macrostoma*, (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Clinostomum complanatum*, (Dechtiar and Lawrie 1988); *Posthodiplostomum minimum*, (Dechtiar and Lawrie 1988); *Uvulifer ambloplitis*, (Dechtiar and Lawrie 1988); *Ichthyocotylurus* sp., (Dechtiar and Lawrie 1988)

Monogenea: *Urocleidus alatus*, (Dechtiar and Lawrie 1988); *Lyrodiscus rupestris*, (Dechtiar and Lawrie 1988); *Tetracleidus stentor*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Lawrie 1988)

Larval/Immature Nematoda: *Raphidascaris acus*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Dechtiar and Lawrie 1988); *Pomphorhynchus bulbocolli*, (Dechtiar and Lawrie 1988)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Dechtiar and Lawrie 1988)

Hirudinea: *Myzobdella lugubris*, (Dechtiar and Lawrie 1988)

Copepoda: *Achtheres pimelodi*, (Dechtiar and Lawrie 1988); *Ergasilus centrarchidarum*, (Dechtiar and Lawrie 1988)

***Micropterus dolomieu* (smallmouth bass)**

Adult Digenea: *Azygia angusticauda*, (Dechtiar and Lawrie 1988)

Monogenea: *Urocleidus ferox*, (Dechtiar and Lawrie 1988); *Tetracleidus banghami*, (Dechtiar and Lawrie 1988)

Larval/Immature Cestoda: *Proteocephalus* sp., (Dechtiar and Lawrie 1988)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Dechtiar and Lawrie 1988)

Copepoda: *Ergasilus centrarchidarum*, (Dechtiar and Lawrie 1988)

Percidae

***Gymnocephalus cernuus* (ruffe)**

Mastigophora: *Trypanosoma acerinae*, (Pronin et al. 1998)

Ciliophora: *Ichthyophthirius multifiliis*, (Pronin et al. 1998); *Scyphidia* sp., (Pronin et al. 1998);

Tetrahymena sp., (Pronin et al. 1998)

Myxozoa: *Myxobolus* sp., (Pronin et al. 1998)

Adult Digenea: *Bunodera sacculata*, (Pronin et al. 1998); *Crepidostomum cooperi*, (Pronin et al. 1998); *Bucephalus elegans*, (Pronin et al. 1998); *Acanthostomum* sp., (Pronin et al. 1998)

Larval/Immature Digenea: *Bucephalus elegans*, (Pronin et al. 1998); *Clinostomum complanatum*, (Pronin et al. 1998); *Ichthyocotylurus pileatus*, (Pronin et al. 1998); *Ichthyocotylurus erraticus*, (Pronin et al. 1998); *Neascus brevicaudatus*, (Pronin et al. 1998); *Diplostomum* sp., (Pronin et al. 1998)

Table 9, continued.

Monogenea: *Dactylogyrus amphibothrium*, (Cone et al. 1994; Pronin et al. 1998); *Dactylogyrus hemiaphibothrium*, (Pronin et al. 1998)

Adult Cestoda: *Proteocephalus ambloplitis*, (Pronin et al. 1998); *Proteocephalus* sp., (Pronin et al. 1998)

Adult Nematoda: *Camallanus oxycephalus*, (Pronin et al. 1998); *Spinitectus gracilis*, (Pronin et al. 1998)

***Perca flavescens* (yellow perch)**

Ciliophora: *Trichodina urinaria*, (Dechtiar and Lawrie 1988).

Myxozoa: *Myxobolus* sp., (Dechtiar and Lawrie 1988)

Adult Digenea: *Crepidostomum cornutum*, (Dechtiar and Lawrie 1988); *Phyllodistomum superbum*, (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Lawrie 1988); *Apophallus brevis*, (Dechtiar and Lawrie 1988); *Ichthyocotylurus pileatus*, (Dechtiar and Lawrie 1988)

Monogenea: *Urocleidus adspectus*, (Dechtiar and Lawrie 1988)

Adult Cestoda: *Proteocephalus pearsei*, (Dechtiar and Lawrie 1988)

Adult Nematoda: *Dichelyne cotylophora*, (Dechtiar and Lawrie 1988); *Spinitectus carolini*, (Dechtiar and Lawrie 1988); *Rhabdochona ovifilamenta*, (Dechtiar and Lawrie 1988)

Larval/Immature Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Lawrie 1988); *Raphidascaris acus*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Lawrie 1988); *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Lawrie 1988)

Copepoda: *Ergasilus luciopercarum*, (Dechtiar and Lawrie 1988)

***Sander vitreus* (walleye)**

Adult Digenea: *Sanguinicola occidentalis*, (Dechtiar and Lawrie 1988)

Larval/Immature Digenea: *Ichthyocotylurus pileatus*, (Dechtiar and Lawrie 1988)

Monogenea: *Urocleidus aculeatus*, (Dechtiar and Lawrie 1988)

Adult Cestoda: *Bothriocephalus cuspidatus*, (Dechtiar and Lawrie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Lawrie 1988); *Neoechinorhynchus tenellus*, (Dechtiar and Lawrie 1988)

Copepoda: *Ergasilus luciopercarum*, (Dechtiar and Lawrie 1988)

Unknown Fish Family

Unspecified fish species

Larval/Immature Cestoda: *Diphyllobothrium latum*, (Nickerson 1906)

Hirudinea: *Piscicola punctata*, (Verrill 1871)

Table 10. Numbers and percentages (in parentheses) of parasite species in each major parasite group reported in five fish families from Lake Superior during 1871-2010. Parasite group abbreviations are Ma (Mastigophora), Ci (Ciliophora), My (Myxozoa), Dt (Digenea), Mo (Monogenea), Ce (Cestoda), Ne (Nematoda), Ac (Acanthocephala), Hi (Hirudinea), Co (Copepoda), and Mol (Mollusca). If a parasite in a group did not infect fish, the parasite group was not included in the table.

| Fish family | Parasite group | | | | | | | | | | | Total |
|---------------|----------------|-----------|-----------|------------|-----------|------------|-----------|-----------|-------|-----------|-------|-------|
| | Ma | Ci | My | Dt | Mo | Ce | Ne | Ac | Hi | Co | Mol | |
| Cyprinidae | 0 | 0 | 5 (17) | 10 (34) | 5 (17) | 2 (7) | 3 (10) | 3 (10) | 0 | 1 (3) | 0 | 29 |
| Catostomidae | 0 | 0 | 1 (3) | 7 (22) | 6 (19) | 7 (22) | 2 (6) | 6 (19) | 1 (3) | 2 (6) | 0 | 32 |
| Centrarchidae | 0 | 1 (4) | 0 | 7 (29) | 5 (21) | 1 (4) | 4 (17) | 3 (13) | 1 (4) | 2 (8) | 0 | 24 |
| Percidae | 1 (2) | 4 (10) | 1 (2) | 14 (37) | 4 (10) | 3 (8) | 7 (18) | 3 (8) | 0 | 1 (2) | 1 (2) | 39 |
| Salmonidae | 0 | 0 | 2 (4) | 5 (11) | 2 (4) | 13 (29) | 9 (20) | 8 (18) | 1 (2) | 5 (11) | 0 | 45 |

Table 11. Jaccard coefficients of parasite-community similarity based on presence of parasites between five fish families from Lake Superior, 1871-2010.

| Fish family | Cyprinidae | Catostomidae | Salmonidae | Centrarchidae |
|---------------|------------|--------------|------------|---------------|
| Cyprinidae | 1.0000 | 0.0740 | 0.0882 | 0.0888 |
| Catostomidae | 0.0740 | 1.0000 | 0.0810 | 0.0377 |
| Salmonidae | 0.0882 | 0.0810 | 1.0000 | 0.0923 |
| Centrarchidae | 0.0888 | 0.0377 | 0.0923 | 1.0000 |
| Percidae | 0.0500 | 0.0615 | 0.0759 | 0.0344 |

ST. MARYS RIVER

Results

Parasite Species

Only six studies (Osborn 1903; Osborn 1910; Muzzall 1984; Muzzall and Peebles 1987; Litvinov et al. 2004; Amin and Muzzall 2009) were found that reported on the parasites of fish from the St. Marys River. These studies identified 39 parasite species (3 Ciliophora, 7 adult Digenea, 5 larval/immature Digenea, 1 Monogenea, 7 adult Cestoda, 2 larval/immature Cestoda, 6 adult Nematoda, 3 larval/immature Nematoda, 4 adult Acanthocephala, 1 Copepoda) in the 26 fish species from 13 families that were examined (Table 12). Myxozoans, microsporans, aspidobothreans, leeches, copepods, and molluscs have not been reported.

Protozoans, Digenetic Trematodes, Monogeneans, and Cestodes

Three genera of ciliates (*Epistylis*, *Trichodina*, *Capriniana*) infecting only *Notropis atherinoides*, seven species of adult digenetic trematodes, and eight species of larval/immature digenetic trematodes were reported. Adults of the trematode, *Centrovarium lobotes* infected six fish species. Other parasites reported were one species of monogenean, *Gyrodactylus* sp., and seven species of adult cestodes (4 species of Proteocephalidae). Many of these parasite species are host-specific. At least five species of immature cestodes were found in the intestine with one species, *Proteocephalus* sp., occurring in seven fish species.

Nematodes and Acanthocephalans

Six species of adult nematodes in five families and five species of immature nematodes were found in the digestive tract of fish hosts. Adults of *Hysterothylacium brachyurum* and immature individuals of *Camallanus oxycephalus* infected four and five fish species, respectively. Four species of adult acanthocephalans were found, with *Echinorhynchus salmonis* and *Neoechinorhynchus tenellus* infecting eight and five fish species, respectively. Immature individuals of *N. tenellus*, *Pomphorhynchus bulbocolli*, and *Leptorhynchoides thecatus* occurred in the digestive tract.

Specific parasite species or genera found in individuals of two or more fish families (in parentheses) were adult digenetic trematodes (*Crepidostomum cooperi* (2), *Centrovarium lobotes* (3), *Cryptogonimus chili* (2)), larval/immature digenetic trematodes (*Azygia* sp. (2)), larval/immature cestodes (*Bothriocephalus claviceps* (2)), adult nematodes (*Hysterothylacium brachyurum* (3), *Camallanus oxycephalus* (2), *Dichelyne cotylophora* (2), *Spinitectus carolini* (2)), larval/immature nematodes (*C. oxycephalus* (2)), adult acanthocephalans (*Echinorhynchus salmonis* (5), *Neoechinorhynchus tenellus* (3), *Pomphorhynchus bulbocolli* (2), *Leptorhynchoides thecatus* (2)), and immature acanthocephalans (*P. bulbocolli* (3)). These 13 helminth species make up 35% of all parasites reported from fish in this river.

Fish Species—Parasite Analysis

Twenty-six species of fish in 13 families were examined for parasites from the St. Marys River with 3 species in the Cyprinidae, 4 species in the Salmonidae, and 5 species each in the Centrarchidae and Percidae (Table 13). *Micropterus dolomieu* was the most-studied species (4 studies), followed by *Esox lucius*, *Ambloplites rupestris*, *Perca flavescens*, and *Sander vitreus* (2 studies each), with the remaining species studied only once. *Perca flavescens* and *M. dolomieu* harbored 14 and 10 parasite species, respectively, and all of these were autogenic species. Ten and nine of the helminth species infecting *P. flavescens* and *M. dolomieu* were represented by adults, respectively. In contrast, nine helminth species in *Notropis atherinoides* were larval/immature individuals.

Discussion

There is no encompassing study documenting all the fish species in the St. Marys River. However, based on the fish species listed by Fielder et al. (2007) as occurring in this river, fishes that have not had information published on their parasites include *Petromyzon marinus*, *Lepisosteus osseus*, *Alosa pseudoharengus*, *Dorosoma cepedianum*, *Cyprinus carpio*, *Coregonus hoyi*, *Oncorhynchus gorboscha*, *O. kisutch*, *Salmo salar*, *S. trutta*, *Salvelinus fontinalis*, *S. namaycush*, *S. fontinalis* x *S. namaycush*, *Catostomus catostomus*, *Hypentelium nigricans*, *Moxostoma* spp., *Micropterus salmoides*, *Pomoxis annularis*, *P. nigromaculatus*, *Lota lota*, *Ictalurus punctatus*, *Aplodinotus grunniens*, *Esox masquinongy*, and *Morone chrysops*. This list is not inclusive because the number of cyprinid species present in this river is unknown.

The St. Marys River is the connecting water between Lake Superior and Lake Huron, but comparing the St. Marys River fish-parasite fauna to that of Lakes Superior and Huron is problematic because of the small number of parasitological studies performed in this river. Albeit, most parasite species found infecting fish from the St. Marys River have also been reported from fish in Lakes Superior and Huron, except for *Neochasmus* sp., as well as *Haplobothrium globuliforme*, *Proteocephalus perplexus*, and *Haplonema immutatum* from Lake Superior. *Neochasmus* sp., a larval digenetic trematode, was found in the muscle, eye orbit, and gills of *Notropis atherinoides* from the St. Marys River but was not reported for Lakes Superior or Huron. The absence of *Neochasmus* sp. from Lake Superior is not surprising since *N. atherinoides* was not examined from this lake. *Notropis atherinoides* was examined in two different surveys from Lake Huron, but *Neochasmus* was not reported. *Haplobothrium globuliforme*, *P. perplexus*, and *H. immutatum* are host-specific to *Amia calva*. *Amia calva* from Lake Superior was not examined for parasites, so it is unknown if these three species are truly absent. Eleven parasite species were reported from *A. calva* in Lake Huron, including *H. globuliforme*, *P. perplexus*, and *H. immutatum* that infected *A. calva* from the St. Marys River. Also, many parasites found in fish from the St. Marys River and Lakes Superior and Huron were identified only to genus and this lack of species identification makes comparisons difficult.

Table 12. Parasites reported in fishes from the St. Mary's River, 1903-2010. Host documentation, in order, consists of references, when observed (cdnp = collection date not provided), prevalence defined as the percentage (%) of fish infected (pnp = prevalence not provided), mean intensity defined as the mean number of parasites per infected fish (minp = mean intensity not provided), location (lns = location not specified), latitude and longitude (lnk = latitude and longitude not known).

Ciliophora (Ciliates)

Epistylidae Kahl, 1935

Epistylis sp.

Site of Infection: Gills

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 3%; minp; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"; June and August 1983; 2%; minp; Raber Bay, Michigan; 46°5'50"/-84°3'48")

Trichodinidae Raabe, 1959

Trichodina sp.

Site of Infection: Gills

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 3%; minp; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"; June and August 1983; 1%; minp; Raber Bay, Michigan; 46°5'50"/-84°3'48")

Trichophryidae Fraipont, 1878

Capriniana sp.

Site of Infection: Gills

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 4%; minp; Lake Munuscong, Michigan; 46°12'0"/-84°10'0")

Adult Digenea (Digenetic Trematodes)

Allocreadiidae Looss, 1899 Stossich, 1903

Bunodera luciopercae (Muller, 1776) Luhe, 1909

Synonym: *Bunodera nodulosa* Froelich, 1791

Site of Infection: Intestine

Host: *Perca flavescens*: Muzzall 1984; April 1981-November 1982; 15%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30")

Table 12, continued.

Crepidostomum cooperi Hopkins, 1931

Synonym: *Crepidostomum ambloplitis* Hopkins, 1931; *Crepidostomum solidum* Van Cleave and Mueller, 1932; *Crepidostomum fausti* Hunninen and Hunter, 1933; *Crepidostomum laureatum* of Stafford (1904) and Cooper (1915) (partim); *Bunodera nodulosa* of Stafford (1904) (partim); *Crepidostomum cornutum* of Cooper (1915)

Site of Infection: Pyloric ceca and anterior intestine

Host:

Micropterus dolomieu: Muzzall 1984; April 1981-November 1982; 17%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Perca flavescens: Muzzall 1984; 25%; minp; Neebish Island, Michigan

Crepidostomum cornutum (Osborn, 1903) Stafford, 1904

Synonym: None

Site of Infection: Pyloric ceca and anterior intestine

Host: *Perca flavescens*: Muzzall 1984; April 1981-November 1982; 4%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Cryptogonimidae (Ward, 1917) Ciurea, 1933

Centrovarium lobotes (MacCallum, 1895) Stafford, 1904

Synonym: *Distomum lobotes* MacCallum, 1895

Site of Infection: Intestine

Host:

Amia calva: Muzzall 1984; April 1981-November 1982; 50%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Esox lucius: Muzzall 1984; 12%; minp; Neebish Island, Michigan

Ambloplites rupestris: Muzzall 1984; 13%; minp; Neebish Island, Michigan

Micropterus dolomieu: Muzzall 1984; 17%; minp; Neebish Island, Michigan

Perca flavescens: Muzzall 1984; 4%; minp; Neebish Island, Michigan

Sander vitreus: Muzzall 1984; 7%; minp; Neebish Island, Michigan

Cryptogonimus chili Osborn, 1903

Synonym: None

Site of Infection: Intestine

Host:

Micropterus dolomieu: Osborn 1903; cdnp; pnp; minp; lns; Michigan; llnk

Micropterus dolomieu: Osborn 1910; cdnp; pnp; minp; between Neebish Island and St Joseph Island, Ontario; 46°10'0"/-83°55'0"

Sander vitreus: Muzzall 1984; April 1981-November 1982; 4%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Remarks: Species name, *chili*, is sometimes misspelled *chyli*.

Table 12, continued.

Homalometridae (Cable and Hunninen, 1942) Yamaguti, 1971

Synonym: *Anallocreadiidae* Hunter and Bangham, 1832

Homalometron armatum (MacCallum, 1895) Manter, 1947

Synonym: *Distomum isoporum* var. *armatum* MacCallum, 1895; *Anallocreadium armatum* (MacCallum, 1895); *Bunodera armatum* (MacCallum, 1895); *Anallocreadium pearsei* Hunter and Bangham, 1932

Site of Infection: Intestine

Host: *Lepomis gibbosus*: Muzzall 1984; April 1981-November 1982; 50%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Macroderoidiidae McMullen, 1957

Glossidium geminum (Mueller, 1930) Yamaguti, 1954

Synonym: *Alloglossidium geminum* (Mueller, 1930); *Plagiorchis geminum* Mueller, 1930

Site of Infection: Intestine

Host: *Ameiurus nebulosus*: Muzzall 1984; April 1981-November 1982; 6%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Larval/Immature Digenea (Digenetic Trematodes)

Allocreadiidae Looss, 1899 Stossich, 1903

Crepidostomum cooperi Hopkins, 1931

Synonym: *Crepidostomum ambloplitis* Hopkins, 1931; *Crepidostomum solidum* Van Cleave and Mueller, 1932; *Crepidostomum fausti* Hunninen and Hunter, 1933; *Crepidostomum laureatum* of Stafford (1904) and Cooper (1915) (partim); *Bunodera nodulosa* of Stafford (1904) (partim); *Crepidostomum cornutum* of Cooper (1915) (partim)

Site of Infection: Anterior intestine

Host: *Etheostoma nigrum*: Muzzall 1984; April 1981-November 1982; 33%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Azygiidae Luhe, 1909

Azygia sp.

Site of Infection: Stomach

Host:

Esox lucius: Muzzall 1984; April 1981-November 1982; 12%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Sander vitreus: Muzzall 1984; 7%; minp; Neebish Island, Michigan

Cryptogonimidae (Ward, 1917) Ciurea, 1933

Centrovarium sp.

Site of Infection: Muscle

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 2%; 1; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"

Table 12, continued.

Cryptogonimus chili Osborn, 1903

Synonym: None

Site of Infection: Intestine

Host: *Perca flavescens*: Muzzall 1984; April 1981-November 1982; 1%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Remarks: Species name, *chili*, is sometimes misspelled *chyli*.

Neochasmus sp.

Site of Infection: Muscle, eye orbit, gills

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 84%; 13; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"; June and August 1983; 70%; 9; Raber Bay, Michigan; 46°5'50"/-84°3'48"

Diplostomidae Poirier, 1886

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Synonym: *Diplostomulum spathaceum* (Rudolphi, 1819); *Diplostomum volvens*, 1832; *Diplostomum volvens* Nordmann, 1833 of Cooper (1915); probably *Diplostomum emarginatae* Olivier, 1942;

Diplostomum flexicaudum (Cort and Brooks, 1928); *Diplostomum indistinctum*; *Diplostomum gigas*

Site of Infection: Lens

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 92%; 7; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"; June and August 1983; 67%; 7; Raber Bay, Michigan; 46°5'50"/-84°3'48"

Diplostomum sp.

Site of Infection: Brain

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 12%; 2; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"; June and August 1983; 22%; 2; Raber Bay, Michigan; 46°5'50"/-84°3'48"

Neascus sp.

Site of Infection: integument

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; June and August 1983; 2%; 1; Raber Bay, Michigan; 46°5'50"/-84°3'48"

Posthodiplostomum sp.

Site of Infection: Mesentery

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 2%; 1; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"; June and August 1983; 4%; 2; Raber Bay, Michigan; 46°5'50"/-84°3'48"

Table 12, continued.

Monogenea (Monogeneans)

Gyrodactylidae Cobbold, 1864

Gyrodactylus sp.

Site of Infection: Gills

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 19%; minp; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"; June and August 1983; 7%; minp; Raber Bay, Michigan; 46°5'50"/-84°3'48"

Adult Cestoda (Cestodes)

Bothriocephalidae Blanchard, 1849

Bothriocephalus claviceps: Goeze, 1782) Rudolphi, 1810

Synonym: None

Site of Infection: Pyloric ceca, anterior intestine

Host: *Sander vitreus*: Muzzall 1984; April 1981-November 1982; 79%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Haplobothriidae Meggitt, 1924

Haplobothrium globuliforme Cooper, 1914

Synonym: None

Site of Infection: Intestine

Host: *Amia calva*: Muzzall 1984; April 1981-November 1982; 50%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Proteocephalidae La Rue, 1911

Corallobothrium sp.

Site of Infection: Pyloric ceca, anterior intestine

Host: *Ameiurus nebulosus*: Muzzall 1984; April 1981-November 1982; 69%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Proteocephalus exiguus La Rue, 1911

Synonym: *Ichthyotaenia laruei* (Faust, 1920)

Site of Infection: Pyloric ceca, anterior intestine

Host: *Coregonus artedi*: Muzzall 1984; April 1981-November 1982; 61%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Proteocephalus perplexus La Rue, 1911

Synonym: None

Site of Infection: Intestine

Host: *Amia calva*: Muzzall 1984; April 1981-November 1982; 100%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Table 12, continued.

Proteocephalus pinguis La Rue, 1911

Synonym: None

Site of Infection: Intestine

Host: *Esox lucius*: Muzzall 1984; April 1981-November 1982; 92%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Proteocephalus sp.

Site of Infection: Anterior intestine

Host: *Etheostoma nigrum*: Muzzall 1984; April 1981-November 1982; 44%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Triaenophoridae Loennberg, 1889

Triaenophorus stizostedionis Miller, 1945

Synonym: None

Site of Infection: Intestine

Host: *Sander vitreus*: Muzzall 1984; April 1981-November 1982; 14%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Larval/Immature Cestoda (Cestodes)

Amphicotyliidae Ariola, 1899

Eubothrium sp.

Site of Infection: Intestine

Host:

Notropis atherinoides: Muzzall and Peebles 1987; July 1984; 2%; 1; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"

Osmerus mordax: Muzzall 1984; April 1981-November 1982; 6%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Coregonus artedi: Muzzall 1984; 11%; minp; Neebish Island, Michigan

Oncorhynchus mykiss: Muzzall 1984; 100%; minp; Neebish Island, Michigan

Bothriocephalidae Blanchard, 1849

Bothriocephalus claviceps (Goeze, 1782) Rudolphi, 1810

Synonym: None

Site of Infection: Pyloric ceca, anterior intestine

Host:

Fundulus diaphanus: Muzzall 1984; April 1981-November 1982; 33%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30"

Perca flavescens: Muzzall 1984; 6%; minp; Neebish Island, Michigan

Table 12, continued.

Bothriocephalus sp.

Site of Infection: Anterior intestine

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 4%; 1; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"; June and August 1983; 2%; 1; Raber Bay, Michigan; 46°5'50"/-84°3'48"

Caryophyllaeidae Leuckhart, 1878

Glaridacris sp.

Site of Infection: Posterior intestine

Host: *Catostomus commersonii*: Muzzall 1984; April 1981-November 1982; 9%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Proteocephalidae La Rue, 1911

Proteocephalus sp.

Site of Infection: Intestine, rectum

Host:

Pimephales notatus: Muzzall 1984; April 1981-November 1982; 14%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Osmerus mordax: Muzzall 1984; 4%; minp; Neebish Island, Michigan

Cottus bairdii: Muzzall 1984; 13%; minp; Neebish Island, Michigan

Micropterus dolomieu: Muzzall 1984; 17%; minp; Neebish Island, Michigan

Perca flavescens: Muzzall 1984; 14%; minp; Neebish Island, Michigan

Percina caprodes: Muzzall 1984; 25%; minp; Neebish Island, Michigan

Sander vitreus: Muzzall 1984; 7%; minp; Neebish Island, Michigan

Triaenophoridae Loennberg, 1889

Triaenophorus stizostedionis Miller, 1945

Synonym: None

Site of Infection: Anterior intestine

Host: *Perca flavescens*: Muzzall 1984; April 1981-November 1982; 1%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Adult Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Hysterothylacium brachyurum Ward and Magath, 1916

Synonym: *Contracaecum brachyurum* Van Cleave and Mueller, 1934; *Thynnascaris brachyurum* Margolis and Arthur, 1979

Site of Infection: Digestive tract

Table 12, continued.

Host:

Esox lucius: Muzzall 1984; April 1981-November 1982; 88%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Micropterus dolomieu: Muzzall 1984; 17%; minp; Neebish Island, Michigan

Perca flavescens: Muzzall 1984; 4%; minp; Neebish Island, Michigan

Sander vitreus: Muzzall 1984; 7%; minp; Neebish Island, Michigan

Camallanidae Railliet and Henry, 1915

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Rectum

Host:

Micropterus dolomieu: Muzzall 1984; April 1981-November 1982; 17%; minp; Neebish Island, Michigan

Pomoxis nigromaculatus: Muzzall 1984; 50%; minp; Neebish Island, Michigan

Perca flavescens: Muzzall 1984; 10%; minp; Neebish Island, Michigan

Cucullanidae Cobbold, 1864

Dichelyne cotylophora Ward and Magath, 1916

Synonym: *Dacnitoides cotylophora* Ward and Magath, 1916; *Cucullanellus cotylophora* (Ward and Magath, 1916) Petter, 1974

Site of Infection: Intestine

Host:

Ameiurus nebulosus: Muzzall 1984; April 1981-November 1982; 13%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Perca flavescens: Muzzall 1984; 33%; minp; Neebish Island, Michigan

Cystidicolidae (as in Anderson et al. 1975)

Spinitectus carolini Holl, 1928

Synonym: None

Site of Infection: Intestine

Host:

Ambloplites rupestris: Muzzall 1984; April 1981-November 1982; 56%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Lepomis gibbosus: Muzzall 1984; 50%; minp; Neebish Island, Michigan

Micropterus dolomieu: Muzzall 1984; 17%; minp; Neebish Island, Michigan

Perca flavescens: Muzzall 1984; 8%; minp; Neebish Island, Michigan

Spinitectus gracilis Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host: *Perca flavescens*: Muzzall 1984; April 1981-November 1982; 7%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Table 12, continued.

Quimperidae Baylis, 1930

Synonym: Haplonematidae Sudarikov and Ryzikov, 1952

Haplonema immutatum Moulton, 1931

Synonym: None

Site of Infection: Intestine

Host: *Amia calva*: Muzzall 1984; April 1981-November 1982; 50%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Larval/Immature Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Raphidascaris sp.

Site of Infection: Intestine

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; June and August 1983; 2%; 1; Raber Bay, Michigan; 46°5'50"/-84°3'48'

Camallanidae Railliet and Henry, 1915

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host:

Prosopium cylindraceum: Muzzall 1984; April 1981-November 1982; 100%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Percopsis omiscomacush: Muzzall 1984; 11%; minp; Neebish Island, Michigan

Percina caprodes: Muzzall 1984; 25%; minp; Neebish Island, Michigan

Sander canadensis: Muzzall 1984; 100%; minp; Neebish Island, Michigan

Sander vitreus: Muzzall 1984; 11%; minp; Neebish Island, Michigan

Cucullanidae Cobbold, 1864

Cucullanus sp.

Site of Infection: Intestine

Host: *Sander vitreus*: Muzzall 1984; April 1981-November 1982; 4%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Cystidicolidae (as in Anderson et al. 1975)

Spinitectus carolini Holl, 1928

Synonym: None

Site of Infection: Intestine

Host: *Ameiurus nebulosus*: Muzzall 1984; April 1981-November 1982; 6%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Table 12, continued.

Spinitectus sp.

Site of Infection: Intestine

Host: *Notropis atherinoides*: Muzzall and Peebles 1987; July 1984; 1%; 1; Lake Munuscong, Michigan; 46°12'0"/-84°10'0"

Rhabdochonidae Skrjabin, 1946

Rhabdochona sp.

Site of Infection: Intestine

Host: *Cyprinella spiloptera*: Muzzall 1984; April 1981-November 1982; 14%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Adult Acanthocephala (Acanthocephalans)

Echinorhynchidae Cobbold, 1876

Echinorhynchus salmonis (Muller, 1784) Petrochenko, 1956

Synonym: *Echinorhynchus coregoni*, *Echinorhynchus pachysomus*, *Echinorhynchus phoenix*, *Echinorhynchus inflatus*, *Echinorhynchus maraenae*, *Echinorhynchus murenae*, *Metechinorhynchus alpinus*, *Metechinorhynchus salmonis*

Site of Infection: Intestine

Host:

Esox lucius: Muzzall 1984; April 1981-November 1982; 32%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Osmerus mordax: Muzzall 1984; 75%; minp; Neebish Island, Michigan

Coregonus artedii: Muzzall 1984; 10%; minp; Neebish Island, Michigan

Oncorhynchus mykiss: Muzzall 1984; 100%; minp; Neebish Island, Michigan

Ambloplites rupestris: Muzzall 1984; 6%; minp; Neebish Island, Michigan

Micropterus dolomieu: Muzzall 1984; 17%; minp; Neebish Island, Michigan

Perca flavescens: Muzzall 1984; 1%; minp; Neebish Island, Michigan

Sander vitreus: Muzzall 1984; 11%; minp; Neebish Island, Michigan

Echinorhynchus sp.

Site of Infection: Intestine

Host: *Oncorhynchus tshawytscha*: Muzzall 1984; April 1981-November 1982; 100%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Neoechinorhynchidae Ward, 1917

Synonym: Hebesomidae Van Cleave, 1928; Hebesomatidae Yamaguti, 1963

Neoechinorhynchus tenellus (Van Cleave, 1913) Van Cleave, 1919

Synonym: *Neorhynchus tenellus* Van Cleave, 1913

Site of Infection: Intestine

Table 12, continued.

Host:

Esox lucius: Amin and Muzzall 2009; 60%; minp; Neebish Island, Michigan

Esox lucius: Muzzall 1984; April 1981-November 1982; 60%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Ambloplites rupestris: Amin and Muzzall 2009; 13%; minp; Neebish Island, Michigan

Ambloplites rupestris: Muzzall 1984; 13%; minp; Neebish Island, Michigan

Micropterus dolomieu: Amin and Muzzall 2009; 50%; minp; Neebish Island, Michigan

Micropterus dolomieu: Muzzall 1984; 50%; minp; Neebish Island, Michigan

Perca flavescens: Amin and Muzzall 2009; 16%; minp; Neebish Island, Michigan

Perca flavescens: Muzzall 1984; 16%; minp; Neebish Island, Michigan

Sander vitreus: Amin and Muzzall 2009; 46 %; minp; Neebish Island, Michigan

Sander vitreus: Muzzall 1984; 46%; minp; Neebish Island, Michigan

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host:

Catostomus commersonii: Muzzall 1984; April 1981-November 1982; 9%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Ambloplites rupestris: Muzzall 1984; 25%; minp; Neebish Island, Michigan

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Pyloric ceca

Host:

Ambloplites rupestris: Muzzall 1984; April 1981-November 1982; 6%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Micropterus dolomieu: Muzzall 1984; 50%; minp; Neebish Island, Michigan

Perca flavescens: Muzzall 1984; 4%; minp; Neebish Island, Michigan

Immature Acanthocephala

Neoechinorhynchidae Ward, 1917

Synonym: Hebesomidae Van Cleave, 1928; Hebesomatidae Yamaguti, 1963

Neoechinorhynchus tenellus (Van Cleave, 1913) Van Cleave, 1919

Synonym: *Neorhynchus tenellus* Van Cleave, 1913

Site of Infection: Intestine

Host: *Perca flavescens*: Muzzall 1984; April 1981-November 1982; 16%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Table 12, continued.

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host:

Percopsis omiscomaycush: Muzzall 1984; April 1981-November 1982; 11%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Lepomis macrochirus: Muzzall 1984; 20%; minp; Neebish Island, Michigan

Percina caprodes: Muzzall 1984; 25%; minp; Neebish Island, Michigan

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891)

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Intestine

Host: *Esox lucius*: Muzzall 1984; April 1981-November 1982; 8%; minp; Neebish Island, Michigan; 46°17'0"/-84°9'30'

Copepoda (Copepods)

Argulidae Yamaguti, 1963

Argulus sp.

Site of Infection: Body surface

Host:

Acipenser fulvescens: Litvinov et al. 2004; 2002; 22%; minp; lns; llnk

Sander vitreus: Litvinov et al. 2004; 2002; pnp; minp; lns; llnk

Table 13. Fishes by family from the St. Marys River from which parasites were reported during 1903-2010 using parasite data in Table 12. References in parentheses following parasites refer to references for host records.

Acipenseridae

***Acipenser fulvescens* (lake sturgeon)**

Copepoda: *Argulus* sp., (Litvinov et al. 2004)

Amiidae

***Amia calva* (bowfin)**

Adult Digenea: *Centrovarium lobotes*, (Muzzall 1984)

Adult Cestoda: *Haplobothrium globuliforme*, (Muzzall 1984); *Proteocephalus perplexus*, (Muzzall 1984)

Adult Nematoda: *Haplonema immutatum*, (Muzzall 1984)

Cyprinidae

***Cyprinella spiloptera* (spotfin shiner)**

Larval/Immature Nematoda: *Rhabdochona* sp., (Muzzall 1984)

***Notropis atherinoides* (emerald shiner)**

Ciliophora: *Epistylis* sp., (Muzzall and Peebles 1987); *Capriniana* sp., (Muzzall and Peebles 1987); *Trichodina* sp., (Muzzall and Peebles 1987)

Larval/Immature Digenea: *Centrovarium* sp., (Muzzall and Peebles 1987); *Diplostomum spathaceum*, (Muzzall and Peebles 1987); *Diplostomum* sp., (Muzzall and Peebles 1987); *Neascus* sp., (Muzzall and Peebles 1987); *Neochasmus* sp., (Muzzall and Peebles 1987); *Posthodiplostomum* sp., (Muzzall and Peebles 1987)

Monogenea: *Gyrodactylus* sp., (Muzzall and Peebles 1987)

Larval/Immature Cestoda: *Eubothrium* sp., (Muzzall and Peebles 1987); *Bothriocephalus* sp., (Muzzall and Peebles 1987)

Larval/Immature Nematoda: *Raphidascaaris* sp., (Muzzall and Peebles 1987); *Spinitectus* sp., (Muzzall and Peebles 1987)

***Pimephales notatus* (bluntnose minnow)**

Larval/Immature Cestoda: *Proteocephalus* sp., (Muzzall 1984)

Table 13, continued.

Catostomidae

***Catostomus commersonii* (white sucker)**

Larval/Immature Cestoda: *Glaridacris* sp., (Muzzall 1984)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Muzzall 1984)

Ictaluridae

***Ameiurus nebulosus* (brown bullhead)**

Adult Digenea: *Glossidium geminum*, (Muzzall 1984)

Adult Cestoda: *Corallobothrium* sp., (Muzzall 1984)

Adult Nematoda: *Dactinoides cotylophora*, (Muzzall 1984)

Larval/Immature Nematoda: *Spinitectus carolini*, (Muzzall 1984)

Esocidae

***Esox lucius* (northern pike)**

Adult Digenea: *Centrovarium lobotes*, (Muzzall 1984)

Larval/Immature Digenea: *Azygia* sp., (Muzzall 1984)

Adult Cestoda: *Proteocephalus pinguis*, (Muzzall 1984)

Adult Nematoda: *Hysterothylacium brachyurum*, (Muzzall 1984)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall 1984); *Neoechinorhynchus tenellus*, (Amin and Muzzall 2009; Muzzall 1984)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Muzzall 1984)

Osmeridae

***Osmerus mordax* (rainbow smelt)**

Larval/Immature Cestoda: *Eubothrium* sp., (Muzzall 1984); *Proteocephalus* spp., (Muzzall 1984)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall 1984)

Salmonidae

***Coregonus artedii* (lake herring/cisco)**

Adult Cestoda: *Proteocephalus exiguus*, (Muzzall 1984)

Larval/Immature Cestoda: *Eubothrium* sp., (Muzzall 1984)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall 1984)

Table 13, continued.

***Oncorhynchus mykiss* (rainbow trout)**

Larval Cestoda: *Eubothrium* sp., (Muzzall 1984)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall 1984)

***Oncorhynchus tshawytscha* (Chinook salmon)**

Adult Acanthocephala: *Echinorhynchus* sp., (Muzzall 1984)

***Prosopium cylindraceum* (round whitefish)**

Larval Nematoda: *Camallanus oxycephalus*, (Muzzall 1984)

Percopsidae

***Percopsis omiscomaycus* (trout-perch)**

Larval Nematoda: *Camallanus oxycephalus*, (Muzzall 1984)

Immature Acanthocephala: *Pomphorhynchus bulbocolli*, (Muzzall 1984)

Fundulidae

***Fundulus diaphanus* (banded killifish)**

Larval/Immature Cestoda: *Bothriocephalus claviceps*, (Muzzall 1984)

Cottidae

***Cottus bairdii* (mottled sculpin)**

Larval/Immature Cestoda: *Proteocephalus* sp., (Muzzall 1984)

Centrarchidae

***Ambloplites rupestris* (rock bass)**

Adult Digenea: *Centrovarium lobotes*, (Muzzall 1984)

Adult Nematoda: *Spinitectus carolini*, (Muzzall 1984)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall 1984); *Neoechinorhynchus tenellus*, (Amin and Muzzall 2009; Muzzall 1984); *Pomphorhynchus bulbocolli*, (Muzzall 1984); *Leptorhynchoides thecatus*, (Muzzall 1984)

***Lepomis gibbosus* (pumpkinseed)**

Adult Nematoda: *Spinitectus carolini*, (Muzzall 1984)

Table 13, continued.

***Lepomis macrochirus* (bluegill)**

Larval/Immature Acanthocephala: *Pomphorhynchus bulbocolli*, (Muzzall 1984)

***Micropterus dolomieu* (smallmouth bass)**

Adult Digenea: *Centrovarium lobotes*, (Muzzall 1984); *Cryptogonimus chili*, (Muzzall 1984; Osborn 1903, 1910); *Crepidostomum cooperi*, (Muzzall 1984)

Larval Cestoda: *Proteocephalus* spp., (Muzzall 1984)

Adult Nematoda: *Hysterothylacium brachyurum*, (Muzzall 1984); *Camallanus oxycephalus*, (Muzzall 1984); *Spinitectus carolini*, (Muzzall 1984)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall 1984); *Neoechinorhynchus tenellus*, (Amin and Muzzall 2009; Muzzall 1984); *Leptorhynchoides thecatus*, (Muzzall 1984)

***Pomoxis nigromaculatus* (black crappie)**

Adult Nematoda: *Camallanus oxycephalus*, (Muzzall 1984)

Percidae

***Etheostoma nigrum* (Johnny darter)**

Larval/Immature Digenea: *Crepidostomum cooperi*, (Muzzall 1984)

Adult Cestoda: *Proteocephalus* sp., (Muzzall 1984)

***Perca flavescens* (yellow perch)**

Adult Digenea: *Crepidostomum cooperi*, (Muzzall 1984); *Crepidostomum cornutum*, (Muzzall 1984); *Centrovarium lobotes*, (Muzzall 1984)

Larval/Immature Digenea: *Cryptogonimus chili*, (Muzzall 1984)

Larval/Immature Cestoda: *Bothriocephalus claviceps*, (Muzzall 1984); *Proteocephalus* spp., (Muzzall 1984)

Adult Nematoda: *Hysterothylacium brachyurum*, (Muzzall 1984); *Camallanus oxycephalus*, (Muzzall 1984); *Dichelyne cotylophora*, (Muzzall 1984); *Spinitectus carolini*, (Muzzall 1984); *Spinitectus gracilis*, (Muzzall 1984)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall 1984); *Leptorhynchoides thecatus*, (Muzzall 1984)

Immature Acanthocephala: *Neoechinorhynchus tenellus*, (Amin and Muzzall 2009; Muzzall 1984)

***Percina caprodes* (logperch)**

Larval/Immature Cestoda: *Proteocephalus* spp., (Muzzall 1984)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Muzzall 1984)

Immature Acanthocephala: *Pomphorhynchus bulbocolli*, (Muzzall 1984)

***Sander canadensis* (sauger)**

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Muzzall 1984)

Table 13, continued.

***Sander vitreus* (walleye)**

Adult Digenea: *Centrovarium lobotes*, (Muzzall 1984); *Cryptogonimus chili*, (Muzzall 1984)

Adult Cestoda: *Bothriocephalus claviceps*, (Muzzall 1984); *Triaenophorus stizostedionis*, (Muzzall 1984)

Larval/Immature Cestoda: *Proteocephalus* spp., (Muzzall 1984)

Adult Nematoda: *Hysterothylacium brachyurum*, (Muzzall 1984)

Larval/Immature Nematoda: *Cucullanus* sp., (Muzzall 1984)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall 1984); *Neoechinorhynchus tenellus*, (Amin and Muzzall 2009; Muzzall 1984)

Copepoda: *Argulus* sp., (Litvinov et al. 2004)

LAKE HURON

Results

Parasite Species

Sixty studies have reported on a parasite species infecting one or more fish species from Lake Huron during 1914-2010 with most studies done after 1960 (Table 4). A total of 242 parasite species (2 Mastigophora, 5 Ciliophora, 16 Myxozoa, 3 Microspora, 41 adult Digenea, 13 larval/immature Digenea, 69 Monogenea, 23 adult Cestoda, 5 larval/immature Cestoda, 24 adult Nematoda, 3 larval/immature Nematoda, 16 adult Acanthocephala, 4 Hirudinea, 17 Copepoda, 1 Mollusca) have been reported from Lake Huron fish (Tables 2 and 14). Although *Bucephalus* sp., *Centrovarium lobotes*, *Eubothrium salvelini*, *Bothriocephalus* sp., *Cyathocephalus truncatus*, *Proteocephalus ambloplitis*, *P. pearsei*, *Proteocephalus* sp., *Triaenophorus crassus*, *T. nodulosus*, *Hysterothylacium brachyurum*, *Raphidascaris acus*, *Camallanus oxycephalus*, *Capillaria salvelini*, *Cystidicola* sp., *Spinitectus gracilis*, *Philometra* sp., *Haplomena hamulatum*, *Rhabdochona* sp., *Echinorhynchus salmonis*, *Neoechinorhynchus tumidus*, *Pomphorhynchus bulbocolli*, and *Leptorhynchoides thecatus* were represented in both adult and larval/immature groups, they are listed in the adult category and only counted once.

Protozoans

Two species of mastigophorans (*Trypanoplasma borreli* and *T. catostomi*) have been reported from one fish species (*Catostomus commersonii*) from Lake Huron. Five species of ciliates (*Epistylis* sp., *Ichthyophthirius multifiliis*, *Trichodina urinaria*, *Trichodina* sp., *Capriniana* sp.) were reported in four families of fish. These ciliates occurred on the gills, fins, and skin except for *Trichodina urinaria* (ureters). *Ichthyophthirius multifiliis* infected six fish species.

Sixteen species of myxozoans representing two families have been documented. Ten species are in the genus *Myxobolus* and three species are in the genus *Henneguya*. Most species are host-specific to one fish species or family. Unidentified myxosporans were found in eight fish species. Three species of microsporans (*Glugea anomala*, *Glugea cepedianae*, *Pleistophora* sp.) have been reported with each host-specific to a fish species or family. All myxozoans and microsporans occurred in non-intestinal sites.

Digenetic Trematodes

At least 41 species of adult digenetic trematodes in 12 families were found. Nine species are in the Allocreadiidae and five of these were in the genus *Crepidostomum*. *Crepidostomum cooperi* infected seven fish species. *Azygia angusticauda* occurred in eight fish species. Eight species in the genus *Phyllodistomum* (Gorgoderidae) were reported and each was host-specific. Twenty-three species of adult trematodes were reported from only one fish species. All digenean species occurred in the digestive tract except for *Crepidostomum farionis* (also gall bladder), *Acetodextra amiuri* (swim bladder), *Phyllodistomum* spp. (ureters), *Plagioporus cooperi* (also gall bladder), and *Sanguinicola* spp. (blood).

Fifteen species of larval/immature trematodes representing six families have been reported. Eight species are in the Diplostomidae. *Diplostomum spathaceum* and *Posthodiplostomum minimum* have been found in 45 fish species plus *S. fontinalis* x *S. namaycush* and 26 fish species, respectively. Larval trematodes that occurred in a variety of non-intestinal sites are *Bucephalus* sp., *Clinostomum complanatum*, *Centrovarium lobotes*, *Crassiphiala bulboglossa*, *Diplostomum baeri eucaliae*, *D. flexicaudum*, *D. huronense*, *D. spathaceum*, *Diplostomum* sp., *Neascus* sp., *Posthodiplostomum minimum*, *Uvulifer ambloplitis*, *Apophallus brevis*, *Ichthyocotylurus intermedia*, *Ichthyocotylurus* sp., *Proalaria huronensis*, and *Tylodelphys scheuringi*. *Ichthyocotylurus intermedia* was associated with the heart and mesentery of 11 fish species plus *S. fontinalis* x *S. namaycush*. Immature trematodes were not found in the digestive tract.

Monogeneans

Sixty-nine species of monogeneans in eight families were documented in Lake Huron fish. All monogenean species are host-specific to one fish species or family. Twenty-four species are in the Ancyrocephalidae and 19 species are in the Dactylogyridae. Monogeneans primarily occurred on the gills, except for *Acolpenteron* spp. (ureters), *Pellucidhaptor catostomi* (also nasal cavity), *P. nasalis* (nasal cavity), and *Pseudocolpenteron pavlovskii* (fins). Fifteen species are in the Gyrodactylidae and occurred on the fins or gills. The genera *Dactylogyrus* and *Gyrodactylus* were each represented by 14 species. *Discocotyle sagittata* infected the gills of four species of coregonines and *S. fontinalis* x *S. namaycush*.

Cestodes

Twenty-three species of adult cestodes representing seven families were found in the digestive tract of fish. Eleven of these species are in the Proteocephalidae. *Proteocephalus exiguus* and *P. laruei* each infected four fish species and *P. pearsei* infected six species. *Cyathocephalus truncatus* has been reported from 15 fish species and *S. fontinalis* x *S. namaycush*. Many species

(*Glaridacris catostomi*, *Eubothrium rugosum*, *E. salvelini*, *Bothriocephalus cuspidatus*, *Haplobothrium globuliforme*, *Corallobothrium fimbriatum*, *Corrallotaenia minutia*, *Megathylacoides giganteum*, *Proteocephalus ambloplitis*, *P. exiguus*, *P. fluviatilis*, *P. perplexus*, *P. pinguis*, *P. stizostethi*, *Triaenophorus nodulosus*, *T. stizostedionis*) are host-specific to one fish species or family.

Twelve species of larval/immature cestodes representing seven families were found. Four species are in the Diphylobothriidae, and two species are in the Triaenophoridae. *Eubothrium salvelini*, *Bothriocephalus* sp., *Cyathocephalus truncatus*, *Proteocephalus pearsei*, and *Triaenophorus crassus* occurred as immature stages in the intestine. *Diphylobothrium ditremum*, *D. laruei*, *Ligula intestinalis*, *Schistocephalus solidus*, *Triaenophorus crassus*, *T. nodulosus*, and *Hymenolepis* sp. were larval stages encysted in non-intestinal sites. *Diphylobothrium* spp. infected salmonids, and *Ligula intestinalis* was found in eight fish species. *Proteocephalus ambloplitis* occurred in the liver and mesentery of six fish species. *Triaenophorus crassus* infected the muscle of coregonine species and *Petromyzon marinus*, and *T. nodulosus* infected the liver of nine species plus *S. fontinalis* x *S. namaycush*.

Nematodes

Twenty-four species of adult nematodes in eight families were found in Lake Huron fish. Four species are in the Capillariidae, 3 in the Cucullanidae, 5 in the Cystidicolidae, and 4 in the Rhabdochonidae. *Hysterothylacium brachyurum* occurred in 8 fish species plus *S. fontinalis* x *S. namaycush*, *Dichelyne cotylophora* in 5 species, *Cystidicola farionis* in 8 salmonid species plus *S. fontinalis* x *S. namaycush* and *Osmerus mordax*, *Cystidicola stigmatura* in 7 salmonid species plus *S. fontinalis* x *S. namaycush*, *Cystidicoloides ephemeridarum* in 7 salmonid species, *Spinitectus gracilis* in 12 species plus *S. fontinalis* x *S. namaycush*, and *Rhabdochona cascadiella* in 11 fish species. All adult nematodes were found in the digestive tract, except for *Truttaedacnitis stelmoideis* (gills, gonads, liver, intestinal wall), *C. farionis* and *C. stigmatura* (swim bladder), *Philometra cylindracea* (body cavity, testes, mesentery and heart), and *Philometroides nodulosa* (subcutaneous tissue of head). Some nematode species (e.g., *Philometra cylindracea*, *Philometroides nodulosa*, *Haplonema hamulatum*, *H. immutatum*, and *Rhabdochona cotti*) are host-specific to one fish species or family.

Thirteen species of larval/immature nematodes representing 10 families were reported. *Spinitectus gracilis* and *Eustrongylides tubifex* each infected four fish species. *Raphidascaris acus* occurred both in the liver as a larval stage and intestine as an immature stage. Immature stages of *Capillaria salvelini*, *Capillaria* sp., *Truttaedacnitis clitellarius*, *Haplonema hamulatum*, *Haplonema* sp., and *Rhabdochona* sp. were found in the digestive tract. Immature *Cystidicola* sp. occurred in the swim bladder. *Contraecaecum* sp., *Hysterothylacium brachyurum*, *Hysterothylacium* sp., *Raphidascaris* sp., *Camallanus oxycephalus*, *Camallanus* sp., *Spinitectus gracilis*, *Eustrongylides tubifex*, *Eustrongylides* sp., *Spiroxys contortus*, *Spiroxys* sp., and *Philometra* sp. infected a variety of non-intestinal sites.

Acanthocephalans

Sixteen species of adult acanthocephalans representing four families were reported, all in the intestine. Ten of these species are in the Neoechinorhynchidae. *Neoechinorhynchus crassus*, *N. cristatus*, *N. strigosus*, and *Octospinifer macilentus* are host-specific to catostomids, but several other species were found in numerous fish species—*Acanthocephalus dirus* (13 plus *S. fontinalis* x *S. namaycush*), *Echinorhynchus salmonis* (32 plus *S. fontinalis* x *S. namaycush*), *Neoechinorhynchus cylindratus* (11), *N. rutili* (17), *Pomphorhynchus bulbocolli* (19 plus *S. fontinalis* x *S. namaycush*), and *Leptorhynchoides thecatus* (17).

Four species of immature acanthocephalans were found. *Echinorhynchus salmonis* and *Pomphorhynchus bulbocolli* infected both the digestive tract and non-intestinal sites. *Echinorhynchus* sp. and *Neoechinorhynchus tumidus* occurred in the intestine. *Leptorhynchoides thecatus* was found encysted in non-intestinal sites.

Leeches

Four species of leeches in two families have been reported from Lake Huron fish. These species were attached to the gill chamber area, under the operculum, on fins, and on the external surface. *Actinobdella inequiannulata* is host-specific to catostomids. *Myzobdella* sp. and *Piscicola punctata* each occurred on 4 fish species.

Crustaceans

Seventeen species of copepods representing four families were found on Lake Huron fishes. Two species are in the Argulidae, 7 in the Ergasilidae, 2 in the Lernaeidae, and 6 in the Lernaeopodidae. All species were found on the external surface, fins, and gills, except for *Ergasilus megaceros* (olfactory sac), *Salmincola extumescens* (also branchial rim, operculum), and *Salmincola inermis* (gill cavities). *Ergasilus caeruleus* was reported from 14 fish species plus *S. fontinalis* x *S. namaycush*, *Neoergasilus japonicus* from 10 species, and *Lernaea cruciata* and *L. cyprinacea* each were reported from 8 fish species. *Argulus japonicus*, *Ergasilus celestis*, *E. megaceros*, *Achtheres pimelodi*, *Salmincola edwardsii*, *S. extensus*, *S. extumescens*, *S. inermis*, and *S. siscowet* are host-specific to one fish species or family.

Molluscs

One species of glochidia (*Anodontoides ferussacianus*) was identified infecting a fish species, *Petromyzon marinus*, and unidentified glochidia were found on the fins and gills of 11 Lake Huron fish species.

Fish Species—Parasite Analyses

The parasite faunas of 76 of the 115 established fish species plus two hybrids (*Cyprinus carpio* x *Carassius auratus* and *S. fontinalis* x *S. namaycush*) representing 20 fish families in Lake Huron have been documented during 1914-2010 (Table 15). Twelve studies have been performed on the parasites of *Perca flavescens*, 10 studies on *Coregonus clupeaformis*, 7 studies on *Salvelinus namaycush*, 9 studies on *Catostomus commersonii*, and 6 studies have been performed on the parasites of both *Osmerus mordax* and *Percopsis omiscomaycus*. Fourteen fish species (*Acipenser fulvescens*, *Couesius plumbeus*, *Notemigonus crysoleucas*, *Notropis atherinoides*, *Rhinichthys cataractae*, *Semotilus atromaculatus*, *Umbra limi*, *Fundulus diaphanus*, *Culaea inconstans*, *Pomoxis annularis*, *Pomoxis nigromaculatus*, *Etheostoma nigrum*, *Myoxocephalus thompsonii*, *Apollonia melanostoma*) have had 2 studies performed on their parasites. Twenty-five fish species (33%) of the 76 fish species plus the two hybrids (*Carassius auratus*, *Lepomis cyanellus*, *L. macrochirus*, *Gasterosteus aculeatus*, *Dorosoma cepedianum*, *Margariscus nachtriebi*, *Notropis rubellus*, *Phoxinus neogaeus*, *Rhinichthys obtusus*, *Carpiodes cyprinus*, *Moxostoma macrolepidotum*, *Noturus flavus*, *Oncorhynchus kisutch*, *Salmo trutta*, *Cottus ricei*, *Nocomis biguttatus*, *Notropis heterodon*, *N. volucellus*, *Phoxinus eos*, *Esox masquinongy*, *Coregonus alpenae*, *Sander canadensis*, *Oncorhynchus gorbusha*, *O. tshawytscha*, *Prosopium coulteri*) have had only one study performed on their parasites. Twenty fish species in the Cyprinidae were examined for parasites. *Perca flavescens* harbored the most parasite species (48), followed by *Micropterus dolomieu* (37), *Ambloplites rupestris* (37), *C. commersonii* (36), and *Notropis hudsonius* (28).

Forty-two fish species from Lake Huron whose parasites have not been documented are *Ichthyomyzon fossor*, *I. unicuspis*, *Lampetra appendix*, *Lepisosteus osseus*, *Hiodon tergisus*, *Campostoma anomalum*, *Cyprinella spiloptera*, *Hybognathus hankinsoni*, *Luxilus chrysocephalus*, *Lythrurus umbratilis*, *Nocomis micropogon*, *Notropis anogenus*, *N. buchanaani*, *N. stramineus*, *Erimyzon sucetta*, *Hypentelium nigricans*, *Minytrema melanops*, *Moxostoma anisurum*, *M. duquesnei*, *M. erythrurum*, *M. valenciennesi*, *Misgurnus anguillicaudatus*, *Ameiurus melas*, *A. natalis*, *Noturus gyrinus*, *N. stigmatosus*, *Esox americanus*, *Aphredoderus sayanus*, *Labidesthes sicculus*, *Morone americana*, *Lepomis megalotis*, *Ammocrypta pellucida*, *Etheostoma blennioides*, *E. caeruleum*, *E. flabellare*, *E. microperca*, *Gymnocephalus cernuus*, *Percina copelandi*, *P. maculata*, *P. shumardi*, *Aplodinotus grunniens*, and *Proterorhinus marmoratus*.

Fish Families—Parasite Species-Richness, Parasite Analyses

The values for parasite species–richness, regardless of life stage, and number of fish species examined in each of the five compared fish families (in parentheses) were Centrarchidae (51, 8), Cyprinidae (66, 20), Catostomidae (44, 4), Percidae (64, 6), and Salmonidae (50, 14). The correlation coefficient between parasite species–richness and number of fish species examined for each family was nonsignificant ($r_s = 0.600$).

The parasite group(s) (in parentheses) most common in each of the five compared fish families from Lake Huron were Cyprinidae (monogeneans followed by digenetic trematodes), Catostomidae (digenetic trematodes followed by acanthocephalans), Centrarchidae (digenetic trematodes and monogeneans), Percidae (digenetic trematodes), and Salmonidae (nematodes followed by cestodes and copepods) (Table 16).

Parasite species or a specific genus found only in centrarchids were adult digenetic trematodes (*Caecinicola parvulus*, *Cryptogonimus chili*, *Phyllodistomum lohrenzi*, *Proterometra macrostoma*), monogeneans (*Acolpenteron ureteroectes*, *Actinocleidus recurvatus*, *Clavunculus bursatus*, *Cleidodiscus robustus*, *Gyrodactylus goerani*, *Haploleidus dispar*, *Leptocleidus megalonchus*, *Lyrodiscus minimus*, *L. rupestris*, *Onchocleidus chautauquaensis*, *O. ferox*, *Synclithrium fusiformis*, *Tetracleidus banghami*, *T. capax*, *T. longus*, *Urocleidus alatus*), adult cestodes (*Bothriocephalus claviceps*, *Proteocephalus ambloplitis*, *P. fluviatilis*), adult nematodes (*Raphidascaris acus*, *Spinitectus carolini*), and copepods (*Achtheres pimelodi*). Parasite species found only in cyprinids were protozoans (*Myxobolus bartai*, *M. burti*, *M. conspicuous*, *M. grandis*, *M. pendula*, *Thelohanellus notatus*, *Zschokkella* sp.), adult digenetic trematodes (*Allocreadium lobatum*, *Plagioporus cooperi*), larval/immature digenetic trematodes (*Bucephalus* sp.), monogeneans (*Cleidodiscus brachus*, *Dactylogyrus anchoratus*, *D. attenuatus*, *D. aureus*, *D. banghami*, *D. bifurcatus*, *D. chrosomi*, *D. cornutus*, *D. extensus*, *D. heterolepis*, *D. lineatus*, *D. pollex*, *Gyrodactyloides* sp., *Gyrodactylus atratuli*, *G. banghami*, *G. couesius*, *G. dechtiara*, *G. margaritae*, *G. medius*, *Octomacrum microconfibula*, *O. semotili*, *Pseudocolpenteron pavlovskii*), adult nematodes (*Rhabdochona canadensis*, *R. decaturensis*), and adult acanthocephalans (*Neoechinorhynchus notemigoni*). Parasites found only in catostomids were protozoans (*Trypanoplasma borreli*, *T. catostomi*, *Myxobolus bibullatum*, *M. rotundum*), adult digenetic trematodes (*Lissorhis attenuatus*, *L. simeri*, *Phyllodistomum lysteri*), monogeneans (*Acolpenteron catostomi*, *Anonchhaptor anomalus*, *Dactylogyrus duquesni*, *Octomacrum lanceatum*, *Pellucidhaptor catostomi*, *Pseudomurraytrema copulatum*), adult cestodes (*Glaridacris catostomi*), adult nematodes (*Capillaria bakeri*, *Philometroides nodulosa*), adult acanthocephalans (*Neoechinorhynchus crassus*, *N. cristatus*, *N. strigosus*, *Octospinifer macilentus*), and leeches (*Actinobdella inequiannulata*). Parasites found only in percids were protozoans (*Trichodina urinaria*, *Henneguya doori*, *Myxobolus scleroperca*), adult digenetic trematodes (*Bucephalus elegans*, *Bunodera sacculata*, *Centrovarium lobotes*, *Phyllodistomum superbum*, *Sanguinicola occidentalis*), larval digenetic trematodes (*Apophallus brevis*), monogeneans (*Aethycteron malleus*, *Gyrodactylus etheostomae*, *G. fremani*, *G. stunkardi*, *Urocleidus aculeatus*, *U. adspectus*), adult cestodes (*Bothriocephalus cuspidatus*, *B. formosus*, *Proteocephalus stizostethi*, *Triaenophorus stizostedionis*), larval/immature cestodes (*Hymenolepis* sp.), adult nematodes (*Dichelyne* sp., *Philometra cylindracea*), and copepods (*Argulus japonicus*, *Ergasilus confusus*). Parasites only found in salmonids were protozoans (*Henneguya zschokkei*), adult digenetic trematodes (*Phyllodistomum coregoni*, *P. lachancei*), monogeneans (*Discocotyle sagittata*, *Tetraonchus variabilis*), adult cestodes (*Eubothrium salvelini*, *Proteocephalus exiguus*), larval cestodes (*Diphyllobothrium ditremum*, *D. laruei*, *Diphyllobothrium* sp., *Triaenophorus crassus*), adult nematodes (*Capillaria salvelini*, *Cystidicoloides ephemeridarum*), immature nematodes (*Haplonema* sp., *Philometra* sp.), adult acanthocephalans (*Echinorhynchus lateralis*, *Neoechinorhynchus tumidus*), and copepods (*Salmincola edwardsii*, *S. extensus*, *S. extumescens*, *S. inermis*, *S. siscowet*).

The numbers and percentages of autogenic and allogenic helminth species (in parentheses), respectively, for each fish family are Centrarchidae (24 species, 71%, 10 species, 29%); Cyprinidae (20 species, 67%, 10 species, 33%); Catostomidae (21 species, 77%, 6 species, 22%); Percidae (31 species, 72%, 12 species, 28%); and Salmonidae (31 species, 84%, 6 species, 16%).

Jaccard Coefficients of Parasite Communities—Fish Families

The Jaccard coefficients of parasite-community similarity among the five comparison fish families were low ranging from 0.0869 (Centrarchidae and Catostomidae) to 0.2872 (Percidae and Centrarchidae) (Table 17). Species in the Percidae shared few parasite species with fish in the Cyprinidae (0.2403). The species involved in the calculations of Jaccard coefficients of parasite-community similarity for each of the five families were (in parentheses) Centrarchidae (*Ambloplites rupestris*, *Lepomis cyanellus*, *L. gibbosus*, *L. macrochirus*, *Micropterus dolomieu*, *M. salmoides*, *Pomoxis annularis*, *P. nigromaculatus*); Cyprinidae (*Carassius auratus*, *Couesius plumbeus*, *Cyprinus carpio*, *C. carpio* x *Carassius auratus*, *Luxilus cornutus*, *Margariscus nachtriebi*, *Nocomis biguttatus*, *Notemigonus crysoleucas*, *Notropis atherinoides*, *N. heterodon*, *N. heterolepis*, *N. hudsonius*, *N. rubellus*, *N. volucellus*, *Phoxinus eos*, *P. neogaeus*, *Pimephales notatus*, *P. promelas*, *Rhinichthys cataractae*, *R. obtusus*, *Semotilus atromaculatus*); Catostomidae (*Carpionodes cyprinus*, *Catostomus catostomus*, *C. commersonii*, *Moxostoma macrolepidotum*); Percidae (*Etheostoma exile*, *E. nigrum*, *Perca flavescens*, *Sander canadensis*, *S. vitreus*), and Salmonidae (*Coregonus alpenae*, *C. artedi*, *C. clupeaformis*, *C. hoyi*, *Oncorhynchus gorboscha*, *O. kisutch*, *O. mykiss*, *O. nerka*, *Prosopium coulteri*, *P. cylindraceum*, *Salmo trutta*, *Salvelinus fontinalis*, *S. namaycush*, *S. fontinalis* x *S. namaycush*).

Parasite species found in two or more fish families (in parentheses) were protozoans—*Ichthyophthirius multifiliis* (5); adult digenetic trematodes—*Azygia angusticauda* (3), *Bunoderina eucaliae* (2), *Rhipidocotyle papillosum* (2), *Crepidostomum cooperi* (3), *C. cornutum* (2), *C. farionis* (3), *C. isostomum* (2), *Microphallus opacus* (2), *Plagioporus sinitsini* (2); larval/immature digenetic trematodes—*Centrovarium lobotes* (3), *Clinostomum complanatum* (4), *Crassiphiala bulboglossa* (2), *Diplostomum flexicaudum* (2), *D. spathaceum* (18), *Ichthyocotylurus intermedia* (5), *Neascus* sp. (6), *Posthodiplostomum minimum* (8), *Proalaria huronensis* (6), *Uvulifer ambloplitis* (3); adult cestodes—*Cyathocephalus truncatus* (6), *Proteocephalus laruei* (2), *P. pearsei* (3); larval/immature cestodes—*Eubothrium salvelini* (2), *Ligula intestinalis* (3), *Proteocephalus ambloplitis* (4), *P. pearsei* (4), *Schistocephalus solidus* (2), *Triaenophorus crassus* (2), *T. nodulosus* (6); adult nematodes—*Camallanus oxycephalus* (2), *Capillaria catostomi* (4), *Cystidicola farionis* (2), *C. stigmatura* (2), *Dichelyne cotylophora* (2), *Hysterothylacium brachyurum* (5), *Rhabdochona cascadiella* (6), *Spinitectus gracilis* (8); larval/immature nematodes—*Eustrongylides tubifex* (2), *Hysterothylacium brachyurum* (3), *Raphidascaris acus* (6), *Spinitectus gracilis* (4), *Spiroxyis* sp. (3); adult acanthocephalans—*Acanthocephalus dirus* (8), *Echinorhynchus leidy* (4), *E. salmonis* (14), *Leptorhynchoides thecatus* (11), *Neoechinorhynchus cylindratus* (4), *N. pungitius* (4), *N. rutili* (10), *Pomphorhynchus bulbocolli* (11); immature acanthocephalans—*Echinorhynchus salmonis* (2), *Neoechinorhynchus tumidus* (2), *Pomphorhynchus bulbocolli* (4), *Leptorhynchoides thecatus* (3); leeches—*Myzobdella lugubris* (2), *Piscicola punctata* (4); and copepods—*Argulus catostomi*

(2), *Ergasilus caeruleus* (7), *E. luciopercarum* (4), *E. nerkae* (3), *E. versicolor* (2), *Lernaea cruciata* (5), *L. cyprinacea* (5), *Neoergasilus japonicus* (4).

Discussion

Lake Huron has an approximate length and width of 332 km and 295 km with a surface area of 59,600 km² (Herdendorf 1982). Its mean depth is 59 m and maximum depth is 229 m. Water from Lake Huron flows into Lake Erie via the St. Clair River, Lake St. Clair, and the Detroit River. Of the 115 fish species listed as established in Lake Huron (Cudmore-Vokey and Crossman 2000), the parasites of 76 species (66%) plus two hybrids have been studied and reported.

The most-encompassing survey of parasites from Lake Huron was done by Dechtiar et al. (1988) who found 218 parasite species (not including agnaths) associated with 57 fish species collected during 1961-1975. Their reported numbers in each main parasite group were Protozoa (18), Digenetic Trematoda (48), Monogenea (69), Cestoda (26), Nematoda (21) Acanthocephala (17), Crustacea (14), Hirudinea (4), and Mollusca (1). These numbers are similar to the totals reported for all studies in this synopsis, except that the numbers of protozoan, digenetic trematode, and nematode species each increased by six, seven, or nine. Dechtiar et al. (1988) found that *Perca flavescens* had the highest species-richness (30) followed by *Micropterus dolomieu* with 28. Other studies reported an additional 18 parasite species for *Perca flavescens* and an additional nine parasite species reported for *M. dolomieu*.

Dechtiar et al. (1988), in referring to Lake Huron, stated “If the species composition of the parasite fauna changes in response to eutrophication, one would expect a trend toward predominance of monogeneans, crustaceans, e.g. *Argulus* and *Ergasilus*, and digenetic trematodes which are most characteristic of eutrophic habitats. This trend is confirmed in the present study as the number of species of monogeneans and trematodes has increased almost fourfold since the early 1950s.” Dechtiar et al. (1988) were probably comparing their data to the data generated by Bangham (1955). Comparing this information in Dechtiar et al. (1988) to the data in this synopsis, the number of monogeneans decreased by four, the numbers of digenetic trematodes increased by six, and the number of copepods increased by three. These changes are probably related to: 1) new parasite species being described; 2) more individuals and fish species examined; and 3) possibly a change in the fish community and thus of potential hosts since the studies of Bangham (1955) and Dechtiar et al. (1988). It is difficult to determine if eutrophication has played a role in these changes in the numbers of these species in these parasite groups.

Pathogenic Parasites

Protozoans

Of the ciliates found, *Ichthyophthirius multifiliis*, *Trichodina urinaria*, and *Trichodina* sp. can cause fish health problems. Allison and Kelly (1963) reported that *Ichthyophthirius multifiliis* caused weight loss and host mortality. Hines and Spira (1974) found that *I. multifiliis* produced

hyperplasia and mucous cell depletion in the skin. Dechtiar (1972a) reported that substantial mortality of young *Perca flavescens* in Lake Erie was due to *Ichthyophthirius multifiliis*. *Trichodina urinaria* can cause inflammation of the ureters and *Trichodina* sp. can produce hyperplasia of the gill lamellae. Of the myxozoans, *Henneguya* spp., *Myxobolus* spp., and *Thelohanellus notatus* are most important, infecting a variety of non-intestinal sites and causing damage to the gills, muscle, internal organs, and skin (Dogiel et al. 1958; Reichenbach-Klinke and Elkan 1965; Reichenbach-Klinke 1973). Two of the microsporans (*Glugea anomala* and *G. cepedianae*) cause hypertrophy of cells, and mortalities of *Pungitius pungitius* have been ascribed to *Glugea anomala* (see Sindermann 1970).

Digenetic Trematodes

The following adult digenetic trematodes may be pathogenic to fish: *Crepidostomum* (5 species reported), *Acetodextra amiuri*, *Phyllodistomum* (8 species reported), *Sanguinicola occidentalis*, and *Sanguinicola* sp. (Davis 1937; Perkins 1951, 1956; Wales 1958b; Gleason et al. 1983). The larval trematodes (*Clinostomum complanatum*, *Centrovarium lobotes*, *Crassiphiala bulboglossa*, *Diplostomum* (4 species reported, including *Diplostomum spathaceum*), *Neascus* sp., *Posthodiplostomum minimum*, *Uvulifer ambloplitis*, *Apophallus brevis*, *Ichthyocotylurus intermedia*, *Ichthyocotylurus* sp., and *Tylodelphys scheuringi* are pathogenic to fish affecting the skin, eyes, brain, internal organs, and muscle (Meyer 1958; Wales 1958b; Kozicka 1958; Sinclair 1972). Bychovskaya-Pavloskaya and Petrushevski (1963) reported on the mortalities of fish caused by adult and larval digenetic trematodes.

Monogeneans

Some of the ancyrocephalid species, several *Dactylogyrus* spp., *Discocotyle sagittata*, several *Gyrodactylus* spp., *Tetraonchus monenteron*, and *T. variabilis* are monogeneans that, when they occur in high numbers, can cause pathology and hyperplasia of gill lamellae (Mizelle 1938; Tripathi 1959; Prost 1963; Lester and Adams 1974). *Discocotyle sagittata* has caused mortalities to fish due to damage to the gills (Blood et al. 2006).

Cestodes

Adults of *Eubothrium crassum*, *E. rugosum*, *E. salvelini*, and *Cyathocephalus truncatus* have been known to cause pathology to fish (Vik 1954; 1958; Smith and Margolis 1970; Boyce 1979). The plerocercoids of *Diphyllbothrium ditremum*, *D. laruei*, *Diphyllbothrium* sp., *Ligula intestinalis*, *Schistocephalus solidus*, *Proteocephalus ambloplitis*, *Triaenophorus crassus*, and *T. nodulosus* that infect the liver, mesentery, and gonads can cause inflammation and other pathology resulting in major damage (Bangham 1927; Lawler 1969; Matthey 1963; Dechtiar 1972a). Plerocercoids of *Proteocephalus ambloplitis* can reduce the reproductive capacity of female *Micropterus dolomieu* by fibrosis of the ovaries and direct oocyte destruction (Esch and Huffines 1973; McCormick and Stokes 1982).

Nematodes

Hysterothylacium brachyurum and *Raphidascaris acus* are large nematodes infecting the digestive tract, but their pathological effect on fish is unknown. *Cystidicola farionis* infected the swim bladder of salmonids and *Osmerus mordax*, while *C. stigmatura* infected *S. namaycush*.

Black (1984) reported swim bladder lesions associated with *Cystidicola stigmatura* in *Salvelinus namaycush*. Willers et al. (1991) and Knudsen et al. (2002) reported on histopathological changes of swim bladders infected with *Cystidicola farionis* and believed this nematode may cause mortality to the most heavily infected *Salvelinus alpinus*. Adults of *Philometra cylindracea* that occur in several non-intestinal sites may play a role in reduced growth and high mortality of *Perca flavescens* (see Allison 1966; Crites 1982; Salz 1989).

Larvae of *Contraecaecum* sp. (mesentery), *Hysterothylacium brachyurum* (liver), *Raphidascaris acus* (liver, spleen), *Raphidascaris* sp. (free and encapsulated in liver, mesentery, and intestinal wall), *Camallanus oxycephalus* (encysted), *Camallanus* sp. (liver, gonads), *Eustrongylides tubifex* (mesentery, muscle), *Eustrongylides* sp. (body cavity, viscera), *Spiroxys contortus* (mesentery), *Spiroxys* sp. (mesentery), and *Philometra* sp. (mesentery) can cause inflammation to the viscera and other sites and possibly increase the fish's susceptibility to secondary infections by viruses, bacteria, and fungi. Larvae of *Eustrongylides tubifex* may play a role in reduced growth and high mortality of *Perca flavescens* (see Allison 1966; Crites 1982; Salz 1989). Crites (1982) suggested that high intensities of *Eustrongylides tubifex* resulted in lower mean weight in infected age-classes of *Perca flavescens*. Salz (1989) demonstrated that water content was consistently higher in the viscera of *Perca flavescens* infected with *Eustrongylides tubifex* than in fish not infected, indicating that *E. tubifex* may utilize some of its host's lipid reserve.

Acanthocephalans

The adult acanthocephalans (*Acanthocephalus dirus*, *Echinorhynchus salmonis*, *Pomphorhynchus bulbocolli*, *Leptorhynchoides thecatus*) can reduce the absorption of nutrients in infected fish (Bullock 1963; Schmidt et al. 1974). McDonough and Gleason (1981) reported that *Pomphorhynchus bulbocolli* caused the formation of a fibrous capsule around its proboscis when it penetrated the intestinal wall. *Echinorhynchus salmonis*, *Pomphorhynchus bulbocolli*, and *L. thecatus* also occurred encysted in a variety of non-intestinal sites causing inflammation and fibrosis.

Leeches

Leeches on Lake Huron fishes had low prevalences and/or intensities and are of minor pathologic importance to fishes, except possibly for *Actinobdella inequiannulata* that has been reported to cause damage to the gills and operculum of catostomids (Dechtiar and Lawrie 1988).

Crustaceans

Argulus, *Ergasilus*, *Neoergasilus*, *Lernaea*, *Achtheres*, and *Salmincola* are genera of parasitic copepods that in high intensities could cause pathology to various attachment sites on fishes, including hemorrhaging and cell hyperplasia (Schumacher 1952; Allum and Huggins 1959; Kabata 1970; Dechtiar and Lawrie 1988). *Lernaea* spp. can damage the scales, skin, and underlying muscle tissue with its anchor attachment structure. Roberts and Janovy (2009) indicated that *Lernaea* spp. may cause inflammation, ulceration, and secondary bacterial and fungal infections at attachment sites, and small fish have been killed by infection with several individuals. Epizootics from *Lernaea* spp. occur in wild-fish populations (Putz and Bowen 1968).

Molluscs

Only larval stages (glochidia) of one species of mollusc (*Anodontoides ferussacianus*) have been identified infecting Lake Huron fishes. Several fish species, however, have been infected with unidentified glochidia, and when present at high intensities, these parasites can cause damage to the skin, fins, and gills--possibly impairing respiratory function (Karna and Milleman 1978).

Parasite Host Specificity—Jaccard Coefficients

Sixty parasite species reported from fish in two or more families make up 25% of all the parasite species reported from fish in Lake Huron. All these parasite species have indirect life cycles with fish becoming infected by eating infected intermediate hosts or paratenic hosts, except for the protozoa, leeches, and copepods that have direct life cycles. The digenetic trematodes made up 33% of these species followed by the nematodes (20%). There are 181 parasite species that are host-specific to one fish species or family.

Jaccard coefficients of similarity for the parasite communities between individuals in five fish-family comparisons were low, indicating fish in these families did not share many parasite species. The highest coefficient (0.2872) involved the Percidae and Centrarchidae, which are in the same order (Perciformes); fish in these families shared 27 parasite species. The next highest coefficient (0.2539) involved the Percidae and Catostomidae (Cypriniformes) that shared 25 species. These low coefficients involving fish species among these different fish families indicate: 1) many parasite species have phylogenetic host specificity; 2) fish species in different families do not occupy the same habitats, or the habitats do not overlap much; and 3) the diets of the fish species do not typically overlap either by food items or spatially in foraging areas. There were no monogenean species shared between fish in these family pairings, and the only protozoan species shared was *Ichthyophthirius multifiliis*. Furthermore, the low Jaccard coefficients for parasite-community similarity among the centrarchids, catostomids, cyprinids, percids, and salmonids indicate that each of these fish families has its own characteristic parasite fauna.

Fish Families—Parasite Communities

Most parasites reported from catostomids, centrarchids, and percids were digenetic trematodes; most from cyprinids were monogeneans and digenetic trematodes. Most parasites infecting salmonids were nematodes followed by cestodes and copepods. Most fish species examined from this lake were cyprinids (20 species) followed by salmonids (14 species). Cyprinids and salmonids harbored 67 and 49 parasite species, respectively. The centrarchids and percids harbored 60 and 63 parasite species, respectively. The salmonids had the highest percentage (84%) of autogenic helminth species and the cyprinids had the highest percentage (33%) of allogenic species. The percentages of autogenic helminth species in fish in these families varied from 67% to 84%. Based on the available literature from a fish family and parasite perspective, Lake Huron is characterized by having a mixture of cyprinid, salmonid, centrarchid, and percid species and their autogenic parasites.

The reported autogenic helminth species that mature in fish include larval/immature trematodes (*Bucephalus* sp., *Centrovarium lobotes*), larval/immature cestodes (*Eubothrium salvelini*, *Eubothrium* sp., *Bothriocephalus* sp., *Cyathocephalus truncatus*, *Proteocephalus ambloplitis*, *P. pearsei*, *Proteocephalus* spp., *Triaenophorus crassus* *T. nodulosus*), larval/immature nematodes (*Hysterothylacium brachyurum*, *Hysterothylacium* sp., *Raphidascaris acus*, *Raphidascaris* sp., *Camallanus oxycephalus*, *Camallanus* sp., *Capillaria salvelini*, *Capillaria* sp., *Truttaedacnitis clitellarius*, *Cystidicola* sp., *Spinitectus gracilis*, *Philometra* sp., *Haplonema hamulatum*, *Haplonema* sp.), immature acanthocephalans (*Echinorhynchus salmonis*, *Echinorhynchus* sp., *Neoechinorhynchus tumidus*, *Pomphorhynchus bulbocolli*, *Leptorhynchoides thecatus*). Of the allogenic helminth species found in fish, larvae of the digenetic trematodes (*Clinostomum complanatum*, *Crassiphiala bulboglossa*, *Diplostomum baeri eucaliae*, *D. flexicaudum*, *D. huronense*, *D. spathaceum*, *Diplostomum* sp., *Neascus* sp., *Posthodiplostomum minimum*, *Uvulifer ambloplitis*, *Apophallus brevis*, *Ichthyocotylurus intermedia*, *Ichthyocotylurus* sp., *Proalaria huronensis*, *Tylodelphys scheuringi*) mature in piscivorous birds; larvae of the cestodes of *Diphyllobothrium ditremum*, *Ligula intestinalis*, *Schistocephalus solidus* and *Hymenolepis* sp. mature in piscivorous birds; larvae of *Diphyllobothrium laruei* mature in mammals; immature/larval nematodes of *Contraecum* sp., *Eustrongylides tubifex*, and *Eustrongylides* sp. mature in birds; and *Spiroxys contortus* and *Spiroxys* sp. mature in turtles.

Table 14. Parasites reported for fishes from Lake Huron, 1914-2010. Host documentation, in order, consists of references; when observed (cdnp = collection date not provided); prevalence defined as the percentage (%) of fish infected (pnp = prevalence not provided); mean intensity defined as the mean number of parasites per infected fish (minp = mean intensity not provided); for the Dechtiar et al. (1988) article, intensity of infection (L = light, 1-9 parasites per host; M = medium, 10-49 parasites per host; and H = heavy, ≥ 50 parasites per host); location (lns = location not specified or incomplete), latitude and longitude (llnk = latitude/longitude not known).

Mastigophora (Flagellates)

Trypanosomatidae Doflein, 1911

Trypanoplasma borreli Laveran and Mesnil, 1902

Synonym: *Trypanoplasma cyprini* Plehn, 1913; *Trypanoplasma keysselitzi* Minchin, 1909; *Trypanoplasma tincae* Schaperclaus, 1954; *Cryptobia kharbulaewi* Chernova, 1984; *Trypanoplasma carassii* (Kashkovski, 1974)

Site of Infection: Blood

Host: *Catostomus commersonii*: Mavor 1916; 1913; pnp; minp; Go Home Bay; llnk; Georgian Bay, Ontario; 45°30'0"/-81°0'0"

Trypanoplasma catostomi Bower and Woo, 1977

Synonym: ?*Trypanoplasma borreli* of Mavor 1915, 1916

Site of Infection: Blood

Host: *Catostomus commersonii*: Bower and Woo 1977; 1975; pnp; minp; Sarnia, Ontario; 42°58'0"/-82°24'0"

Remarks: Bower and Woo (1977) suggested that the tentative record of *Trypanoplasma borreli* from *Catostomus commersonii* by Mavor (1915) is a misidentification.

Ciliophora (Ciliates)

Epistylidae Kahl, 1935

Epistylis sp.

Site of Infection: Gills

Host:

Lota lota: Muzzall et al. 2003; July 1998; 4%; minp; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Cottus cognatus: Muzzall and Bowen 2002; June 1995; 79%; minp; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58")

Ichthyophthiriidae Kent, 1881

Ichthyophthirius multifiliis (Fouquet, 1876)

Synonym: None

Site of Infection: Fins, gills, skin

Table 14, continued.

Host:

Luxilus cornutus: Dechtiar et al. 1988; 1961-1971; 13%; M; lns; Ontario; llnk

Pimephales notatus: Dechtiar et al. 1988; 29%; M; lns; Ontario

Catostomus commersonii: Dechtiar et al. 1988; 3%; H; lns; Ontario

Fundulus diaphanus: Dechtiar et al. 1988; 23%; L; lns; Ontario

Cottus ricei: Dechtiar et al. 1988; 14%; M; lns; Ontario

Perca flavescens: Dechtiar et al. 1988; 4%; M; lns; Ontario

Trichodinidae Raabe, 1959

Trichodina urinaria Dogiel, 1940

Synonym: *Trichodina algonquinensis* Li and Desser, 1983

Site of Infection: Ureters

Host: *Perca flavescens*: Dechtiar et al. 1988; 1961-1971; 11%; H; lns; Ontario; llnk

Trichodina sp.

Site of Infection: Gills

Host:

Notropis hudsonius: Dechtiar et al. 1988; 1961-1971; 4%; H; lns; Ontario; llnk

Phoxinus neogaeus: Dechtiar et al. 1988; 10%; H; lns; Ontario

Catostomus commersonii: Dechtiar et al. 1988; 1%; H; lns; Ontario

Umbra limi: Dechtiar et al. 1988; 14%; M; lns; Ontario

Lota lota: Muzzall et al. 2003; July 1998; 80%; minp; Six Fathom Bank; 44°48'50"/-82°27'58"; 85%; minp; Yankee Reef, Michigan; 44°28'59"/-83°33'29"

Cottus cognatus: Muzzall and Bowen 2002; June 1995; 55%; minp; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Myoxocephalus thompsonii: Muzzall et al. 1997; 1995; 17%; minp; Alpena, Michigan; 45°3'42"/-82°25'57"; 27%; minp; Harbor Beach, Michigan; 43°50'30"/-82°38'29"

Sander vitreus: Muzzall and Haas 1998; September 1993; September 1994; 9%; minp; Inner Saginaw Bay; 43°45'0"/-83°39'59"; 19%; minp; Outer Saginaw Bay, Michigan; 43°45'0"/-83°39'59"

Trichophryidae Fraipont, 1878

Capriniana sp.

Site of Infection: Gills

Host: *Morone chrysops*: Dechtiar et al. 1988; 1961-1971; 33%; H; lns; Ontario; llnk

Table 14, continued.

Myxozoa (Myxosporans)

Myxidiidae Thelohan, 1892

Myxidium lieberkuhni Butschli, 1882

Synonym: None

Site of Infection: Urinary bladder

Host: *Esox lucius*: Mavor 1916; 1913; 100%; minp; Go Home Bay; lnk; Georgian Bay, Ontario; 45°30'0"/-81°0'0"

Myxobolidae Thelohan, 1892

Henneguya doori Guilford, 1963

Synonym: None

Site of Infection: Gills

Host: *Perca flavescens*: Dechtiar et al. 1988; 1961-1971; 8%; M; lns; Ontario; lnk

Henneguya exilis Kudo, 1929

Synonym: None

Site of Infection: Gills

Host: *Ameiurus nebulosus*: Dechtiar et al. 1988; 1961-1971; 37%; M; lns; Ontario; lnk

Henneguya zschokkei (Gurley, 1893) Doflein, 1901

Synonym: *Henneguya salmincola* Ward, 1919 according to Shulman, 1966

Site of Infection: Muscle

Host: *Coregonus artedii*: Dechtiar et al. 1988; 1961-1971; 2%; minp; lns; Ontario; lnk

Myxobolus bartai Salim and Desser, 2000

Synonym: None

Site of Infection: Intracellular in striated muscle

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 60%; minp; Goderich, Ontario; 43°10' 59"/-81°42'0" 81°44'

Myxobolus bibullatum (Kudo, 1934) Landsberg and Lom, 1991

Synonym: *Myxosoma bibullatum* Kudo, 1934

Site of Infection: Gills

Host:

Catostomus catostomus: Dechtiar et al. 1988; 1961-1971; 24%; M; lns; Ontario; lnk

Catostomus commersonii: Dechtiar et al. 1988; 3%; H; lns; Ontario

Table 14, continued.

Myxobolus burti Cone and Marcogliese 2010

Synonym: *Myxobolus* sp. of Cone et al. 2004

Site of infection: Intracellular in striated muscle

Host:

Notropis hudsonius: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 6%; minp; Goderich, Ontario; 43°43'5"/-81°42'0"

Notropis hudsonius: Cone and Marcogliese 2010, same infection data and information as in Cone et al. 2004

Myxobolus cognati Cone et al. 1996

Synonym: None

Site of Infection: Operculum, periorbital tissue

Host: *Cottus cognatus*: Muzzall and Bowen 2002; June 1995; 4%; minp; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Myxobolus conspicuous Kudo, 1929

Synonym: None

Site of Infection: Skin

Host: *Phoxinus neogaeus*: Dechtiar et al. 1988; 1961-1971; 6%; L; lns; Ontario; llnk

Myxobolus grandis (Kudo, 1934) Lom and Noble, 1984

Synonym: *Myxosoma grandis* Kudo, 1934; *Myxosoma grandis* Fantham, Porter, and Richardson, 1939

Site of Infection: Liver

Host: *Notropis hudsonius*: Dechtiar et al. 1988; 1961-1971; 4%; H; lns; Ontario; llnk

Myxobolus pendula Guilford, 1967

Synonym: *Myxosoma pendula* (Guilford, 1967)

Site of Infection: Gills

Host: *Semotilus atromaculatus*: Dechtiar et al. 1988; 1961-1971; 22%; M; lns; Ontario; llnk

Myxobolus procercum (Kudo, 1934) Lom and Noble, 1984

Synonym: *Myxosoma procercum* (Kudo, 1934) Lom and Noble, 1984

Site of Infection: Skin, muscle

Host: *Percopsis omiscomaycus*: Dechtiar et al. 1988; 1961-1971; 16%; M; lns; Ontario; llnk

Myxobolus rotundum (Meglitsch, 1937) Lom and Noble, 1984

Synonym: *Myxosoma rotundum* (Meglitsch, 1937) Lom and Noble, 1984

Site of Infection: Gills

Host: *Carpiodes cyprinus*: Dechtiar et al. 1988; 1961-1971; 100%; L; lns; Ontario; llnk

Table 14, continued.

Myxobolus scleroperca (Guilford, 1963) Lom and Noble, 1984

Synonym: *Myxosoma scleroperca* (Guilford, 1963) Lom and Noble, 1984

Site of Infection: Fins

Host: *Percina caprodes*: Dechtiar et al. 1988; 1961-1971; 33%; M; lns; Ontario, llnk

Myxobolus sp.

Site of Infection: Gills

Host:

Notropis hudsonius: Dechtiar et al. 1988; 1961-1971; 2%; L; lns; Ontario; llnk

Moxostoma macrolepidotum: Dechtiar et al. 1988; 33%; M; lns; Ontario

Lota lota: Dechtiar et al. 1988; 14%; M; lns; Ontario

Ambloplites rupestris: Dechtiar et al. 1988; 11%; L; lns; Ontario

Thelohanellus notatus (Mavor, 1916) Kudo, 1929

Synonym: None

Site of Infection: Muscle, skin, tissue

Host:

Notropis hudsonius: Beis and Cone 1990; Fall 1967; 98%; 2-30 cysts; Lake Mindemoya, Manitoulin Island; llnk

Notropis hudsonius: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 13%; minp; Goderich, Ontario; 43°43'5"/-81°42'0"

Pimephales notatus: Dechtiar et al. 1988; 32%; M; lns; Ontario

Pimephales notatus: Mavor 1916; 1913; 6%; minp; Go Home Bay; llnk; Georgian Bay; 45°30'0"/-81°0'0"

Zschokkella sp.

Site of Infection: Bile ducts of liver

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 6%; minp; Goderich, Ontario; 43°43'5"/-81°42'0"

Unidentified Myxospora

Synonym: None

Site of Infection: Urinary bladder, various tissues

Host:

Notropis atherinoides: Bangham 1955; 1951; 20%; minp; Providence Bay; llnk; South Bay, Ontario; 45°33'0"/-82°1'0"

Pimephales notatus: Bangham 1955; 6%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk

Semotilus atromaculatus: Bangham 1955; 6%; Lake Manitou River; llnk

Catostomus catostomus: Bangham 1955; 5%; minp; South Bay, Ontario

Table 14, continued.

Catostomus commersonii: Bangham 1955; 5%; minp; South Bay, Ontario
Coregonus artedi: Bangham 1955; 1951; 5%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; White Lake on Manitoulin Island; llnk; Manitou River, Ontario; llnk
Micropterus dolomieu: Bangham 1955; <1%; minp; several bays of Lake Huron; llnk; lakes on Manitoulin Island, Ontario; llnk
Sander vitreus: Mavor 1916; 1913; 100%; minp; Go Home Bay; llnk; Georgian Bay; 45°30'0"/-81°0'0"

Microspora (Microsporans)

Glugeidae Thelohan, 1892

Glugea anomala (Moniez, 1887) Gurley, 1893

Synonym: None

Site of Infection: Skin, muscle

Host:

Culaea inconstans: Dechtiar et al. 1988; 1961-1971 4%; L; lns; Ontario; llnk

Pungitius pungitius: Dechtiar et al. 1988; 7%; L; lns; Ontario

Glugea cepedianae (Putz, Hoffman, and Dunbar, 1965) Canning, Lom, and Dykova, 1986

Synonym: *Pleistophora cepedianae* Putz et al. 1965

Site of Infection: Mesentery

Host: *Dorosoma cepedianum*: Dechtiar et al. 1988; 1961-1971; 8%; minp; lns; Ontario; llnk

Pleistophora sp.

Site of Infection: Muscle

Host:

Cottus cognatus: Muzzall and Bowen 2002; June 1995; 4%; minp; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Myoxocephalus thompsonii: Muzzall et al. 1997; 1995; 22%; minp; Harbor Beach, Michigan; 43°50'30"/-82°38'29"

Adult Digenea (Digenetic Trematodes)

Acanthocolpidae Luhe, 1909

Skrjabinopsolus manteri (Cable, 1952) Cable, 1955

Synonym: None

Site of Infection: Intestine

Host: *Acipenser fulvescens*: Dechtiar et al. 1988; 1961-1971; 3%; minp; lns; Ontario; llnk

Table 14, continued.

Allocreadiidae (Looss, 1899) Stossich, 1903

Allocreadium lobatum Wallin, 1909

Synonym: *Allocreadium isoporum* (Looss, 1894) of Canadian authors

Site of Infection: Intestine

Host:

Luxilus cornutus: Bangham 1955; 1951; 25%; minp; Pleasant Creek, Ontario; llnk

Luxilus cornutus: Dechtiar et al. 1988; 1961-1971; 12%; L; lns; Ontario; llnk

Nocomis biguttatus: Bangham 1955; 25%; minp; Manitou River, Ontario; llnk

Notropis hudsonius: Bangham 1955; 9%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Rhinichthys cataractae: Dechtiar et al. 1988; 39%; L; lns; Ontario

Semotilus atromaculatus: Bangham 1955; 38%; minp; Lake Manitou River; llnk; White Lake of Manitoulin Island; llnk; Manitou River, Ontario; llnk

Semotilus atromaculatus: Dechtiar et al. 1988; 44%; L; lns; Ontario

Bunoderina sacculata (Van Cleave and Mueller, 1932) Yamaguti, 1958

Synonym: ?*Bunoderina sacculata*

Site of Infection: Intestine

Host:

Perca flavescens: Bangham 1955; 1951; 22%; minp; South Bay; 45°33'0"/-82°1'0"; Manitoulin Island lakes, Ontario

Perca flavescens: Dechtiar et al. 1988; 1961-1971; 8%; L; lns; Ontario; llnk

Bunoderina eucaliae Miller, 1936

Synonym: *Bunoderina eucaliae* (Miller, 1936)

Site of Infection: Intestine

Host:

Umbra limi: Bangham 1955; 1951; 25%; minp; stream of South Bay, Ontario; 45°33'0"/-82°1'0"

Umbra limi: Dechtiar et al. 1988; 1961-1971; 14%; L; lns; Ontario; llnk

Culaea inconstans: Bangham 1955; 74%; minp; White Lake on Manitoulin Island; llnk; small stream of South Bay, Ontario

Culaea inconstans: Dechtiar et al. 1988; 7%; L; lns; Ontario

Crepidostomum cooperi Hopkins, 1931

Synonym: *Crepidostomum ambloplitis* Hopkins, 1931; *Crepidostomum solidum* Van Cleave and Mueller, 1932; *Crepidostomum fausti* Hunninen and Hunter, 1933; *Crepidostomum laureatum* of Stafford (1904) and Cooper (1915) (partim); *Bunoderina nodulosa* of Stafford (1904) (partim); *Crepidostomum cornutum* of Cooper (1915) (partim)

Site of Infection: Intestine

Table 14, continued.

Host:

Luxilus cornutus: Bangham 1955; 1951; 25%; minp; Pleasant Creek, Ontario; llnk

Notropis hudsonius: Bangham 1955; 4%; minp; Providence Bay; llnk; South Bay, Ontario; 45°33'0"/-82°1'0"

Ambloplites rupestris: Bangham 1955; <1%; minp; lake on Manitoulin Island, Ontario; llnk

Ambloplites rupestris: Dechtiar et al. 1988; 1961-1971; 4%; L; lns; Ontario; llnk

Lepomis gibbosus: Bangham 1955; 2%; minp; lake on Manitoulin Island, Ontario

Lepomis gibbosus: Dechtiar et al. 1988; 15%; L; lns; Ontario

Micropterus dolomieu: Bangham 1955; <1%; minp; lns; llnk

Micropterus dolomieu: Dechtiar et al. 1988; 1%; M; lns; Ontario

Etheostoma nigrum: Bangham 1955; 3%; minp; lake on Manitoulin Island, Ontario

Perca flavescens: Bangham 1955; 42%; minp; South Bay, North Channel; 46°4'59"/-83°0'0"; Manitoulin Island lakes, Ontario; llnk

Perca flavescens: Dechtiar et al. 1988; 22%; L; lns; Ontario

Crepidostomum cornutum (Osborn, 1903) Stafford, 1904

Synonym: None

Site of Infection: Pyloric ceca, intestine

Host:

Amia calva: Dechtiar et al. 1988; 1961-1971; 31%; minp; lns; Ontario; llnk

Ameiurus nebulosus: Bangham 1955; 1951; 31%; minp; Bass Lake on Manitoulin Island, Ontario; llnk

Ambloplites rupestris: Bangham 1955; 59%; minp; South Bay; 45°33'0"/-82°1'0"; lakes on Manitoulin Island, Ontario; llnk

Lepomis gibbosus: Bangham 1955; 15%; minp; Bass Lake; llnk; Lily Lake, Ontario; 45°49'59"/-82°25'0"

Lepomis gibbosus: Dechtiar et al. 1988; 15%; L; lns; Ontario

Micropterus dolomieu: Bangham 1955; 43%; minp; several bays, lakes on Manitoulin Island, Ontario

Micropterus salmoides: Bangham 1955; 60%; minp; South Bay and/or Thomas Bay, Ontario; 45°49'59"/-82°25'0"

Crepidostomum farionis (Muller, 1784) Nicoll, 1909

Synonym: *Crepidostomum laureatum* Cooper, 1915; ?*Stephanophiala farionis* Mueller

Site of Infection: Pyloric ceca, intestine, gall bladder

Host:

Coregonus clupeaformis: Collins and Dechtiar 1974; 1966-1972; p; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Oncorhynchus nerka: Collins and Dechtiar 1974; 3%; minp; Georgian Bay; 45°30'0"/-81°0'0"; North Channel; 46°4'59"/-83°0'0"; South Bay, southern shore of Manitoulin Island, Ontario; llnk

Oncorhynchus nerka: Dechtiar et al. 1988; 1961-1971; 5%; minp; lns; Ontario; llnk

Salvelinus fontinalis: Dechtiar et al. 1988; 14%; M; lns; Ontario

Table 14, continued.

Salvelinus fontinalis x *Salvelinus namaycush*: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 3%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations in Ontario; llnk

Cottus cognatus: Muzzall and Bowen 2002; June 1995; 12%; 2; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Crepidostomum isostomum Hopkins, 1931

Synonym: *Crepidostomum laureatum* of Cooper (1915) (partim); *Crepidostomum canadense* Hopkins, 1931

Site of Infection: Intestine

Host:

Percopsis omiscomaycus: Bangham 1955; 1951; 68%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Percopsis omiscomaycus: Dechtiar et al. 1988; 1961-1971; 16%; M; lns; Ontario; llnk

Etheostoma nigrum: Bangham 1955; 33%; minp; lakes on Manitoulin Island, Ontario; llnk

Etheostoma nigrum: Dechtiar et al. 1988; 10%; L; lns; Ontario

Crepidostomum lintoni (Pratt and Linton, 1901) Hopkins, 1933

Synonym: *Crepidostomum petalosum* Lander

Site of Infection: Intestine

Host:

Acipenser fulvescens: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Acipenser fulvescens: Dechtiar et al. 1988; 1961-1971; 2%; H; lns; Ontario; llnk

Creptotrema funduli Mueller, 1934

Synonym: ?*Allocreadium commune* of Cooper, 1915 (partim)

Site of Infection: [Intestine]

Host:

Umbra limi: Bangham 1955; 1951; 25%; minp; stream of South Bay, Ontario; 45°33'0"/-82°1'0"

Umbra limi: Dechtiar et al. 1988; 1961-1971; 36%; L; lns; Ontario; llnk

Azygiidae Luhe, 1909

Azygia angusticauda (Stafford, 1904) Manter, 1926

Synonym: *Mimodistomum angusticaudum* Stafford, 1904; *Azygia loossi* Marshall and Gilbert, 1905;

Ptychogonimus fontanus Lyster, 1939

Site of Infection: Intestine

Host:

Ameiurus nebulosus: Bangham 1955; 1951; 7%; minp; South Bay; 45°33'0"/-82°1'0"; 6%; minp; Bass Lake on Manitoulin Island, Ontario; llnk

Ictalurus punctatus: Bangham 1955; 33%; minp; South Bay, Ontario

Ambloplites rupestris: Bangham 1955; 4%; minp; lakes on Manitoulin Island, Ontario; llnk

Table 14, continued.

Lepomis gibbosus: Bangham 1955; 2%; minp; lake on Manitoulin Island, Ontario
Micropterus dolomieu: Bangham 1955; 3%; minp; several bays, lakes on Manitoulin Island, Ontario
Micropterus dolomieu: Dechtiar et al. 1988; 1961-1971; 3%; L; Ins; Ontario; llnk
Micropterus salmoides: Bangham 1955; 40%; minp; several bays, lakes on Manitoulin Island, Ontario
Etheostoma exile: Bangham 1955; 40%; minp; Lily Lake on Manitoulin Island; 45°49'59"/-82°25'0"; South Bay, Ontario
Perca flavescens: Bangham 1955; 2%; minp; South Bay, Manitoulin Island lakes, Ontario; llnk
Perca flavescens: Dechtiar et al. 1988; 4%; L; Ins; Ontario

Azygia longa (Leidy, 1851) Manter, 1926

Synonym: *Megadistomum longum* (Leidy, 1851); *Azygia acuminata* Goldberger, 1911; *Azygia lucii* of Cooper, 1915; *Azygia tereticolle* of Stafford, 1904

Site of Infection: [Stomach]

Host:

Esox lucius: Bangham 1955; 1951; 3%; minp; Thomas Bay; 45°49'59"/-82°25'0"; Sheguandah Bay; llnk; Bass Lake; llnk; Long Lake on Manitoulin Island, Ontario; 49°31'59"/-86°49'59"

Esox lucius: Dechtiar et al. 1988; 1961-1971; 5%; L; Ins; Ontario; llnk

Proterometra macrostoma (Faust, 1918) Horsfall, 1933

Synonym: None

Site of Infection: Intestine

Host:

Ambloplites rupestris: Bangham 1955; 1951; <1%; minp; Ins; Ontario; llnk

Lepomis gibbosus: Bangham 1955; 2%; minp; lake on Manitoulin Island, Ontario; llnk

Lepomis gibbosus: Dechtiar et al. 1988; 1961-1971; 12%; L; Ins; Ontario; llnk

Bucephalidae Poche, 1907

Bucephalus elegans Woodhead, 1930

Synonym: None

Site of Infection: [Pyloric ceca]

Host: *Perca flavescens*: Bangham 1955; 1951; 1%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Bucephalus sp.

Site of Infection: [Digestive tract]

Host:

Notropis hudsonius: Bangham 1955; 1951; 1%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Morone chrysops: Bangham 1955; 67%; minp; South Bay, Ontario

Morone chrysops: Dechtiar et al. 1988; 1961-1971; 100%; L; Ins; Ontario; llnk

Table 14, continued.

Prosorhynchoides pusilla (Stafford, 1904) Eckman, 1932

Synonym: *Bucephalopsis pusilla* (Stafford, 1904); *Bucephalus pusillus* (Stafford 1904); *Gasterostomum pusillum* (Stafford 1904)

Site of Infection: Intestine

Host:

Sander vitreus: Bangham 1955; 1951; 10%; minp; South Bay; 45°33'0"/-82°1'0"; Mindemoya Lake; llnk; Windfall Lake on Manitoulin Island, Ontario; llnk

Sander vitreus: Dechtiar et al. 1988; 1961-1971; 19%; L; lns; Ontario; llnk

Sander vitreus: Woodhead 1930; 1926; pnp; minp; Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Rhipidocotyle papillosa (Woodhead, 1929) Eckmann, 1932

Synonym: *Gasterostomum pusillum* of Cooper, 1915; *Bucephalus papillosus* Woodhead, 1929

Site of Infection: [Digestive tract]

Host: *Micropterus dolomieu*: Bangham 1955; 1951; <1%; minp; lns; Ontario; llnk

Unidentified bucephalid

Synonym: None

Site of Infection: Stomach

Host: *Sander vitreus*: Muzzall and Haas 1998; September 1993, September 1996; 2%; 1; Inner Saginaw Bay; 43°45'0"/-83°39'59"; 3%; 1; Outer Saginaw Bay, Michigan; 43°45'0"/-83°39'59"

Cryptogonomidae (Ward, 1917) Ciurea, 1933

Acetodextra amiuri (Stafford, 1900) Pearse, 1924

Synonym: *Monostomum amiuri* (Stafford, 1900) Pearse, 1924

Site of Infection: Swim bladder

Host:

Ameiurus nebulosus: Bangham 1955; 1951; 43%; minp; South Bay; 45°33'0"/-82°1'0"; 100%; minp; Thomas Bay, Ontario; 45°49'59"/-82°25'0"

Ameiurus nebulosus: Dechtiar et al. 1988; 1961-1971; 22%; L; lns; Ontario; llnk

Allacanthochasmus artus Mueller and Van Cleave, 1932

Synonym: None

Site of Infection: [Intestine]

Host:

Morone chrysops: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Morone chrysops: Dechtiar et al. 1988; 1961-1971; 100%; M; lns; Ontario; llnk

Table 14, continued.

Allacanthochasmus varius Van Cleave, 1922

Synonym: None

Site of Infection: [Digestive tract]

Host:

Morone chrysops: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Morone chrysops: Dechtiar et al. 1988; 1961-1971; 100%; L; lns; Ontario; llnk

Caecincola parvulus Marshall and Gilbert, 1905

Synonym: None

Site of Infection: [Intestine]

Host: *Micropterus salmoides*: Bangham 1955; 1951; 100%; minp; South Bay; 45°33'0"/-82°1'0"; Thomas Bay, Ontario; 45°49'59"/-82°25'0"

Centrovarium lobotes (MacCallum, 1895) Stafford, 1904

Synonym: *Distomum lobotes* MacCallum, 1895

Site of Infection: [Digestive tract]

Host:

Perca flavescens: Dechtiar et al. 1988; 1961-1971; 2%; L; lns; Ontario; llnk

Sander canadensis: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Cryptogonimus chili Osborn, 1903

Synonym: None

Site of Infection: Intestine

Host:

Ambloplites rupestris: Bangham 1955; 1951; 64%; minp; South Bay; 45°33'0"/-82°1'0"; lakes on Manitoulin Island, Ontario; llnk

Ambloplites rupestris: Dechtiar et al. 1988; 1961-1971; 43%; M; lns; Ontario; llnk

Micropterus dolomieu: Bangham 1955; 43%; minp; several bays, lakes on Manitoulin Island, Ontario

Micropterus dolomieu: Dechtiar et al. 1988; 18%; M; lns; Ontario

Remarks: Species name, *chili* is sometimes misspelled *chyli*.

Gorgoderidae Looss, 1901

Phyllodistomum brevicecum Steen, 1938

Synonym: None

Site of Infection: Ureters

Host: *Umbra limi*: Dechtiar et al. 1988; 1961-1971; 93%; L; lns; Ontario; llnk

Table 14, continued.

Phyllodistomum coregoni Dechtiar, 1966

Synonym: None

Site of Infection: Ureters

Host: *Coregonus clupeaformis*: Dechtiar et al. 1988; 1961-1971; 39%; minp; lns; Ontario; llnk

Phyllodistomum lachancei Choquette, 1947

Synonym: None

Site of Infection: Ureters

Host:

Oncorhynchus mykiss: Dechtiar et al. 1988; 1961-1971; 32%; minp; lns; Ontario; llnk

Salvelinus fontinalis: Dechtiar et al. 1988; 2%; L; lns; Ontario

Phyllodistomum lohrenzi (Loewen, 1935)

Synonym: None

Site of Infection: Ureters

Host: *Micropterus dolomieu*: Dechtiar et al. 1988; 1961-1971; 4%; L; lns; Ontario; llnk

Phyllodistomum lysteri Miller, 1940

Synonym: None

Site of Infection: Ureters

Host: *Catostomus catostomus*: Dechtiar et al. 1988; 1961-1971; 16%; L; lns; Ontario; llnk

Catostomus commersonii: Dechtiar et al. 1988; 4%; L; lns; Ontario

Moxostoma macrolepidotum: Dechtiar et al. 1988; 33%; L; lns; Ontario

Phyllodistomum staffordi Pearse 1924a

Synonym: *Phyllodistomum folium* (Olfers, 1816) (partim) of Stafford (1902); *Phyllodistomum superbum* Stafford, 1904 (partim); ?*Phyllodistomum carolini* Holl, 1929; *Phyllodistomum lacustri* of Dechtiar (1972a) and Dechtiar and Nepszy (1988); *Phyllodistomum hunteri* Arnold, 1934

Site of Infection: Ureters

Host:

Ameiurus nebulosus: Bangham 1955; 1951; 56%; minp; Bass Lake on Manitoulin Island, Ontario; llnk

Ameiurus nebulosus: Dechtiar et al. 1988, 1961-1971, 19%, L, lns, Ontario, llnk

Phyllodistomum superbum Stafford, 1904

Synonym: *Phyllodistomum fausti* Pearse 1924; *Phyllodistomum pearsei* Holl, 1929; *Phyllodistomum lohrenzi* (Loewen, 1935) Bhalerao, 1937

Site of Infection: Ureters

Host: *Perca flavescens*: Dechtiar et al. 1988; 1961-1971; 2%; L; lns; Ontario; llnk

Table 14, continued.

Phyllodistomum undulans Steen, 1938

Synonym: None

Site of Infection: Ureters

Host: *Cottus bairdii*: Dechtiar et al. 1988; 1961-1971; 4%; L; lns; Ontario; llnk

Phyllodistomum sp.

Site of Infection: Ureters

Host:

Coregonus artedi: Dechtiar et al. 1988; 1961-1971; 49%; minp; lns; Ontario; llnk

Coregonus hoyi: Dechtiar et al. 1988; 45%; minp; lns; Ontario

Prosopium cylindraceum: Dechtiar et al. 1988; 7%; minp; lns; Ontario

Lepocreadiidae (Odhner, 1905) Nicoll, 1935

Megalonia ictaluri Surber, 1928

Synonym: *Crepidostomum ictaluri* Surber, 1928

Site of Infection: Intestine

Host:

Ictalurus punctatus: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Ictalurus punctatus: Dechtiar et al. 1988; 67%; L; lns; Ontario

Ameiurus nebulosus: Bangham 1955; 50%; minp; South Bay, Ontario

Ameiurus nebulosus: Dechtiar et al. 1988; 1961-1971; 44%; L; lns; Ontario; llnk

Lissorchiidae (Poche, 1926) Yamaguti, 1971

Lissorchis attenuatus (Mueller and Van Cleave, 1932) Krygier and Macy, 1969

Synonym: *Triganodistomum attenuatum* Mueller and Van Cleave, 1932

Site of Infection: Intestine

Host:

Catostomus commersonii: Bangham 1955; 1951; 3%; minp; South Bay; 45°33'0"/-82°1'0"; lakes on Manitoulin Island, Ontario; llnk

Catostomus commersonii: Dechtiar et al. 1988; 1961-1971; 3%; M; lns; Ontario; llnk

Lissorchis simeri Mueller and Van Cleave, 1932

Synonym: *Triganodistomum simeri* Mueller and Van Cleave, 1932

Site of Infection: [Intestine]

Host: *Catostomus catostomus*: Bangham 1955; 1951; 15%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Lissorchis sp.

Site of Infection: [Intestine]

Host: *Notropis hudsonius*: Bangham 1955; 1951; 5%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Table 14, continued.

Macroderoidiidae McMullen, 1957

Alloglossidium corti (Lamont, 1921) Van Cleave and Mueller, 1934

Synonym: *Plagiorchis corti* Lamont; *Plagiorchis ameiurensis* McCoy, 1928

Site of Infection: Intestine

Host:

Ictalurus punctatus: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Ictalurus punctatus: Dechtiar et al. 1988; 1961-1971; 67%; M; lns; Ontario; llnk

Glossidium geminum (Mueller, 1930) Yamaguti, 1954

Synonym: *Alloglossidium geminus*, *Plagiorchis geminum* Mueller

Site of Infection: [Intestine]

Host: *Ameiurus nebulosus*: Bangham 1955; 1951; 69%; minp; Bass Lake on Manitoulin Island, Ontario; llnk

Macroderoides typicus (Winfield, 1929) Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Intestine

Host: *Amia calva*: Bangham 1955; 1951; 33%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Microphallidae (Ward, 1901) Travassos, 1920

Microphallus opacus (Ward, 1894) Ward, 1901

Synonym: *Distomum opacum* Ward, 1894; *Microphallus opacus ovatus* Strandine, 1943

Site of Infection: [Intestine]

Host:

Ictalurus punctatus: Bangham 1955; 1951; 33%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Ameiurus nebulosus: Bangham 1955; 7%; minp; South Bay, Ontario

Ameiurus nebulosus: Dechtiar et al. 1988; 1961-1971; 7%; M; lns; Ontario; llnk

Ambloplites rupestris: Bangham 1955; 2%; minp; South Bay; lakes on Manitoulin Island, Ontario; llnk

Micropterus dolomieu: Bangham 1955; 8%; minp; several bays; lakes on Manitoulin Island, Ontario; llnk

Micropterus salmoides: Bangham 1955; 20%; minp; Thomas Bay; 45°49'59"/-82°25'0"; South Bay, Ontario

Opecoelidae Ozaki, 1925

Plagioporus cooperi (Hunter and Bangham, 1932) Price, 1934

Synonym: *Allocreadium commune* of Cooper, 1915 (partim); *Lebouria cooperi* Hunter and Bangham, 1932

Site of Infection: Intestine, gall bladder

Host:

Couesius plumbeus: Dechtiar et al. 1988; 1961-1971; 12%; L; lns; Ontario; llnk

Luxilus cornutus: Dechtiar et al. 1988; 10%; L; lns; Ontario

Notropis atherinoides: Dechtiar et al. 1988; 13%; L; lns; Ontario

Notropis hudsonius: Dechtiar et al. 1988; 8%; L; lns; Ontario

Table 14, continued.

Plagioporus sinitsini Mueller, 1934

Synonym: ?*Allocreadium commune* of Cooper, 1915 (partim)

Site of Infection: [Intestine]

Host:

Nocomis biguttatus: Bangham 1955; 1951; 25%; minp; Manitou River, Ontario; llnk

Catostomus commersonii: Bangham 1955; <1%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Podocotyle lepomis (Dobrovolny, 1939) Yamaguti, 1971

Synonym: *Plagioporus lepomis* Dobrovolny, 1939

Site of Infection: Intestine

Host: *Petromyzon marinus*: Wilson and Ronald 1967; 1961 and 1962; upstream migrant; <1%; minp; stream in the Manitoulin Island, Bruce Peninsula area; Michigan; llnk

Sanguinicolidae Graaff, 1907

Sanguinicola occidentalis Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Blood

Host: *Sander vitreus*: Dechtiar et al. 1988; 1961-1971; 19%; L; lns; Ontario; llnk

Sanguinicola sp.

Site of Infection: Blood

Host:

Catostomus catostomus: Dechtiar et al. 1988; 1961-1971; 5%; M; lns; Ontario; llnk

Catostomus commersonii: Dechtiar et al. 1988; 10%; L; lns; Ontario

Unknown Family

Unidentified digenean

Synonym: None

Site of Infection: Intestine?

Host: *Coregonus hoyi*: Lundahl and Hoerberling 1967; June-July 1965; <1%; 1; Thunder Bay, Michigan; 45°0'0"/-83°23'59"

Larval/Immature Digenea (Digenetic Trematodes)

Bucephalidae Poche, 1907

Bucephalus sp.

Site of Infection: Gills

Host:

Notropis hudsonius: Dechtiar et al. 1988; 1961-1971; 4%; L; lns; Ontario; llnk

Semotilus atromaculatus: Dechtiar et al. 1988; 22%; L; lns; Ontario

Table 14, continued.

Clinostomidae Luhe, 1901

Clinostomum complanatum (Rudolphi, 1814) Braun, 1899

Synonym: *Clinostomum marginatum* (Rudolphi, 1819) Braun, 1899; ?*Clinostomum gracile* of Stafford (1904); ?*Distomum gracile* of Wright (1879)

Site of Infection: Mesentery, muscle

Host:

Notropis heterolepis: Dechtiar et al. 1988; 1961-1971; 40%; L; lns; Ontario; llnk

Phoxinus neogaeus: Dechtiar et al. 1988; 6%; M; lns; Ontario

Rhinichthys obtusus: Dechtiar et al. 1988; 19%; L; lns; Ontario

Ameiurus nebulosus: Bangham 1955; 1951; 31%; minp; Bass Lake on Manitoulin Island, Ontario; llnk

Ameiurus nebulosus: Dechtiar et al. 1988; 7%; M; lns; Ontario

Ambloplites rupestris: Bangham 1955; 9%; minp; South Bay; 45°33'0"/-82°1'0"; lakes on Manitoulin Island, Ontario; llnk

Ambloplites rupestris: Dechtiar et al. 1988; 37%; L-M; lns; Ontario

Lepomis gibbosus: Bangham 1955; 33%; minp; Bass Lake; llnk; Lily Lake on Manitoulin Island, Ontario; 45°49'59"/-82°25'0"

Lepomis gibbosus: Dechtiar et al. 1988; 15%; L; lns; Ontario

Micropterus dolomieu: Bangham 1955; 10%; minp; bays of Manitoulin Island; llnk; lakes on Manitoulin Island, Ontario; llnk

Micropterus dolomieu: Dechtiar et al. 1988; 17%; L-M; lns; Ontario

Perca flavescens: Bangham 1955; 10%; minp; Manitoulin Island lakes, Ontario; llnk

Perca flavescens: Dechtiar et al. 1988; 2%; M; lns; Ontario

Remarks: Dzikowski et al. (2004) reported *Clinostomum complanatum* and *Clinostomum marginatum* were distinct species based on differences in ribosomal DNA.

Cryptogonimidae (Ward, 1917) Ciurea, 1933

Centrovarium lobotes (MacCallum, 1895) Stafford, 1904

Synonym: None

Site of Infection: Muscle

Host:

Notropis hudsonius: Dechtiar et al. 1988; 1961-1971; 21%; L; lns; Ontario; llnk

Notropis volucellus: Bangham 1955; 1951; 9%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk

Pimephales notatus: Bangham 1955; 35%; minp; Mindemoya Lake on Manitoulin Island, Ontario

Pimephales notatus: Dechtiar et al. 1988; 13%; M; lns; Ontario

Ameiurus nebulosus: Bangham 1955; 7%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Percopsis omiscomaycus: Dechtiar et al. 1988; 27%; L-M; lns; Ontario

Table 14, continued.

Diplostomidae Poirier, 1886

Crassiphiala bulboglossa Van Haitsma, 1925

Synonym: *Neascus bulboglossa* (Van Haitsma, 1925)

Site of Infection: Fins, skin

Host:

Luxilus cornutus: Dechtiar et al. 1988; 1961-1971; 8%; M; lns; Ontario; llnk

Notemigonus crysoleucas: Dechtiar et al. 1988; 20%; L; lns; Ontario

Rhinichthys cataractae: Dechtiar et al. 1988; 19%; L; lns; Ontario

Semotilus atromaculatus: Dechtiar et al. 1988; 44%; L; lns; Ontario

Perca flavescens: Dechtiar et al. 1988; 11%; L; lns; Ontario

Sander vitreus: Dechtiar et al. 1988; 19%; L; lns; Ontario

Diplostomum baeri eucaliae Hoffman and Hundley, 1957

Synonym: None

Site of Infection: Brain

Host: *Culaea inconstans*: Dechtiar et al. 1988; 1961-1971; 3%; H; lns; Ontario; llnk

Diplostomum flexicaudum (Cort and Brooks, 1928)

Synonym: Considered a synonym of *Diplostomum spathaceum* by some authors

Site of Infection: [Eye]

Host:

Catostomus catostomus: Bangham 1955; 1951. 90%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus commersonii: Bangham 1955; 82%; minp; South Bay; lakes on Manitoulin Island, Ontario; llnk

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 10%; minp; primarily South Bay 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Diplostomum huronense (La Rue, 1927) Hughes and Hall, 1929

Synonym: Considered a synonym of *Diplostomum spathaceum* by some authors

Site of Infection: Eye

Host: *Petromyzon marinus*: Wilson and Ronald 1967; 1961 and 1962; upstream migrants; 24%; 2; four streams in the Manitoulin Island, Bruce Peninsula area; llnk; lake stages; 2%; 2; five offshore areas of the Manitoulin Island, Bruce Peninsula area, Michigan; llnk

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Synonym: *Diplostomulum spathaceum* (Rudolphi, 1819); *Diplostomum volvens* Nordmann, 1832;

Diplostomum volvens Nordmann, 1833 of Cooper (1915); probably *Diplostomum emarginatae* Olivier, 1942; *Diplostomum flexicaudum* (Cort and Brooks, 1928); *Diplostomum indistinctum*; *Diplostomum gigas*.

Site of Infection: Eye

Table 14, continued.

Host:

Amia calva: Dechtiar et al. 1988; 1961-1971; 31%; minp; lns; Ontario; llnk
Alosa pseudoharengus: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Alosa pseudoharengus: Dechtiar et al. 1988; 65%; minp; lns; Ontario
Dorosoma cepedianum: Dechtiar et al. 1988; 39%; minp; lns; Ontario
Couesius plumbeus: Dechtiar et al. 1988; 7%; L; lns; Ontario
Cyprinus carpio: Dechtiar et al. 1988; 12%; L; lns; Ontario
Notropis atherinoides: Dechtiar et al. 1988; 38%; L; lns; Ontario
Notropis heterolepis: Dechtiar et al. 1988; 40%; L; lns; Ontario
Notropis hudsonius: Dechtiar et al. 1988; 3%; L; lns; Ontario
Notropis rubellus: Dechtiar et al. 1988; 60%; L; lns; Ontario
Phoxinus neogaeus: Dechtiar et al. 1988; 8%; L; lns; Ontario
Pimephales notatus: Dechtiar et al. 1988; 26%; L; lns; Ontario
Rhinichthys cataractae: Dechtiar et al. 1988; 23%; L; lns; Ontario
Semotilus atromaculatus: Dechtiar et al. 1988; 56%; L; lns; Ontario
Carpiodes cyprinus: Dechtiar et al. 1988; 100%; L; lns; Ontario
Catostomus catostomus: Dechtiar et al. 1988; 40%; L-M; lns; Ontario
Catostomus commersonii: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Catostomus commersonii: Dechtiar et al. 1988; 27%; L-M; lns; Ontario
Ameiurus nebulosus: Dechtiar et al. 1988; 37%; L-M; lns; Ontario
Ictalurus punctatus: Dechtiar et al. 1988; 100%; L; lns; Ontario
Esox lucius: Dechtiar et al. 1988; 18%; L; lns; Ontario
Osmerus mordax: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Osmerus mordax: Dechtiar et al. 1988; 15%; L-M; lns; Ontario
Osmerus mordax: Muzzall and Peebles 1988; April 1984, April 1985, April 1986; 88%; 11; Carp River area, Mackinaw County, Michigan; 46°1'29"/-84°41'33"; 93%; 11; De Tour Village, Chippewa County, Michigan; 45°57'46"/-83°54'17"; 98%; 14; Hessel, Mackinaw County, Michigan; 46°0'15"/-84°25'33"; 84%; 7; Point Lookout, northwest Saginaw Bay, Michigan; 44°2'59"/-83°34'46"
Coregonus artedi: Dechtiar et al. 1988; 2%; minp; lns; Ontario
Coregonus clupeaformis: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Coregonus clupeaformis: Dechtiar et al. 1988; 20%; minp; lns; Ontario
Coregonus hoyi: Dechtiar et al. 1988; 4%; minp; lns; Ontario
Oncorhynchus kisutch: Dechtiar et al. 1988; 50%; minp; lns; Ontario
Oncorhynchus nerka: Collins and Dechtiar 1974; 2%; minp; Georgian Bay; 45°30'0"/-81°0'0"; North Channel; 46°4'59"/-83°0'0"; South Bay; southern shore of Manitoulin Island, Ontario; 45°49'59"/-82°25'0"
Oncorhynchus nerka: Dechtiar et al. 1988; 2%; minp; lns; Ontario
Oncorhynchus mykiss: Dechtiar et al. 1988; 18%; minp; lns; Ontario
Prosopium cylindraceum: Dechtiar et al. 1988; 21%; minp; lns; Ontario
Salvelinus fontinalis: Dechtiar et al. 1988; 14%; L; lns; Ontario
Salvelinus fontinalis: Dechtiar et al. 1988; 8%; L; lns; Ontario

Table 14, continued.

Salvelinus namaycush: Dechtiar et al. 1988; 12%; L; lns; Ontario
Salvelinus fontinalis x *Salvelinus namaycush*: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Umbra limi: Dechtiar et al. 1988; 7%; L; lns; Ontario
Percopsis omiscomaycus: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Percopsis omiscomaycus: Dechtiar et al. 1988; 27%; L; lns; Ontario
Lota lota: Dechtiar et al. 1988; 28%; L-M; lns; Ontario
Fundulus diaphanus: Dechtiar et al. 1988; 54%; L; lns; Ontario
Culaea inconstans: Dechtiar et al. 1988; 7%; L; lns; Ontario
Pungitius pungitius: Dechtiar et al. 1988; 19%; L; lns; Ontario
Cottus bairdii: Dechtiar et al. 1988; 9%; L; lns; Ontario
Cottus ricei: Dechtiar et al. 1988; 48%; L; lns; Ontario
Morone chrysops: Dechtiar et al. 1988; 100%; L; lns; Ontario
Ambloplitis rupestris: Dechtiar et al. 1988; 43%; L; lns; Ontario
Lepomis gibbosus: Dechtiar et al. 1988; 29%; L; lns; Ontario
Micropterus dolomieu: Dechtiar et al. 1988; 4%; L; lns; Ontario
Pomoxis nigromaculatus: Dechtiar et al. 1988; 75%; L; lns; Ontario
Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Perca flavescens: Dechtiar et al. 1988; 8%; L; lns; Ontario
Sander vitreus: Dechtiar et al. 1988; 19%; L; lns; Ontario
Apollonia melanostoma: Kvach and Stepien 2008b; October-November 2006; 60%; 8; 5; Saginaw River, Michigan; 43°38'49"/-83°51'1"

Diplostomum sp.

Site of Infection: Lens, brain

Host:

Petromyzon marinus: Bangham 1955; 1951; 8%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Acipenser fulvescens: Bangham 1955; 100%; minp; South Bay, Ontario
Amia calva: Bangham 1955; 100%; minp; South Bay, Ontario
Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; 3%; 1; Saginaw Bay, Michigan; 43°45'0"/-83°33'29"
Couesius plumbeus: Bangham 1955; 50%; minp; lns; Ontario; llnk
Cyprinus carpio: Bangham 1955; 67%; minp; South Bay, Ontario
Nocomis biguttatus: Bangham 1955; 75%; minp; Manitou River, Ontario
Notemigonus crysoleucas: Bangham 1955; 100%; minp; Lily Lake on Manitoulin Island, Ontario; 45°49'59"/-82°25'0"
Notropis heterodon: Bangham 1955; 100%; minp; South Bay, Ontario
Notropis heterolepis: Bangham 1955; 32%; minp; Lily Lake on Manitoulin Island, Ontario
Notropis hudsonius: Bangham 1955; 60%; minp; Providence Bay; llnk; South Bay, Ontario
Notropis volucellus: Bangham 1955; 64%; minp; Mindemoya Lake on Manitoulin Island; llnk; South Bay, Ontario

Table 14, continued.

Phoxinus eos: Bangham 1955; 24%; minp; Rogers Creek; llnk; McKimm Creek; llnk; near South Bay, Ontario; 45°33'0"/-82°1'0"

Pimephales notatus: Bangham 1955; 59%; minp; Mindemoya Lake and Lily Lake on Manitoulin Island, Ontario

Semotilus atromaculatus: Bangham 1955; 68%; minp; Lake Manitou River; llnk; White Lake of Manitoulin Island; llnk; Manitou River, Ontario; llnk

Ameiurus nebulosus: Bangham 1955; 86%; minp; South Bay, Ontario

Ictalurus punctatus: Bangham 1955; 33%; minp; South Bay, Ontario

Esox lucius: Bangham 1955; 39%; minp; South Bay; Thomas Bay; 45°49'59"/-82°25'0"; Sheguandah Bay; llnk; Bass Lake; llnk; Long Lake, Ontario; 49°31'59"/-86°49'59"

Esox masquinongy: Bangham 1955; 100%; minp; Bass Lake on Manitoulin Island

Umbra limi: Bangham 1955; 25%; minp; stream of South Bay, Ontario

Osmerus mordax: Bangham 1955; 94%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario

Coregonus alpenae: Bangham 1955; 100%; minp; North Channel, Ontario

Coregonus artedi: Bangham 1955; 61%; minp; North Channel, South Bay, Ontario

Coregonus clupeaformis: Bangham 1955; 71%; minp; North Channel, South Bay, Ontario

Coregonus hoyi: Bangham 1955; 51%; minp; North Channel; west of South Baymouth, Ontario; 45°33'0"/-82°1'0"

Oncorhynchus mykiss: Bangham 1955; 7%; minp; Manitou River, South Bay, Ontario

Prosopium cylindraceum: Bangham 1955; 95%; minp; North Channel, South Bay, Ontario

Salvelinus fontinalis: Bangham 1955; 15%; minp; Manitou River, Ontario

Salvelinus namaycush: Bangham 1955; 39%; minp; South Bay, South Baymouth, Ontario

Salvelinus namaycush: Muzzall and Bowen 2000; May 1995; 1%; 1; Six Fathom Bank; 44°48'50"/-82°27'58"; Adams Point, Michigan; 45°24'52"/-83°42'59"

Percopsis omiscomaycus: Bangham 1955; 79%; minp; South Bay, Ontario

Lota lota: Bangham 1955; 81%; minp; North Channel, South Bay, Ontario

Lota lota: Muzzall et al. 2003; July 1998; 60%; 59; Six Fathom Bank; 100%; 93; Yankee Reef, Michigan; 44°28'59"/-83°33'29"

Culaea inconstans: Bangham 1955; 30%; minp; South Bay, White Lake on Manitoulin Island, Ontario

Cottus bairdii: Bangham 1955; 38%; minp; lns; Ontario

Cottus cognatus: Muzzall and Bowen 2002; June 1995; 89%; 96; Six Fathom Bank, Michigan

Cottus ricei: Dechtiar et al. 1988; 1961-1971; 10%; M; lns; Ontario; llnk

Morone chrysops: Bangham 1955; 100%; minp; South Bay, Ontario

Ambloplites rupestris: Bangham 1955; 86%; minp; South Bay, lakes of Manitoulin Island, Ontario

Lepomis gibbosus: Bangham 1955; 25%; minp; Lily Lake and Bass Lake on Manitoulin Island, Ontario

Micropterus dolomieu: Bangham 1955; 27%; minp; several bays of Manitoulin Island; llnk; lakes on Manitoulin Island, Sandfield Hatchery, Ontario; llnk

Micropterus salmoides: Bangham 1955; 40%; minp; South Bay and Thomas Bay, Ontario

Pomoxis nigromaculatus: Bangham 1955; 50%; minp; South Bay, Ontario

Etheostoma nigrum: Bangham 1955; 5%; minp; lakes on Manitoulin Island, Ontario

Perca flavescens: Bangham 1955; 68%; South Bay, North Channel, Manitoulin Island lakes, Ontario

Table 14, continued.

Sander canadensis: Bangham 1955; 100%; minp; South Bay, Ontario
Sander vitreus: Bangham 1955; 68%; minp; Mindemoya Lake; Whitefish Lake; 46°19'59"/-81°13'0"; Windfall Lake on Manitoulin Island; llnk; Sandfield Hatchery, Ontario
Sander vitreus: Muzzall and Haas 1998; September 1993; September 1994; 2%; 4; Inner Saginaw Bay; 43°45'0"/-83°33'29"

Diplostomum sp. or *Tylodelphys* sp.
Site of Infection: Eye
Host: *Coregonus clupeaformis*: La Rue et al. 1926; ?cdnp; 100%; minp; Cheboygan, Michigan; 45°39'52"/-84°26'8"
Remarks: Genus of trematode not specified.

Neascus sp.
Site of Infection: Body surface
Host:
Luxilus cornutus: Bangham 1955; 1951; 25%; minp; Pleasant Creek, Ontario; llnk
Notropis heterolepis: Bangham 1955; 4%; minp; Lily Lake on Manitoulin Island, Ontario; 45°49'59"/-82°25'0"
Notropis hudsonius: Bangham 1955; 15%; minp; Manitou River; llnk; South Bay, Ontario; 45°33'0"/-82°1'0"
Pimephales notatus: Bangham 1955; 12%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk
Pimephales promelas: Bangham 1955; 100%; minp; South Bay, Ontario
Pimephales promelas: Dechtiar et al. 1988; 1961-1971; 20%; L; lns; Ontario; llnk
Semotilus atromaculatus: Bangham 1955; 15%; minp; Lake Manitou River; llnk; White Lake on Manitoulin Island, llnk; Manitou River, Ontario; llnk
Catostomus commersonii: Bangham 1955; 14%; minp; South Bay; lakes on Manitoulin Island, Ontario; llnk
Catostomus commersonii: Dechtiar et al. 1988; 8%; M; lns; Ontario
Umbra limi: Bangham 1955; 25%; minp; stream of South Bay, Ontario
Percopsis omiscomaycus: Bangham 1955; 11%; minp; South Bay, Ontario
Culaea inconstans: Bangham 1955; 15%; minp; White Lake on Manitoulin Island, Ontario
Ambloplites rupestris: Bangham 1955; 10%; minp; lns; Ontario
Lepomis gibbosus: Bangham 1955; 89%; minp; Bass Lake; llnk; Lily Lake, Ontario
Micropterus dolomieu: Bangham 1955; <1%; minp; lns; Ontario; llnk
Etheostoma nigrum: Bangham 1955; 18%; minp; lakes on Manitoulin Island, Ontario
Perca flavescens: Bangham 1955; 21%; minp, South Bay; North Channel; 46°4'59"/-83°0'0"; Manitoulin Island lakes, Ontario; llnk
Sander canadensis: Bangham 1955; 15%; minp; Mindemoya Lake on Manitoulin Island, Ontario

Table 14, continued.

Posthodiplostomum minimum (MacCallum, 1921) Dubois, 1936
Synonym: *Neascus vanacleavi* (Agersborg, 1926); *Diplostomum cuticola* (Nordmann, 1832) Diesing, 1850 of Stafford (1904) and Cooper (1915); *Posthodiplostomum cuticola* (Nordmann, 1832) Dubois, 1936 of Margolis and Arthur (1979)
Site of Infection: Liver, mesentery
Host:
Couesius plumbeus: Bangham 1955; 1951; 50%; minp; lns; llnk
Couesius plumbeus: Dechtiar et al. 1988; 1961-1971; 6%; M; lns; Ontario; llnk
Luxilus cornutus: Bangham 1955; 100%; minp; Pleasant Creek, Ontario; llnk
Luxilus cornutus: Dechtiar et al. 1988; 8%; M; lns; Ontario
Nocomis biguttatus: Bangham 1955; 75%; minp; Manitou River, Ontario; llnk
Notropis atherinoides: Bangham 1955; 100%; minp; Providence Bay; llnk; South Bay, Ontario; 45°33'0"/-82°1'0"
Notropis atherinoides: Dechtiar et al. 1988; 81%; M; lns; Ontario
Notropis heterodon: Bangham 1955; 100%; minp; South Bay, Ontario
Notropis heterolepis: Bangham 1955; 52%; Lily Lake on Manitoulin Island; 45°49'59"/-82°25'0"; South Bay, Ontario
Notropis heterolepis: Dechtiar et al. 1988; 100%; M; lns; Ontario
Notropis hudsonius: Bangham 1955; 80%; minp; Manitou River, Providence Bay; South Bay, Ontario
Notropis hudsonius: Dechtiar et al. 1988; 4%; L; lns; Ontario
Notropis rubellus: Dechtiar et al. 1988; 50%; L; lns; Ontario
Notropis volucellus: Bangham 1955; 91%; minp; Mindemoya Lake on Manitoulin Island; llnk; South Bay, Ontario
Phoxinus eos: Bangham 1955; 18%; minp; Rogers Creek; llnk; McKimm Creek; llnk; near South Bay, Rogers Creek, Ontario; llnk
Phoxinus neogaeus: Dechtiar et al. 1988; 31%; M; lns; Ontario
Pimephales notatus: Bangham 1955; 82%; minp; Mindemoya Lake and Lily Lake on Manitoulin Island, South Bay, Ontario
Pimephales notatus: Dechtiar et al. 1988; 32%; M; lns; Ontario
Rhinichthys cataractae: Bangham 1955; 100%; minp; Pleasant Creek; llnk; near South Bay, Ontario
Rhinichthys cataractae: Dechtiar et al. 1988; 15%; M; lns; Ontario
Semotilus atromaculatus: Bangham 1955; 76%; minp; Lake Manitou River; llnk; White Lake on Manitoulin Island; llnk; Manitou River, Ontario; llnk
Semotilus atromaculatus: Dechtiar et al. 1988; 50%; M; lns; Ontario
Catostomus catostomus: Bangham 1955; 3%; minp; South Bay, Ontario
Salvelinus fontinalis: Bangham 1955; 1951; 8%; minp; Manitou River, Ontario; llnk
Percopsis omiscomaycus: Bangham 1955; 11%; minp; South Bay, Ontario
Percopsis omiscomaycus: Dechtiar et al. 1988; 4%; M; lns; Ontario
Fundulus diaphanus: Dechtiar et al. 1988; 54%; M; lns; Ontario
Culaea inconstans: Bangham 1955; 3%; minp; White Lake; llnk; South Bay, Ontario
Culaea inconstans: Dechtiar et al. 1988; 4%; M; lns; Ontario

Table 14, continued.

Ambloplites rupestris: Bangham 1955; 86%; minp; South Bay; lakes on Manitoulin Island, Ontario
Ambloplites rupestris: Dechtiar et al. 1988; 22%; M; Ins; Ontario
Lepomis gibbosus: Bangham 1955; 95%; minp; Bass Lake; lnk; Lily Lake on Manitoulin Island; Rogers Creek of South Bay, Ontario
Lepomis gibbosus: Dechtiar et al. 1988; 32%; M-H; Ins; Ontario
Micropterus dolomieu: Bangham 1955; 34%; minp; several bays; lnk; lakes on Manitoulin Island, Ontario
Micropterus dolomieu: Dechtiar et al. 1988; 4%; M; Ins; Ontario
Pomoxis nigromaculatus: Dechtiar et al. 1988; 75%; M; Ins; Ontario
Etheostoma exile: Bangham 1955; 40%; minp; Lily Lake on Manitoulin Island or South Bay, Ontario
Etheostoma nigrum: Bangham 1955; 10%; minp; lakes on Manitoulin Island, Ontario; lnk
Etheostoma nigrum: Dechtiar et al. 1988; 12%; M; Ins; Ontario
Perca flavescens: Bangham 1955; 3%; minp; Manitoulin Island lakes, Ontario; lnk

Uvulifer ambloplitis (Hughes, 1927) Dubois, 1938

Synonym: *Neascus ambloplitis* Hughes, 1927; *Crassiphiala ambloplitis* (Hughes, 1927) Hunter and Hunter, 1931; *Neascus wardi* Hunter, 1928

Site of Infection: Fins, skin

Host:

Notropis heterolepis: Dechtiar et al. 1988; 1961-1971; 40%; M; Ins; Ontario; lnk

Esox lucius: Dechtiar et al. 1988; 5%; M; Ins; Ontario

Ambloplites rupestris: Dechtiar et al. 1988; 9%; L; Ins; Ontario

Lepomis gibbosus: Dechtiar et al. 1988; 15%; L; Ins; Ontario

Micropterus dolomieu: Dechtiar et al. 1988; 3%; M; Ins; Ontario

Heterophyidae Odhner, 1914

Apophallus brevis Ransom, 1920

Synonym: *Apophallus americanus* Van Cleave and Mueller, 1932; *Apophallus itascaensis* Warren, 1953; *Distomum* sp. larva of Cooper (1915)

Site of Infection: Muscle

Host: *Perca flavescens*: Dechtiar et al. 1988; 1961-1971; 49%; L; Ins; Ontario; lnk

Strigeidae Railliet, 1919

Ichthyocotylurus intermedia (Hughes, 1928)

Synonym: *Tetracotyle intermedia* Hughes, 1928

Site of Infection: Heart, mesentery

Table 14, continued.

Host:

Alosa pseudoharengus: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus commersonii: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Osmerus mordax: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Coregonus artedi: Dechtiar et al. 1988; 1961-1971; 10%; minp; lns; Ontario; llnk

Coregonus artedi: Hughes 1928; March 1927 and April 1927; pnp; minp; Saint Ignace, Michigan; 45°52'7"/-84°43'40"

Coregonus clupeaformis: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Coregonus clupeaformis: Dechtiar et al. 1988; 19%; minp; lns; Ontario

Coregonus hoyi: Dechtiar et al. 1988; 27%; minp; lns; Ontario

Oncorhynchus nerka: Collins and Dechtiar 1974; 4%; minp; Georgian Bay; 45°30'0"/-81°0'0"; North Channel; 46°4'59"/-83°0'0"; South Bay; southern shore of Manitoulin Island, Ontario; llnk

Oncorhynchus nerka: Dechtiar et al. 1988; 11%; minp; lns; Ontario

Prosopium cylindraceum: Hughes 1928; pnp; minp; Saint Ignace, Michigan

Salvelinus namaycush: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Salvelinus fontinalis x *Salvelinus namaycush*: Collins and Dechtiar 1974; pnp; minp; lns; South Bay, Ontario

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 6%; L-M; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 16%; L; lns; Ontario

Percopsis omiscomaycus: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Percopsis omiscomaycus: Dechtiar et al. 1988; 20%; L; lns; Ontario

Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Ichthyocotylurus sp.

Site of Infection: Brain, connective tissue, eye, heart, kidney, liver, mesentery, muscle, spleen, vertebral column

Host:

Alosa pseudoharengus: Dechtiar et al. 1988; 1961-1971; 5%; minp; lns; Ontario; llnk

Notropis hudsonius: Bangham 1955; 1951; 1%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Notropis hudsonius: Dechtiar et al. 1988; 13%; M; lns; Ontario

Phoxinus eos: Bangham 1955; 1951; 6%; minp; Rogers Creek; llnk; McKimm Creek; llnk; near South Bay, Ontario; 45°33'0"/-82°1'0"

Rhinichthys obtusus: Dechtiar et al. 1988; 12%; L; lns; Ontario

Umbra limi: Bangham 1955; 25%; minp; stream of South Bay, Ontario

Umbra limi: Dechtiar et al. 1988; 14%; L; lns; Ontario

Esox lucius: Dechtiar et al. 1988; 32%; L; lns; Ontario

Oncorhynchus mykiss: Dechtiar et al. 1988; 18%; L; Ontario

Prosopium cylindraceum: Dechtiar et al. 1988; 14%; minp; lns; Ontario

Percopsis omiscomaycus: Bangham 1955; 37%; minp; South Bay, Ontario

Table 14, continued.

Culaea inconstans: Dechtiar et al. 1988; 42%; L; Ins; Ontario
Cottus bairdii: Bangham 1955; 75%; minp; Ins; Ontario
Cottus bairdii: Dechtiar et al. 1988; 13%; L; Ins; Ontario
Cottus cognatus: Muzzall and Bowen 2002; June 1995; 100%; 156; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"
Cottus ricei: Dechtiar et al. 1988; 38%; L; Ins; Ontario
Lepomis gibbosus: Dechtiar et al. 1988; 44%; M; Ins; Ontario
Etheostoma exile: Bangham 1955; 20%; minp; Lily Lake; 45°49'59"/-82°25'0"; South Bay, Ontario
Etheostoma nigrum: Bangham 1955; 54%; minp; lakes on Manitoulin Island, Ontario; llnk
Etheostoma nigrum: Dechtiar et al. 1988; 24%; L; Ins; Ontario
Perca flavescens: Bangham 1955; <1%; minp; Ins; Ontario; llnk
Lota lota: Dechtiar et al. 1988; 28%; L; Ins; Ontario

Proalaria huronensis La Rue, 1927

Synonym: ?

Site of Infection: [Eye]

Host: La Rue (1927); cdnp; lists *Luxilus cornutus*, *Notropis hudsonius*, *Pimephales notatus*, *Catostomus commersonii*, *Ameiurus nebulosus*, *Percopsis omiscomaycus*, *Ambloplites rupestris*, *Lepomis gibbosus*, *Micropterus salmoides*, and *Percina caprodes* as possible fish hosts; Thunder Bay, Michigan; 45°0'0"/-83°23'59"

Remarks: Involved feeding infected fish to herring gulls, *Larus argentatus*.

Tylodelphys scheuringi (Hughes, 1929) Dubois, 1938

Synonym: *Diplostomum scheuringi* Hughes, 1929

Site of Infection: Eye

Host: *Fundulus diaphanus*: Dechtiar et al. 1988; 1961-1971; 15%; L; Ins; Ontario; llnk

Unknown Family

Digenea gen. sp.

Synonym: ?

Site of Infection: Mesentery

Host: *Apollonia melanostoma*: Kvach and Stepien 2008b; October-November 2006; 7%; 2; 0.1; Saginaw River, Michigan; 43°38'49"/-83°51'1"

Monogenea (Monogeneans)

Ancyrocephalidae Bykhovski and Nagibina, 1978

Actinocleidus recurvatus Mizelle and Donahue, 1944

Synonym: None

Site of Infection: Skin, gills

Host: *Lepomis gibbosus*: Dechtiar et al. 1988; 1961-1971; 29%; L; Ins; Ontario; llnk

Table 14, continued.

Aethycteron malleus (Mueller, 1938) Suriano and Beverley-Burton, 1982

Synonym: *Cleidodiscus malleus* Mueller, 1938

Site of Infection: Gills

Host: *Percina caprodes*: Dechtiar et al. 1988; 1961-1971; 83%; L; lns; Ontario; llnk

Clavunculus bursatus (Mueller, 1936) Mizelle, Stokely, Jakoski, Seamster, and Monaco, 1956

Synonym: *Actinocleidus bursatus*, *Ancyrocephalus bursatus*

Site of Infection: Gills

Host: *Micropterus dolomieu*: Dechtiar et al. 1988; 1961-1971; 3%; L; lns; Ontario; llnk

Cleidodiscus brachus Mueller, 1938

Synonym: *Urocleidus brachus* (Mueller, 1938) Price, 1967

Site of Infection: Gills

Host: *Semotilus atromaculatus*: Dechtiar et al. 1988; 1961-1971; 61%; L; lns; Ontario; llnk

Cleidodiscus robustus Mueller, 1934

Synonym: *Cleidodiscus incisor*, *Actinocleidus incisor*

Site of Infection: Gills

Host: *Lepomis gibbosus*: Dechtiar et al. 1988; 1961-1971; 15%; L; lns; Ontario; llnk

Haplocleidus dispar (Mueller, 1936) Mueller, 1937

Synonym: Considered *Onchocleidus dispar* by Wheeler and Beverley-Burton (1989)

Site of Infection: Gills

Host:

Lepomis gibbosus: Dechtiar et al. 1988; 1961-1971; 41%; L; lns; Ontario; llnk

Micropterus dolomieu: Dechtiar et al. 1988; 21%; L; lns; Ontario

Leptocleidus megalonchus Mueller, 1936

Synonym: *Ancyrocephalus paradoxus*, *Cleidodiscus megalonchus* (Mueller, 1936) Mizelle and Hugher, 1938; *Tetraonchus unguiculatus*, *Urocleidus megalonchus* (Mueller, 1936) Price, 1968

Site of Infection: Gills

Host: *Micropterus dolomieu*: Dechtiar et al. 1988; 1961-1971; 18%; L; lns; Ontario; llnk

Ligictaluridus floridanus (Mueller, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus floridanus* Mueller, 1936; *Cleidodiscus mirabilis* Mueller, 1937 (partim)

Site of Infection: Gills

Host: *Ictalurus punctatus*: Dechtiar et al. 1988; 1961-1971; 100%; M; lns; Ontario; llnk

Table 14, continued.

Ligictaluridus monticellii (Cognetti de Martiis, 1924) Klassen and Beverley-Burton, 1985

Synonym: None

Site of Infection: Nasal cavity

Host: *Ameiurus nebulosus*: Dechtiar et al. 1988; 1961-1971; 7%; L; lns; Ontario; llnk

Ligictaluridus pricei (Mueller, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus pricei* Mueller, 1936; *Cleidodiscus mirabilis* Mueller, 1937

Site of Infection: Gills

Host:

Ameiurus nebulosus: Dechtiar et al. 1988; 1961-1971; 74%; M; lns; Ontario; llnk

Noturus flavus: Dechtiar et al. 1988; 100%; M; lns; Ontario

Lyrodiscus minimus Kritsky and Hathaway, 1969

Synonym: None

Site of Infection: Fins

Host: *Ambloplites rupestris*: Dechtiar et al. 1988; 1961-1971; 7%; L; lns; Ontario; llnk

Lyrodiscus rupestris Dechtiar, 1973

Synonym: None

Site of Infection: Nasal cavity, fins, skin

Host:

Ambloplites rupestris: Dechtiar 1973; cdnp; pnp; minp; lns; llnk

Ambloplites rupestris: Dechtiar et al. 1988; 1961-1971; 33%; L; lns; Ontario; llnk

Onchocleidus chautauquaensis (Mueller, 1938) Murith and Beverley-Burton, 1984

Synonym: *Tetracleidus chautauquaensis* (Mueller, 1938); *Urocleidus chautauquaensis* (Mueller, 1938)

Mizelle and Hughes, 1938; *Cleidodiscus chautauquaensis* (Mueller, 1938) Yamaguti, 1963

Site of Infection: Gills

Host: *Ambloplites rupestris*: Dechtiar et al. 1988; 1961-1971; 43%; L; lns; Ontario; llnk

Onchocleidus chrysops (Mizelle and Klucka, 1953) Beverley-Burton, 1984

Synonym: *Cleidodiscus chrysops* (Mizelle and Klucka, 1953) Price and Mura, 1969; *Urocleidus chrysops*

Mizelle and Klucka, 1953

Site of Infection: Gills

Host: *Morone chrysops*: Dechtiar et al. 1988; 1961-1971; 100%; M; lns; Ontario; llnk

Onchocleidus ferox (Mueller, 1934) Mueller, 1936

Synonym: *Urocleidus ferox* (Mueller, 1934; *Onchocleidus nucronatus* Mizelle, 1936; *Cleidodiscus ferox*

(Mueller, 1934) Price and Mura, 1969

Site of Infection: Gills

Host: *Lepomis gibbosus*: Dechtiar et al. 1988; 1961-1971; 44%; L; lns; Ontario; llnk

Table 14, continued.

Salsuginus fundulus (Mizelle, 1940) Murith and Beverley-Burton, 1985

Synonym: *Urocleidus fundulus* Mizelle, 1940

Site of Infection: Gills

Host: *Fundulus diaphanus*: Dechtiar et al. 1988; 1961-1971; 31%; L; lns; Ontario; llnk

Synclathrium fusiformis (Mueller, 1934) Price, 1967

Synonym: *Actinocleidus fusiformis* (Mueller, 1934) Mueller, 1937; *Ancyrocephalus cruciatus* (Cooper, 1915) Mueller, 1936; *Cleidodiscus fusiformis* Mueller, 1934

Site of Infection: Gills

Host: *Micropterus dolomieu*: Dechtiar et al. 1988; 1961-1971; 38%; L; lns; Ontario; llnk

Tetracleidus banghami Mueller, 1936

Synonym: *Cleidodiscus banghami* (Mueller, 1936) Mizelle, 1940

Site of Infection: Gills

Host: *Micropterus dolomieu*: Dechtiar et al. 1988; 1961-1971; 35%; L; lns; Ontario; llnk

Tetracleidus capax (Mizelle, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus capax* Mizelle, 1936

Site of Infection: Gills

Host: *Pomoxis nigromaculatus*: Dechtiar et al. 1988; 1961-1971; 100%; L; lns; Ontario; llnk

Tetracleidus longus (Mizelle, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus longus* Mizelle, 1936

Site of Infection: Gills

Host: *Pomoxis nigromaculatus*: Dechtiar et al. 1988; 1961-1971; 75%; L; lns; Ontario; llnk

Urocleidus aculeatus (Van Cleave and Mueller, 1932) Mueller, 1934

Synonym: *Ancyrocephalus aculeatus* Van Cleave and Mueller, 1932; *Cleidodiscus aculeatus* (Van Cleave and Mueller, 1932) Mizelle and Regensberger, 1945

Site of Infection: Gills

Host:

Sander vitreus: Dechtiar et al. 1988; 1961-1971; 88%; L; lns; Ontario; llnk

Sander vitreus: Muzzall and Haas 1998; September 1993, September 1994; 62%; minp; Inner Saginaw Bay; 43°45'0"/-83°33'29"; 34%; minp; Outer Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Urocleidus adspectus (Mueller, 1936) Beverley-Burton, 1984

Synonym: None

Site of Infection: Gills

Host: *Perca flavescens*: Dechtiar et al. 1988; 1961-1971; 56%; L; lns; Ontario; llnk

Table 14, continued.

Urocleidus alatus (Mueller, 1938) Price, 1968

Synonym: *Cleidodiscus alatus* (Mueller, 1938)

Site of Infection: Gills

Host: *Ambloplitis rupestris*: Dechtiar et al. 1988; 1961-1971; 46%; L; lns; Ontario; llnk

Urocleidus baldwini (Dechtiar, 1974) Beverley-Burton, 1984

Synonym: *Cleidodiscus baldwini* Dechtiar, 1974

Site of Infection: Gills

Host:

Percopsis omiscomaycus: Dechtiar 1974a; 1969; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Percopsis omiscomaycus: Dechtiar et al. 1988; 1961-1971; 43%; L; lns; Ontario; llnk

Dactylogyridae Bykhovski, 1933

Acolpenteron catostomi Fischthal and Allison, 1942

Synonym: None

Site of Infection: Ureters

Host:

Catostomus catostomus: Dechtiar et al. 1988; 1961-1971; 24%; M; lns; Ontario; llnk

Catostomus commersonii: Dechtiar et al. 1988; 3%; M; lns; Ontario

Acolpenteron ureteroecetes Fischthal and Allison, 1940

Synonym: None

Site of Infection: Ureters

Host: *Micropterus dolomieu*: Dechtiar et al. 1988; 1961-1971; 3%; L; lns; Ontario; llnk

Dactylogyrus anchoratus (Dujardin, 1845) Wagener, 1857

Synonym: None

Site of Infection: Gills

Host: *Cyprinus carpio*: Dechtiar et al. 1988; 1961-1971; 29%; L; lns; Ontario; llnk

Dactylogyrus attenuatus Mizelle and Klucka, 1953

Synonym: *Neodactylogyrus attenuatus* Yamaguti, 1963

Site of Infection: Gills

Host: *Semotilus atromaculatus*: Dechtiar et al. 1988; 1961-1971; 44%; L; lns; Ontario; llnk

Dactylogyrus aureus Seamster, 1948

Synonym: None

Site of Infection: Gills

Host: *Notemigonus crysoleucas*: Dechtiar et al. 1988; 1961-1971; 60%; M; lns; Ontario; llnk

Table 14, continued.

Dactylogyrus banghami Mizelle and Donahue, 1944

Synonym: None

Site of Infection: Gills

Host:

Couesius plumbeus: Dechtiar et al. 1988; 1961-1971 39%; L; Ins; Ontario; llnk

Rhinichthys cataractae: Dechtiar et al. 1988; 62%; L; Ins; Ontario

Rhinichthys obtusus: Dechtiar et al. 1988; 46%; L; Ins; Ontario

Margariscus nachtriebi: Dechtiar et al. 1988; 60%; L; Ins; Ontario

Dactylogyrus bifurcatus Mizelle, 1937

Synonym: *Neodactylogyrus bifurcatus* Price, 1938

Site of Infection: Gills

Host:

Pimephales notatus: Dechtiar et al. 1988; 1961-1971; 39%; L; Ins; Ontario; llnk

Pimephales promelas: Dechtiar et al. 1988; 70%; L; Ins; Ontario

Dactylogyrus buddi Dechtiar, 1974

Synonym: None

Site of Infection: Gills

Host:

Cottus bairdii: Dechtiar 1974b; 1969; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Cottus bairdii: Dechtiar et al. 1988; 40%; L; Ins; Ontario

Cottus cognatus: Dechtiar 1974b; pnp; minp; South Bay, Ontario

Cottus cognatus: Muzzall and Bowen 2002; June 1995; 52%; minp; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Cottus ricei: Dechtiar et al. 1988; 1961-1971; 71%; L; Ins; Ontario; llnk

Dactylogyrus chrosomi Hanek, Molnar and Fernando, 1975

Synonym: None

Site of Infection: Gills

Host: *Phoxinus neogaeus*: Dechtiar et al. 1988; 1961-1971; 51%; L; Ins; Ontario; llnk

Dactylogyrus cornutus Mueller, 1938

Synonym: *Neodactylogyrus cornutus* Price, 1938

Site of Infection: Gills

Host: *Luxilus cornutus*: Dechtiar et al. 1988; 1961-1971; 45%; L; Ins; Ontario; llnk

Table 14, continued.

Dactylogyrus duquesni (Mueller, 1938) Price, 1938

Synonym: *Neodactylogyrus duquesni* Price, 1938

Site of Infection: Gills

Host: *Moxostoma macrolepidotum*: Dechtiar et al. 1988; 1961-1971; 50%; L; lns; Ontario; llnk

Dactylogyrus eucalius Mizelle and Regensberger, 1945

Synonym: None

Site of Infection: Gills

Host: *Culaea inconstans*: Dechtiar et al. 1988; 1961-1971; 62%; L; lns; Ontario; llnk

Dactylogyrus extensus Mueller and Van Cleave, 1932

Synonym: *Dactylogyrus solidus* Akhmerov, 1948; *Dactylogyrus hovorkai* Kastak, 1957

Site of Infection: [Gills]

Host:

Cyprinus carpio: Bangham 1955; 1951; 33%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Cyprinus carpio: Dechtiar et al. 1988; 1961-1971; 29%; M; lns; Ontario; llnk

Dactylogyrus heterolepis Hanek, Molnar and Fernando, 1975

Synonym: None

Site of Infection: Gills

Host: *Notropis heterolepis*: Dechtiar et al. 1988; 1961-1971; 60%; L; lns; Ontario; llnk

Dactylogyrus lineatus Mizelle and Klucka, 1953

Synonym: None

Site of Infection: Gills

Host: *Semotilus atromaculatus*: Dechtiar et al. 1988; 1961-1971; 56%; L; lns; Ontario; llnk

Dactylogyrus pollex Mizelle and Donahue, 1944

Synonym: None

Site of Infection: Gills

Host: *Luxilus cornutus*: Dechtiar et al. 1988; 1961-1971; 3%; L; lns; Ontario; llnk

Dactylogyrus sp.

Site of Infection: Gills

Host:

Notropis atherinoides: Dechtiar et al. 1988; 1961-1971; 81%; L; lns; Ontario; llnk

Notropis hudsonius: Dechtiar et al. 1988; 67%; L; lns; Ontario

Etheostoma exile: Dechtiar et al. 1988; 60%; L; lns; Ontario

Table 14, continued.

Pellucidhaptor catostomi Dechtiar, 1969

Synonym: None

Site of Infection: Gills, nasal cavity

Host: *Catostomus catostomus*: Dechtiar et al. 1988; 1961-1971; 24%; L; lns; Ontario; llnk

Pellucidhaptor nasalis Dechtiar, 1969

Synonym: None

Site of Infection: Nasal cavity

Host: *Catostomus commersonii*: Dechtiar et al. 1988; 1961-1971; 14%; L; lns; Ontario; llnk

Pellucidhaptor sp.

Site of Infection: Fins, skin

Host: *Moxostoma macrolepidotum*: Dechtiar et al. 1988; 1961-1971; 33%; L; lns; Ontario; llnk

Pseudocolpenteron pavlovskii Bykhovskii and Gusev, 1955

Synonym: None

Site of Infection: Fins

Host:

Cyprinus carpio: Dechtiar 1971b; August-November 1969; pnp; minp; lns; llnk

Cyprinus carpio: Dechtiar et al. 1988; 1961-1971; 29%; L; lns; Ontario; llnk

Diclybothriidae Bykhovskii and Gusev, 1950

Diclybothrium armatum Leuckart, 1835

Synonym: *Diplobothrium armatum* (Leuckart, 1835)

Site of Infection: Gills

Host: *Acipenser fulvescens*: Dechtiar et al. 1988; 1961-1971; 5%; minp; lns; Ontario; llnk

Diclybothrium hamulatum (Simer, 1929) Price, 1942

Synonym: None

Site of Infection: Gills

Host: *Acipenser fulvescens*: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Remarks: Bangham (1955) misspelled this as *Diplobothrium hammulatum*.

Discocotylidae Price, 1936

Discocotyle sagittata (Leuckart, 1842) Diesing, 1850

Synonym: *Discocotyle salmonis* Schaffer, 1916

Site of Infection: Gills

Table 14, continued.

Host:

Coregonus artedi: Bangham 1955; 1951; 11%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus clupeaformis: Dechtiar et al. 1988; 1961-1971; 17%; minp; lns; Ontario; llnk

Coregonus hoyi: Bangham 1955; 11%; minp; North Channel, Ontario

Coregonus hoyi: Dechtiar et al. 1988; 18%; minp; lns; Ontario

Prosopium cylindraceum: Bangham 1955; 5%; minp; South Bay, Ontario

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 1%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 2%; L; lns; Ontario

Octomacrum lanceatum Mueller, 1934

Synonym: *Octobothrium sagittatum* Wright, 1879

Site of Infection: Gills

Host:

Catostomus catostomus: Dechtiar et al. 1988; 1961-1971; 25%; L; lns; Ontario; llnk

Catostomus commersonii: Bangham 1955; 1951; 3%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus commersonii: Dechtiar et al. 1988; 12%; L; lns; Ontario

Octomacrum microconfibula Hargis, 1952

Synonym: None

Site of Infection: Gills

Host: *Luxilus cornutus*: Dechtiar et al. 1988; 1961-1971; 8%; L; lns; Ontario; llnk

Octomacrum semotili Dechtiar, 1966

Synonym: None

Site of Infection: Gills

Host:

Couesius plumbeus: Dechtiar et al. 1988; 1961-1971; 18%; L; lns; Ontario; llnk

Notropis hudsonius: Dechtiar et al. 1988; 3%; L; lns; Ontario

Gyrodactylidae Cobbold, 1864

Gyrodactyloides sp.

Site of Infection: [Gills]

Host: *Notropis heterolepis*: Bangham 1955; 1951; 40%; minp; Lily Lake on Manitoulin Island, Ontario; 45°49'59"/-82°25'0"

Gyrodactylus atratuli Putz and Hoffman, 1963

Synonym: None

Site of Infection: Fins

Host: *Rhinichthys cataractae*: Dechtiar et al. 1988; 1961-1971; 19%; L; lns; Ontario; llnk

Table 14, continued.

Gyrodactylus bairdi Wood and Mizelle, 1957

Synonym: None

Site of Infection: Fins

Host: *Cottus bairdii*: Dechtiar et al. 1988; 1961-1971; 38%; L; lns; Ontario; llnk

Gyrodactylus couesius Wood and Mizelle, 1957

Synonym: None

Site of Infection: Fins, gills

Host: *Couesius plumbeus*: Dechtiar et al. 1988; 1961-1971; 5%; L; lns; Ontario; llnk

Gyrodactylus dechtiari Hanek and Fernando, 1971

Synonym: None

Site of Infection: Gills

Host:

Rhinichthys cataractae: Dechtiar et al. 1988; 12%; L; lns; Ontario

Rhinichthys obtusus: Dechtiar et al. 1988; 1961-1971; 46%; L; lns; Ontario; llnk

Gyrodactylus etheostomae Wellborn and Rogers, 1967

Synonym: None

Site of Infection: Fins

Host: *Etheostoma nigrum*: Dechtiar et al. 1988; 1961-1971; 51%; L; lns; Ontario; llnk

Gyrodactylus eucaliae Ikezaki and Hoffman, 1957

Synonym: None

Site of Infection: Fins

Host:

Culaea inconstans: Dechtiar et al. 1988; 1961-1971; 59%; L; lns; Ontario; llnk

Pungitius pungitius: Dechtiar et al. 1988; 7%; L; lns; Ontario

Gyrodactylus freemani Hanek and Fernando, 1971

Synonym: None

Site of Infection: Fins

Host: *Perca flavescens*: Dechtiar et al. 1988; 1961-1971; 2%; L; lns; Ontario; llnk

Gyrodactylus funduli Hargis, 1955

Synonym: None

Site of Infection: Fins

Host: *Fundulus diaphanus*: Dechtiar et al. 1988; 1961-1971; 38%; L; lns; Ontario; llnk

Table 14, continued.

Gyrodactylus goerani Hanek and Fernando, 1971

Synonym: None

Site of Infection: Fins

Host: *Ambloplites rupestris*: Dechtiar et al. 1988; 1961-1971; 11%; L; lns; Ontario; llnk

Gyrodactylus margaritae Putz and Hoffman, 1963

Synonym: None

Site of Infection: Fins

Host: *Margariscus nachtriebi*: Dechtiar et al. 1988; 1961-1971; 60%; L; lns; Ontario; llnk

Gyrodactylus medius Kathariner, 1895

Synonym: ?*Gyrodactylus carpio*

Site of Infection: Gills

Host: *Cyprinus carpio*: Dechtiar et al. 1988; 1961-1971; 24%; L; lns; Ontario; llnk

Gyrodactylus nebulosus Kritsky and Mizelle, 1968

Synonym: None

Site of Infection: Fins

Host: *Ameiurus nebulosus*: Dechtiar et al. 1988; 1961-1971; 19%; L; lns; Ontario; llnk

Gyrodactylus spathulatus Mueller, 1936

Synonym: None

Site of Infection: Fins

Host: *Catostomus commersonii*: Dechtiar et al. 1988; 1961-1971; 10%; L; lns; Ontario; llnk

Gyrodactylus stunkardi Kritsky and Mizelle, 1968

Synonym: None

Site of Infection: Fins

Host: *Etheostoma nigrum*: Dechtiar et al. 1988; 1961-1971; 7%; L; lns; Ontario; llnk

Gyrodactylus sp.

Site of Infection: Fins, gills

Host:

Luxilus cornutus: Dechtiar et al. 1988; 1961-1971; 43%; L; lns; Ontario; llnk

Notropis atherinoides: Dechtiar et al. 1988; 19%; L; lns; Ontario

Notropis hudsonius: Dechtiar et al. 1988; 13%; M; lns; Ontario

Phoxinus neogaeus: Dechtiar et al. 1988; 49%; L; lns; Ontario

Pimephales notatus: Dechtiar et al. 1988; 13%; L; lns; Ontario

Pimephales promelas: Dechtiar et al. 1988; 50%; L; lns; Ontario

Catostomus commersonii: Dechtiar et al. 1988; 7%; H; lns; Ontario

Table 14, continued.

Esox lucius: Dechtiar et al. 1988; 5%; L; lns; Ontario
Percopsis omiscomaycus: Dechtiar 1974a; 1969; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Percopsis omiscomaycus: Dechtiar et al. 1988; 4%; L; lns; Ontario
Cottus cognatus: Dechtiar 1974b; 1969; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Cottus cognatus: Muzzall and Bowen 2002; June 1995; 3%; minp; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"
Etheostoma exile: Dechtiar et al. 1988; 40%; L; lns; Ontario
Percina caprodes: Dechtiar et al. 1988; 33%; L; lns; Ontario

Unidentified Gyrodactyloidea

Synonym: ?

Site of Infection: Gills

Host:

Luxilus cornutus: Bangham 1955; 1951; 100%; minp; Pleasant Creek, Ontario; llnk
Notemigonus crysoleucas: Bangham 1955; 25%; minp; Lily Lake on Manitoulin Island, Ontario; 45°49'59"/-82°25'0"
Notropis atherinoides: Bangham 1955; 20%; minp; Providence Bay; llnk; South Bay, Ontario; 45°33'0"/-82°1'0"
Notropis hudsonius: Bangham 1955; 56%; minp; Providence Bay and South Bay, Ontario
Phoxinus eos: Bangham 1955; 12%; minp; Rogers Creek, llnk; McKimm Creek; llnk; near South Bay, Ontario
Pimephales notatus: Bangham 1955; 12%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk
Semotilus atromaculatus: Bangham 1955; 1951; 29%; minp; Lake Manitou River; llnk; White Lake on Manitoulin Island; llnk; Manitou River, Ontario; llnk
Ameiurus nebulosus: Bangham 1955; 21%; minp; South Bay; 69%; minp; Bass Lake, Ontario; llnk
Ictalurus punctatus: Bangham 1955; 100%; minp; South Bay, Ontario
Esox lucius: Bangham 1955; 56%; minp; South Bay, Thomas Bay; 45°49'59"/-82°25'0"; Sheguandah Bay; llnk; Bass Lake; llnk; Long Lake on Manitoulin Island, Ontario; 49°31'59"/-86°49'59"
Esox masquinongy: Bangham 1955; 100%; minp; Bass Lake on Manitoulin Island, Ontario
Percopsis omiscomaycus: Bangham 1955; 74%; minp; South Bay, Ontario
Culaea inconstans: Bangham 1955; 24%; minp; South Bay; White Lake on Manitoulin Island, Ontario
Morone chrysops: Bangham 1955; 33%; minp; South Bay, Ontario
Ambloplites rupestris: Bangham 1955; 78%; minp; South Bay; lakes on Manitoulin Island, Ontario
Lepomis gibbosus: Bangham 1955; 75%; minp; lakes on Manitoulin Island, Ontario
Micropterus dolomieu: Bangham 1955; 73%; minp; Lake Huron bays associated with Manitoulin Island, lakes on Manitoulin Island, Ontario
Micropterus salmoides: Bangham 1955; 11%; minp; Thomas Bay, South Bay, Ontario
Pomoxis nigromaculatus: Bangham 1955; 50%; minp; South Bay, Ontario

Table 14, continued.

Etheostoma nigrum: Bangham 1955; 10%; minp; lakes on Manitoulin Island, Ontario

Perca flavescens: Bangham 1955; 49%; minp; South Bay, North Channel, Manitoulin Island lakes, Ontario

Percina caprodes: Bangham 1955; 100%; minp; South Bay, Ontario

Sander vitreus: Bangham 1955; 49%; minp; South Bay, Mindemoya Lake on Manitoulin Island, Ontario

Mazocraeoidae Price, 1936

Mazocraeoides olentangiensis Sroufe, 1958

Synonym: *Mazocraeoides similis* Price, 1959

Site of Infection: Gills

Host: *Dorosoma cepedianum*: Dechtiar et al. 1988; 1961-1971; 46%; minp; lns; Ontario; llnk

Pseudomurraytreematidae (Kritsky, Mizelle, and Bilquees, 1978) Beverley-Burton, 1984

Anonchohaptor anomalus Mueller, 1938

Synonym: None

Site of Infection: Gills

Host:

Catostomus catostomus: Dechtiar and Dillon 1974; 1968-1971; pnp; minp; lns; llnk

Catostomus catostomus: Dechtiar et al. 1988; 1961-1971; 24%; L; lns; Ontario; llnk

Catostomus commersonii: Dechtiar et al. 1988; 10%; L; lns; Ontario

Pseudomurraytrema copulatum (Mueller, 1938) Bykhovski, 1957

Synonym: None

Site of Infection: Gills

Host: *Moxostoma macrolepidotum*: Dechtiar et al. 1988; 1961-1971; 50%; L; lns; Ontario; llnk

Tetraonchidae Bykhovski, 1937

Tetraonchus monenteron (Wagener, 1857) Diesing, 1858

Synonym: None

Site of Infection: Gills

Host:

Esox lucius: Dechtiar 1972b; cdnp; pnp; minp; lns; llnk

Esox lucius: Dechtiar et al. 1988; 1961-1971; 92%; M; lns; Ontario; llnk

Tetraonchus variabilis Mizelle and Webb, 1953

Synonym: None

Site of Infection: Gills

Host:

Prosopium cylindraceum: Dechtiar 1972b; pnp; minp; lns; llnk

Prosopium cylindraceum: Dechtiar et al. 1988; 1961-1971; 70%; minp; lns; Ontario; llnk

Table 14, continued.

Adult Cestoda (Cestodes)

Caryophyllaeidae Leuckhart, 1878

Glaridacris catostomi (Cooper, 1920) Mackiewicz, 1965

Synonym: *Caryophyllaeus terebrans* of Bangham and Adams, 1954 (partim); *Glaridacris laruei* of Bangham and Venard, 1946

Site of Infection: Intestine

Host:

Catostomus catostomus: Dechtiar et al. 1988; 1961-1971; 16%; M; lns; Ontario; llnk

Catostomus commersonii: Bangham 1955; 1951; 34%; minp; South Bay; 45°33'0"/-82°1'0"; lakes on Manitoulin Island, Ontario; llnk

Catostomus commersonii: Dechtiar et al. 1988; 14%; L-M; lns; Ontario

Unidentified cestodaria

Synonym: ?

Site of Infection: [Intestine]

Host: *Catostomus catostomus*: Bangham 1955; 1951; 28%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Amphicotylidae Ariola, 1899

Eubothrium crassum (Bloch, 1779) Nybelin, 1922

Synonym: *Abothrium crassum* (Bloch, 1779); *Eubothrium oncorhynchi* Wardle, 1932

Site of Infection: Intestine

Host:

Coregonus artedi: Bangham 1955; 1951; 4%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Oncorhynchus mykiss: Bangham 1955; 13%; minp; Blue Jay Creek; llnk; Manitou River, Ontario; llnk

Lota lota: Bangham 1955; 95%; minp; North Channel, South Bay, Mindemoya Lake on Manitoulin Island, Ontario; llnk

Eubothrium rugosum (Batsch, 1786) Nybelin, 1922

Synonym: None

Site of Infection: Intestine

Host:

Lota lota: Dechtiar et al. 1988; 1961-1971; 17%; M; lns; Ontario; llnk

Lota lota: Muzzall et al. 2003; July 1998; 96%; 10; Six Fathom Bank; 44°48'50"/-82°27'58"; 100%; 9; Yankee Reef, Michigan; 44°28'59"/-83°33'29"

Table 14, continued.

Eubothrium salvelini (Schränk, 1790) Nybelin, 1922

Synonym: None

Site of Infection: Pyloric ceca; intestine

Host:

Oncorhynchus gorbusha: Muzzall and Peebles 1986; September-October 1983, September-October 1984; pnp; minp; Albany Creek, Chippewa County, Michigan; 45°58'12"/-84°4'35"

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; 1%; 1; Albany Creek, Chippewa County, Michigan

Salvelinus namaycush: Bangham 1955; 1951; 100%; minp; South Bay; 45°33'0"/-82°1'0"; Lake Manitou on Manitoulin Island; llnk; South Baymouth, Ontario; 45°33'0"/-82°1'0"

Salvelinus namaycush: Muzzall and Bowen 2000; May 1995; 98%; minp; Six Fathom Bank; 44°48'50"/-82°27'58"; Adams Point, Michigan; 45°24'52"/-83°42'59"

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 10%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Bothriocephalidae Blanchard, 1849

Bothriocephalus claviceps (Goeze, 1782) Rudolphi, 1810

Synonym: None

Site of Infection: [Intestine]

Host:

Ambloplites rupestris: Bangham 1955; 1951; <1%; minp; lns; Ontario; llnk

Ambloplites rupestris: Dechtiar et al. 1988; 1961-1971; 11%; L; lns; Ontario; llnk

Lepomis gibbosus: Bangham 1955; 2%; minp; lake on Manitoulin Island, Ontario; llnk

Bothriocephalus cuspidatus Cooper, 1917

Synonym: *Bothriocephalus cuspidatus luciopercae* Wardle, 1932; *Bothriocephalus cuspidatus hiodontos* Wardle, 1932; *Bothriocephalus cuspidatus cuspidatus* Cooper, 1917

Site of Infection: Pyloric ceca, anterior intestine

Host:

Sander canadensis: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Sander vitreus: Bangham 1955; 51%; minp; South Bay, Mindemoya Lake on Manitoulin Island, Ontario; llnk

Sander vitreus: Dechtiar et al. 1988; 1961-1971; 58%; M; lns; Ontario; llnk

Sander vitreus: Muzzall and Haas 1998; September 1993, September 1994; 96%; 16; Inner Saginaw Bay; 43°45'0"/-83°33'29"; 84%; 13; Outer Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Bothriocephalus formosus Mueller and Van Cleave, 1932

Synonym: None

Site of Infection: [Intestine]

Table 14, continued.

Host:

Percopsis omiscomaycus: Bangham 1955; 1951; 16%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Percopsis omiscomaycus: Dechtiar et al. 1988; 1961-1971; 7%; L; Ins; Ontario; lnk

Etheostoma exile: Bangham 1955; 20%; minp; Lily Lake on Manitoulin Island; 45°49'59"/-82°25'0"; South Bay, Ontario

Etheostoma nigrum: Bangham 1955; 51%; minp; lakes on Manitoulin Island; Ontario; lnk

Etheostoma nigrum: Dechtiar et al. 1988; 56%; L; Ins; Ontario

Cyathocephalidae Nybelin, 1922

Cyathocephalus truncatus (Pallas, 1781) Kessler, 1868

Synonym: *Cyathocephalus americanus* Cooper, 1917

Site of Infection: Stomach, pyloric ceca, intestine

Host:

Osmerus mordax: Dechtiar et al. 1988; 1961-1971; 1%; L; Ins; Ontario; lnk

Osmerus mordax: Muzzall and Peebles 1988; April 1984, April 1985, April 1986; 4%; 3; De Tour Village, Chippewa County, Michigan; 46°1'29"/-84°41'33"; 11%; 1; Point Lookout, northwest Saginaw Bay, Michigan; 44°2'59"/-83°34'46"

Coregonus artedi: Dechtiar et al. 1988; 44%; minp; Ins; Ontario

Coregonus clupeaformis: Bangham 1955; 1951; 40%; minp; North Channel, Ontario; 46°4'59"/-83°0'0"

Coregonus clupeaformis: Cooper 1919; cdp; pnp; minp; Giant's Tomb Island; lnk; Georgian Bay, 45°30'0"/-81°0'0"

Coregonus clupeaformis: Dechtiar and Loftus 1965; February and March 1963; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus clupeaformis: Dechtiar et al. 1988; 17%; minp; Ins; Ontario

Coregonus clupeaformis: French et al. 2005; 2001-2003; 24%; 1; eastern and southern portion of lake; lnk

Coregonus hoyi: Dechtiar et al. 1988; 9%; minp; Ins; Ontario

Coregonus hoyi: French et al. 2005; 52%; 5; eastern and southern portion of lake

Coregonus hoyi: Lundahl and Hoerberling 1967; June-July 1965; 11%; <1; Thunder Bay, Michigan; 45°0'0"/-83°23'59"

Oncorhynchus gorbuscha: Muzzall and Peebles 1986; September-October 1983, September-October 1984; pnp; minp; Albany Creek, Chippewa County, Michigan; 45°58'12"/-84°4'35"

Prosopium cylindraceum: Dechtiar et al. 1988; 14%; minp; Ins; Ontario

Prosopium cylindraceum: French et al. 2005; 8%; <1; eastern and southern portion of lake

Salvelinus namaycush: Muzzall and Bowen 2000; May 1995; 8%; 2; Six Fathom Bank; 44°48'50"/-82°27'58"; Adams Point, Michigan; 45°24'52"/-83°42'59"

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 1%; minp; primarily South Bay; other locations, Ontario; lnk

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 2%; L; Ins; Ontario

Percopsis omiscomaycus: French et al. 2005; 17%; 2; eastern and southern portion of lake

Lota lota: Muzzall et al. 2003; July 1998; 13%; 3; Six Fathom Bank; 45%; 4; Yankee Reef, Michigan; 44°28'59"/-83°33'29"

Pungitius pungitius: French et al. 2005; 45%; 2; eastern and southern portion of lake

Table 14, continued.

Cottus bairdii: Dechtiar et al. 1988; 6%; L; lns; Ontario
Cottus cognatus: Muzzall and Bowen 2002; June 1995; 1%; 1; Six Fathom Bank, Michigan
Cottus ricei: Dechtiar et al. 1988; 14%; L; lns; Ontario
Perca flavescens: Dechtiar and Loftus 1965; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Perca flavescens: Dechtiar et al. 1988; 4%; L; lns; Ontario
Apollonia melanostoma: French et al. 2005; 20%; 2; eastern and southern portion of lake

Haplobothriidae Meggitt, 1924

Haplobothrium globuliforme Cooper, 1914

Synonym: None

Site of Infection: Intestine

Host:

Amia calva: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Amia calva: Cooper 1914; cdnp; pnp; minp; Georgian Bay; 45°30'0"/-81°0'0"

Proteocephalidae La Rue, 1911

Corallobothrium fimbriatum Essex, 1927

Synonym: None

Site of Infection: Intestine

Host:

Ameiurus nebulosus: Bangham 1955; 1951; 71%; minp; South Bay; 45°33'0"/-82°1'0"; 56%; minp; Bass Lake on Manitoulin Island, Ontario; llnk

Ameiurus nebulosus: Dechtiar et al. 1988; 1961-1971; 19%; M; lns; Ontario; llnk

Noturus flavus: Dechtiar et al. 1988; 100%; M; lns; Ontario

Corallotaenia minutia (Fritts, 1959) Befus and Freeman, 1973

Synonym: *Corallobothrium minutium* Fritts, 1959

Site of Infection: Intestine

Host: *Ameiurus nebulosus*: Dechtiar et al. 1988; 1961-1971; 19%; L; lns; Ontario; llnk

Megathylacoides giganteum (Essex, 1928) Freze, 1965

Synonym: *Corallobothrium giganteum* Essex, 1928

Site of Infection: Intestine

Host:

Ictalurus punctatus: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Ictalurus punctatus: Dechtiar et al. 1988; 1961-1971; 67%; L; lns; Ontario; llnk

Table 14, continued.

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Intestine

Host:

Micropterus dolomieu: Bangham 1955; 1951; 16%; minp; South Bay; 45°33'0"/-82°1'0"; several lakes on Manitoulin Island, Ontario; llnk

Micropterus dolomieu: Dechtiar et al. 1988; 1961-1971; 19%; L-M; lns; Ontario; llnk

Micropterus salmoides: Bangham 1955; 20%; minp; South Bay; 45°33'0"/-82°1'0"; Thomas Bay, Ontario; 45°49'59"/-82°25'0"

Proteocephalus exiguus La Rue, 1911

Synonym: *Ichthyotaenia laruei* (Faust, 1920)

Site of Infection: [Intestine]

Host:

Coregonus artedi: Bangham 1955; 1951; 11%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus artedi: Dechtiar et al. 1988; 1961-1971; 12%; minp; lns; Ontario; llnk

Coregonus clupeaformis: Bangham 1955; 65%; minp; Whitefish Lake on Manitoulin Island, Ontario; llnk

Coregonus hoyi: Bangham 1955; 28%; minp; North Channel, South Bay, Ontario

Prosopium cylindraceum: Bangham 1955; 18%; minp; South Bay, Ontario

Proteocephalus fluviatilis Bangham, 1925

Synonym: None

Site of Infection: Intestine

Host: *Micropterus dolomieu*: Dechtiar et al. 1988; 1961-1971; 4%; M; lns; Ontario; llnk

Proteocephalus laruei Faust, 1920

Synonym: *Ichthyotaenia laruei* (Faust, 1920)

Site of Infection: Intestine

Host:

Petromyzon marinus: Bangham 1955; 1951; 15%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus artedi: Bangham 1955; 90%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay; Bass Lake; llnk; Manitoulin Island, Ontario; llnk

Coregonus artedi: Dechtiar et al. 1988; 1961-1971; 44%; minp; lns; Ontario; llnk

Coregonus clupeaformis: Bangham 1955; 2%; minp; South Bay, Ontario

Coregonus clupeaformis: Dechtiar et al. 1988; 6%; minp; lns; Ontario

Coregonus hoyi: Bangham 1955; 68%; minp; North Channel, South Bay, west of South Baymouth, Ontario; 45°33'0"/-82°1'0"

Table 14, continued.

Proteocephalus pearsei La Rue, 1919

Synonym: None

Site of Infection: Intestine

Host:

Cottus bairdii: Dechtiar et al. 1988; 1961-1971; 9%; L; lns; Ontario; llnk

Cottus cognatus: Muzzall and Bowen 2002; June 1995; 6%; 2; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Cottus ricei: Dechtiar et al. 1988; 38%; L; lns; Ontario

Pomoxis annularis: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Perca flavescens: Bangham 1955; 33%; minp; South Bay; Manitoulin Island lakes, Ontario; llnk

Percina caprodes: Dechtiar et al. 1988; 50%; L; lns; Ontario

Proteocephalus perplexus La Rue, 1911

Synonym: None

Site of Infection: [Intestine]

Host:

Amia calva: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Amia calva: Dechtiar et al. 1988; 1961-1971; 39%; minp; lns; Ontario; llnk

Proteocephalus pinguis La Rue, 1911

Synonym: None

Site of Infection: [Intestine]

Host:

Esox lucius: Bangham 1955; 1951; 91%; minp; South Bay; 45°33'0"/-82°1'0"; Thomas Bay; 45°49'59"/-82°25'0"; Sheguandah Bay; llnk; Bass Lake; llnk; Long Lake on Manitoulin Island, Ontario; 49°31'59"/-86°49'59"

Esox lucius: Dechtiar et al. 1988; 1961-1971; 95%; M; lns; Ontario; llnk

Esox masquinongy: Bangham 1955; 100%; minp; Bass Lake on Manitoulin Island, Ontario

Proteocephalus stizostethi Hunter and Bangham, 1932

Synonym: None

Site of Infection: [Intestine]

Host:

Sander vitreus: Bangham 1955; 1951; 24%; minp; Mindemoya Lake; llnk; Whitefish Lake on Manitoulin Island, Ontario; 46°19'59"/-81°13'0"

Sander vitreus: Dechtiar et al. 1988; 1961-1971; 19%; L; lns; Ontario; llnk

Table 14, continued.

Proteocephalus sp.

Site of Infection: Intestine

Host:

Petromyzon marinus: Wilson and Ronald 1967; 1961; 1962; <1%; 2; upstream migrants; stream associated with Manitoulin Island, Bruce Peninsula area, Michigan; llnk; lake stages; <1%; 1; offshore areas associated with Manitoulin Island, Bruce Peninsula area, Michigan; llnk

Coregonus hoyi: Lundahl and Hoerberling 1967; June-July 1965; 33%; 3; Thunder Bay, Michigan; 45°0'0"/-83°23'59"

Salvelinus fontinalis: Bangham 1955; 1951; 8%; minp; Blue Jay Creek, Ontario; llnk

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar and Berst 1978; 1962-1974; 3%; L-M; primarily South Bay, Ontario; 45°33'0"/-82°1'0"

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 1961-1971; 8%; L; lns; Ontario; llnk

Triaenophoridae Loennberg, 1889

Triaenophorus crassus Forel, 1868

Synonym: *Triaenophorus robustus* Olsson, 1893; *Triaenophorus tricuspидatus morpha megadentatus* Wardle, 1932; *Triaenophorus tricuspидatus* of Newton, 1932 (partim); *Triaenophorus* sp. type *robustus* of Cooper, 1919

Site of Infection: Intestine

Host:

Petromyzon marinus: Wilson and Ronald 1967; 1961; 1962; 1%; 1; upstream migrants; streams associated with Manitoulin Island, Bruce Peninsula area, Michigan; llnk

Esox lucius: Bangham 1955; 1951; 48%; minp; South Bay; 45°33'0"/-82°1'0"; Thomas Bay; 45°49'59"/-82°25'0"; Sheguandah Bay; llnk; Bass Lake on Manitoulin Island, Ontario; llnk

Esox lucius: Dechtiar et al. 1988; 1961-1971; 39%; M; lns; Ontario; llnk

Triaenophorus nodulosus (Pallas, 1760) Rudolphi, 1819

Synonym: *Triaenophorus* sp. type *nodulosus* of Cooper, 1919 (partim)

Site of Infection: Intestine

Host: *Esox lucius*: Dechtiar et al. 1988; 1961-1971; 39%; L; lns; Ontario; llnk

Triaenophorus stizostedionis Miller, 1945

Synonym: None

Site of Infection: [Intestine]

Host: *Sander vitreus*: Bangham 1955; 1951; 5%; minp; Mindemoya Lake; llnk; Whitefish Lake on Manitoulin Island, Ontario; 46°19'59"/-81°13'0"

Table 14, continued.

Larval/Immature Cestoda (Cestodes)

Amphicotyliidae Ariola, 1899

Eubothrium salvelini (Schrank, 1790) Nybelin, 1922

Synonym: None

Site of Infection: Pyloric ceca, intestine

Host:

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 1961-1971; 11%; L; lns; Ontario; llnk

Myoxocephalus thompsoni: Muzzall et al. 1997; 1995; 20%; 1; Alpena, Michigan; 45°3'42"/-82°25'57"; 6%; 1; Harbor Beach, Michigan; 43°50'30"/-82°38'29"

Eubothrium sp.

Site of Infection: Anterior intestine

Host:

Petromyzon marinus: Applegate 1950; June 1948; pnp; minp; Carp Creek; 45°30'30"/-84°5'0"; Ocqueoc River, Hammond Bay; 45°29'24"/-84°4'27"

Osmerus mordax: Muzzall and Peebles 1988; April 1984, April 1985, April 1986; 2%; 1; Carp River area, Mackinaw County, Michigan; 46°1'29"/-84°41'33"; 10%; 2; De Tour Village, Chippewa County, Michigan; 45°57'46"/-83°54'17"; 8%; 2; Hessel, Mackinaw County, Michigan; 46°0'15"/-84°25'33"; 3%; 3; Point Lookout, northwest Saginaw Bay, Michigan; 44°2'59"/-83°34'46"

Cottus cognatus: Muzzall and Bowen 2002; June 1995; 2%; 1; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Bothriocephalidae Blanchard, 1849

Bothriocephalus sp.

Site of Infection: Intestine

Host:

Ictalurus punctatus: Bangham 1955; 1951; 33%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Lota lota: Bangham 1955; 14%; minp; South Bay, Ontario

Perca flavescens: Bangham 1955; 14%; minp; South Bay, Manitoulin Island lakes, Ontario; llnk

Cyathocephalidae Nybelin, 1922

Cyathocephalus truncatus (Pallas, 1781) Kessler, 1868

Synonym: *Cyathocephalus americanus* Cooper, 1917

Site of Infection: Pyloric ceca, anterior intestine

Host: *Myoxocephalus thompsoni*: Muzzall et al. 1997; 1995; 7%; 1; Alpena, Michigan; 45°3'42"/-82°25'57"; 2%; 1; Harbor Beach, Michigan; 43°50'30"/-82°38'29"

Table 14, continued.

Diphyllbothriidae Luhe, 1910

Diphyllbothrium ditremum (Creplin, 1825) Luhe, 1910

Synonym: *Diphyllbothrium osmeri* (von Linstow, 1878)

Site of Infection: Stomach wall

Host: *Coregonus artedi*: Dechtiar et al. 1988; 1961-1971; 47%; minp; lns; Ontario; llnk

Diphyllbothrium laruei Vergeer, 1942

Synonym: None

Site of Infection: Stomach, under peritoneum lining the flesh, "other viscera"

Host:

Coregonus artedi: Vergeer 1942; cdnp; pnp; minp; lns; llnk

Coregonus nigripinnis: Vergeer 1942; pnp; minp; lns

Diphyllbothrium sp.

Site of Infection: Stomach, pyloric ceca, intestinal wall

Host:

Coregonus artedi: Bangham 1955; 1951; 68%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus clupeaformis: Bangham 1955; 1%; minp; lns; Ontario; llnk

Coregonus clupeaformis: Dechtiar et al. 1988; 1961-1971; 2%; minp; lns; Ontario; llnk

Coregonus hoyi: Bangham 1955; 55%; minp; North Channel; South Bay, west of South Baymouth, Ontario; 45°33'0"/-82°1'0"

Coregonus hoyi: Dechtiar et al. 1988; 36%; minp; lns; Ontario

Coregonus hoyi: Lundahl and Hoerberling 1967; June-July 1965; 71%; 6; Thunder Bay, Michigan; 45°0'0"/-83°23'59"

Oncorhynchus gorbusha: Muzzall and Peebles 1986; September-October 1983, September-October 1984; pnp; minp; Albany Creek, Chippewa County, Michigan; 45°58'12"/-84°4'35"

Oncorhynchus mykiss: Bangham 1955; 13%; minp; Blue Jay Creek; llnk; Manitou River, Ontario; llnk

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; pnp; minp; Albany Creek, Chippewa County; Michigan

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 2%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Ligula intestinalis (Linnaeus, 1758) Gmelin, 1790

Synonym: None

Site of Infection: Body cavity

Host:

Notropis heterolepis: Dechtiar et al. 1988; 1961-1971; 40%; L; lns; Ontario; llnk

Notropis hudsonius: Bangham 1955; 1951; 3%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Pimephales notatus: Dechtiar et al. 1988; 16%; L; lns; Ontario

Semotilus atromaculatus: Dechtiar et al. 1988; 11%; L; lns; Ontario

Table 14, continued.

Catostomus catostomus: Dechtiar et al. 1988; 8%; L; lns; Ontario
Catostomus commersonii: Bangham 1955; 3%; minp; South Bay; Ontario
Catostomus commersonii: Dechtiar et al. 1988; 5%; L; lns; Ontario
Etheostoma nigrum: Dechtiar et al. 1988; 12%; L; lns; Ontario
Perca flavescens: Dechtiar et al. 1988; 4%; L; lns; Ontario

Schistocephalus solidus (Muller, 1776) Steenstrup, 1857

Synonym: None

Site of Infection: Body cavity

Host:

Pungitius pungitius: Dechtiar et al. 1988; 1961-1971; 15%; L; lns; Ontario; llnk

Cottus bairdii: Dechtiar et al. 1988; 9%; L; lns; Ontario

Sparganum pseudosegmentatum

Synonym: *Diphyllobothrium* sp. Cobbold, 1858

Site of Infection: Stomach wall, among intestinal ceca

Host: *Lota lota*: Vergeer 1942; cdnp; pnp; minp; Alpena; 45°3'42"/-82°25'57"; Cheboygan, Michigan; 45°39'52"/-84°26'8"

Remarks: Mongrain (1967) reared larvae of *Sparganum pseudosegmentatum* in hamsters and identified adults belonging to the genus *Diphyllobothrium*.

Proteocephalidae La Rue, 1911

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Intestine

Host:

Ambloplites rupestris: Dechtiar et al. 1988; 1961-1971; 11%; L; lns; Ontario; llnk

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Liver, mesentery

Host:

Ameiurus nebulosus: Bangham 1955; 1951; 81%; minp; Bass Lake on Manitoulin Island, Ontario; llnk

Morone chrysops: Bangham 1955; 33%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Morone chrysops: Dechtiar et al. 1988; 1961-1971; 100%; L; lns; Ontario; llnk

Ambloplites rupestris: Bangham 1955; 26%; minp; lakes on Manitoulin Island, Ontario

Lepomis gibbosus: Bangham 1955; 64%; minp; lakes on Manitoulin Island, Ontario

Lepomis gibbosus: Dechtiar et al. 1988; 15%; L; lns; Ontario

Table 14, continued.

Micropterus dolomieu: Bangham 1955; 55%; minp; South Bay; several bays; lnk; lakes on Manitoulin Island, Ontario; lnk

Micropterus dolomieu: Dechtiar et al. 1988; 33%; H; lns; Ontario

Perca flavescens: Bangham 1955; 7%; minp; South Bay; North Channel; 46°4'59"/-83°0'0"; Manitoulin Island lakes, Ontario; lnk

Proteocephalus pearsei La Rue, 1919

Synonym: None

Site of Infection: Intestine

Host:

Ameiurus nebulosus: Bangham 1955; 1951; 13%; minp; Bass Lake on Manitoulin Island, Ontario; lnk

Lota lota: Bangham 1955; 5%; minp; lns; Ontario

Morone chrysops: Bangham 1955; 33%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Ambloplites rupestris: Bangham 1955; <1%; minp; lns; Ontario; lnk

Lepomis gibbosus: Bangham 1955; 2%; minp; South Bay, Ontario

Pomoxis nigromaculatus: Bangham 1955; 50%; minp; South Bay, Ontario

Proteocephalus sp.

Site of Infection: Intestine

Host:

Petromyzon marinus: Bangham 1955; 1951; 62%; minp; North Channel, Ontario; 46°4'59"/-83°0'0"

Couesius plumbeus: Dechtiar et al. 1988; 1961-1971; 5%; L; lns; Ontario; lnk

Notropis heterolepis: Bangham 1955; 20%; minp; Lily Lake on Manitoulin Island, Ontario; 45°49'59"/-82°25'0"

Notropis heterolepis: Dechtiar et al. 1988; 40%; L; lns; Ontario

Notropis hudsonius: Bangham 1955; 10%; minp; South Bay, Ontario

Pimephales notatus: Dechtiar et al. 1988; 16%; L; lns; Ontario

Osmerus mordax: Dechtiar et al. 1988; 76%; L; lns; Ontario

Osmerus mordax: Muzzall and Peebles 1988; April 1984, April 1985, April 1986; 1%; 1; Point Lookout, northwest Saginaw Bay, Michigan; 44°2'59"/-83°34'46"

Oncorhynchus mykiss: Bangham 1955; 20%; minp; Blue Jay Creek; lnk; Manitou River; lnk; South Bay, Ontario; 45°33'0"/-82°1'0"

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 3%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; lnk

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 8%; L; lns; Ontario

Proteocephalus sp.

Site of Infection: Encysted in liver

Host: *Sander vitreus*: Muzzall and Haas 1998; September 1993, September 1994; 2%; 1; Inner Saginaw Bay, Michigan; 43°45'0"/-83°39'59"

Table 14, continued.

Triaenophoridae Loennberg, 1889

Triaenophorus crassus Forel, 1868

Synonym: *Triaenophorus robustus* Olsson, 1893; *Triaenophorus tricuspидatus morpha megadentatus* Wardle, 1932; *Triaenophorus tricuspидatus* of Newton, 1932 (partim); *Triaenophorus* sp. type *robustus* of Cooper, 1919

Site of Infection: Muscle

Host:

Petromyzon marinus: Applegate 1950; June 1948; pnp; minp; Carp Creek; 45°30'30"/-84°5'0"; Ocqueoc River, Hammond Bay; 45°29'24"/-84°4'27"

Petromyzon marinus: Bangham 1955; 1951; 15%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Petromyzon marinus: McClain 1952; 1949-1950; actively feeding lampreys; 7%; minp; northern Lake Huron; llnk

Coregonus artedi: Bangham 1955; 77%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario

Coregonus artedi: Dechtiar et al. 1988; 1961-1971; 47%; minp; lns; Ontario; llnk

Coregonus clupeaformis: Bangham 1955; 18%; minp; South Bay; Mindemoya Lake on Manitoulin Island, Ontario; llnk

Coregonus clupeaformis: Dechtiar et al. 1988; 8%; minp; lns; Ontario

Coregonus hoyi: Bangham 1955; 36%; minp; North Channel, South Bay, Ontario

Coregonus hoyi: Dechtiar et al. 1988; 47%; minp; lns; Ontario

Prosopium cylindraceum: Dechtiar et al. 1988; 7%; minp; lns; Ontario

Triaenophorus crassus Forel, 1868

Synonym: *Triaenophorus robustus* Olsson, 1893; *Triaenophorus tricuspидatus morpha megadentatus* Wardle, 1932; *Triaenophorus tricuspидatus* of Newton, 1932 (partim); *Triaenophorus* sp. type *robustus* of Cooper, 1919

Site of Infection: Digestive tract

Host: *Petromyzon marinus*: McClain 1952; 1949-1950; upstream migrants; <1%; minp; Ocqueoc River, 45°29'24"/-84°4'27"; Presque Isle County, Michigan

Triaenophorus nodulosus (Pallas, 1760) Rudolphi, 1819

Synonym: *Triaenophorus* sp. type *nodulosus* of Cooper, 1919 (partim)

Site of Infection: Liver

Host:

Amia calva: Dechtiar et al. 1988; 1961-1971; 15%; minp; lns; Ontario; llnk

Catostomus catostomus: Dechtiar et al. 1988; 5%; L; lns; Ontario

Catostomus commersonii: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus commersonii: Dechtiar et al. 1988; 1%; L; lns; Ontario

Moxostoma macrolepidotum: Dechtiar et al. 1988; 17%; L; lns; Ontario

Oncorhynchus nerka: Collins and Dechtiar 1974; 1%; minp; Georgian Bay; 45°30'0"/-81°0'0"; North Channel; 46°4'59"/-83°0'0"; South Bay; southern shore on Manitoulin Island, Ontario; llnk

Table 14, continued.

Oncorhynchus nerka: Dechtiar et al. 1988; <1%; minp; lns; Ontario
Prosopium cylindraceum: Dechtiar et al. 1988; 9%; minp; lns; Ontario
Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 1%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 2%; L; lns; Ontario
Percopsis omiscomaycus: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Culaea inconstans: Dechtiar et al. 1988; 100%; L; lns; Ontario
Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Perca flavescens: Dechtiar et al. 1988; 4%; L; lns; Ontario

Triaenophorus sp.

Site of Infection: [Viscera]

Host: *Catostomus catostomus*: Bangham 1955; 1951; 3%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Hymenolepididae Ariola, 1899

Hymenolepis sp.

Site of Infection: Encysted

Host: *Etheostoma exile*: Bangham 1955; 1951; 20%; minp; Lily Lake; 45°49'59"/-82°25'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Remarks: This report could be referring to a different genus.

Unknown Family

Unidentified cestode

Synonym: ?

Site of Infection: Intestine

Host: *Petromyzon marinus*: Applegate 1950; June 1948; pnp; minp; Carp Creek; 45°30'30"/-84°5'0"; Ocqueoc River, Hammond Bay; 45°29'24"/-84°4'27"

Unidentified plerocercoid

Synonym: ?

Site of Infection: Mesentery

Host: *Lota lota*: Muzzall et al. 2003; July 1998; 13%; 2; Six Fathom Bank; 44°48'50"/-82°27'58"; 5%; 1; Yankee Reef, Michigan

Table 14, continued.

Adult Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Hysterothylacium brachyurum Ward and Magath, 1916

Synonym: *Contracaecum brachyurum* Van Cleave and Mueller, 1934; *Thynnascaris brachyurum* Margolis and Arthur, 1979

Site of Infection: Intestine

Host:

Esox lucius: Bangham 1955; 1951; 53%; minp; South Bay; 45°33'0"/-82°1'0"; Thomas Bay; 45°49'59"/-82°25'0"; Sheguandah Bay; llnk; Bass Lake llnk; Long Lake on Manitoulin Island, Ontario; 49°31'59"/-86°49'59"

Esox lucius: Dechtiar et al. 1988; 42%; M; lns; Ontario

Esox masquinongy: Bangham 1955; 100%; minp; Bass Lake on Manitoulin Island, Ontario

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar and Berst 1978; 1962-1974; 3%; L; M; South Bay, Ontario; 45°33'0"/-82°1'0"

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 1961-1971; 8%; L; lns; Ontario; llnk

Percopsis omiscomaycus: Bangham 1955; 5%; minp; South Bay, Ontario

Percopsis omiscomaycus: Dechtiar et al. 1988; 8%; L; lns; Ontario

Ambloplites rupestris: Bangham 1955; <1%; minp; lns; Ontario; llnk

Micropterus dolomieu: Bangham 1955; 9%; minp; several bays; llnk; lakes on Manitoulin Island, Ontario; llnk

Micropterus dolomieu: Dechtiar et al. 1988; 7%; L; lns; Ontario

Micropterus salmoides: Bangham 1955; 40%; minp; Thomas Bay; 45°49'59"/-82°25'0"; South Bay, Ontario

Etheostoma exile: Bangham 1955; 20%; minp; Lily Lake on Manitoulin Island; 45°49'59"/-82°25'0"; South Bay, Ontario

Sander vitreus: Bangham 1955; 2%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk

Sander vitreus: Dechtiar et al. 1988; 19%; M; lns; Ontario

Raphidascaris acus (Bloch, 1779) Railliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790; *Ascaris anguillae* Schrank, 1790; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris mucronata* Schrank, 1790 nec Froel., 1791; *Fusaria acus* (Bloch, 1779) Zeder, 1800; *Fusaria dentata* Zeder, 1800; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata* (Zeder, 1800) Rudolphi, 1809; *Ascaris labiata* Rudolphi, 1809; *Agamonema leucisci rutili* Diesing, 1851; *Trichina cyprinorum* Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris gracillima* Linstow, 1890; *Hysterothylacium cayugensis* Wigdor, 1918; *Ascaris lucii* Pearse, 1924; *Raphidascaris cayugensis* (Wigdor, 1918) Yorke and Maplstone, 1926; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928; *Raphidascaris canadensis* Smedley, 1933; *Raphidascaris gracillima* (Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937; *Raphidascaris laurentianus* Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Intestine

Table 14, continued.

Host:

Esox lucius: Dechtiar et al. 1988; 1961-1971; 5%; L-M; lns; Ontario; llnk

Esox lucius: Smith 1984; May 1979-June 1981; 92%; minp; Smoky Hollow; llnk; Wickett Lake on Manitoulin Island, Ontario; llnk; 67%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Esox lucius: Smith 1986; May-November 1979; May-November 1980; 78-100%; 12-206; Smoky Hollow Lake; llnk; 64-100%; 4-230; Wickett Lake; llnk; Manitoulin Island, Ontario; 45°49'59"/-82°25'0"

Micropterus dolomieu: Smith 1984; 50%; minp; South Bay, Ontario

Camallanidae Railliet and Henry, 1915

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host:

Ambloplites rupestris: Bangham 1955; 1951; <1%; minp; lake on Manitoulin Island, Ontario; llnk

Micropterus dolomieu: Bangham 1955; <1%; minp; lns; Ontario; llnk

Micropterus dolomieu: Dechtiar et al. 1988; 1961-1971; 1%; M; lns; Ontario; llnk

Pomoxis annularis: Bangham 1955; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Perca flavescens: Rosinski et al. 1997; May and September/October 1992; pnp; minp; North Island; 43°53'00"/-83°26'00"

Capillariidae Neuve-Lemaire, 1936

Capillaria bakeri (Mueller and Van Cleave, 1932)

Synonym: *Hepaticola bakeri* Mueller and Van Cleave, 1932; Moravec (1987) considers *Capillaria bakeri* a synonym of *Pseudocapillaria tomentosa*

Site of Infection: [Intestine]

Host: *Catostomus commersonii*: Bangham 1955; 1951; 1%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Capillaria catenata (Van Cleave and Mueller, 1932)

Synonym: *Echinocoleus catenata* (Van Cleave and Mueller, 1932) Lopez-Meyra, 1947; *Thomnix catenata* (Van Cleave and Mueller, 1932) Skrjabin and Schikhobalova, 1954)

Site of Infection: Intestine

Host:

Osmerus mordax: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Oncorhynchus nerka: Collins and Dechtiar 1974; 1%; minp; Georgian Bay; 45°30'0"/-81°0'0"; North Channel; 46°4'59"/-83°0'0"; South Bay; southern shore of Manitoulin Island, Ontario; llnk

Oncorhynchus nerka: Dechtiar et al. 1988; 1961-1971; 1%; minp; lns; Ontario; llnk

Table 14, continued.

Capillaria catostomi Pearse, 1924

Synonym: Moravec (1987) considers *Capillaria catostomi* a synonym of *Pseudocapillaria tomentosa*; ?*Skrjabinocapillaria bakeri* (Mueller and Van Cleave, 1932) Skrjabin and Schikhobalova, 1954

Site of Infection: Intestine

Host:

Cyprinus carpio: Bell and Beverley-Burton 1981; May 1975-May 1976; pnp; minp; southern Lake Huron, Ontario; llnk

Cyprinus carpio x *Carassius auratus*: Bell and Beverley-Burton 1981; pnp; minp; southern Lake Huron, Ontario; llnk

Catostomus commersonii: Bell and Beverley-Burton 1980; May-December 1975, April-May 1976; 66%-freshly examined fish; 81% frozen examined fish, 10-freshly examined fish, 10-frozen examined fish; Point Edward, Ontario; 43°0'0"/-82°24'0"

Catostomus commersonii: Bell and Beverley-Burton 1981; pnp; minp; southern Lake Huron, Ontario

Coregonus clupeaformis: Bell and Beverley-Burton 1981; pnp; minp; southern Lake Huron, Ontario

Capillaria salvelini Polyanskii; 1952

Synonym: *Capillaria baicalensis* Ryzhikov and Sudarikov, 1953; *Capillaria coregoni* Shulman-Albova, 1953; *Capillaria curilica* Zhukov, 1960; *Capillaria brevispicula* sensu Moravec and Ergens, 1970, nec Linstow, 1873; *Capillaria bakeri* sensu Meyer, 1954, nec Mueller and Van Cleave, 1932

Site of Infection: Intestine

Host:

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; September-October 1983, September-October 1984; 40%; 6; Albany Creek, Chippewa County, Michigan; 45°58'12"/-84°4'35"

Salvelinus namaycush: Muzzall and Bowen 2000; May 1995; 3%; 2; Six Fathom Bank; 44°48'50"/-82°27'58"; Adams Point, Michigan; 45°24'52"/-83°42'59"

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 1%; minp; primarily South Bay, Ontario; 45°33'0"/-82°1'0"

Cucullanidae Cobbold, 1864

Dichelyne cotylophora Ward and Magath, 1916

Synonym: *Dacnitoides cotylophora* Ward and Magath, 1916; *Cucullanellus cotylophora* (Ward and Magath, 1916) Petter, 1974

Site of Infection: Stomach, small intestine

Host:

Ambloplites rupestris: Bangham 1955; 1951; <1%; minp; lns; Ontario; llnk

Micropterus dolomieu: Bangham 1955; 13%; minp; several bays; llnk; lakes on Manitoulin Island, Ontario; llnk

Micropterus salmoides: Bangham 1955; 20%; minp; South Bay; Thomas Bay, Ontario; 45°49'59"/-82°25'0"

Perca flavescens: Bangham 1955; 55%; minp; South Bay; 45°33'0"/-82°1'0"; Manitoulin Island lakes, Ontario; llnk

Perca flavescens: Dechtiar et al. 1988; 1961-1971; 2%; L; lns; Ontario; llnk

Table 14, continued.

Perca flavescens: Rosinski et al. 1997; May and September/October 1992; pnp; minp; Au Gres (43°58'58"; 83°39' 37"/10.1); pnp; minp; North Island (43°53'00", 83°26'00" /4.6); Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Perca flavescens: Smedley 1934; 1933; pnp; minp; Grand Bend, Canada, 43°19'0"/-81°45'0"

Sander vitreus: Bangham 1955; 10%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk

Dichelyne robusta (Van Cleave and Mueller, 1932) Petter, 1974

Synonym: None

Site of Infection: [Intestine]

Host: *Ameiurus nebulosus*: Bangham 1955; 1951; 29%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Dichelyne sp.

Site of Infection: [Intestine]

Host: *Etheostoma nigrum*: Bangham 1955; 1951; 3%; minp; lake on Manitoulin Island, Ontario; llnk

Truttaedacnitis stelmioides (Vessichelli, 1910) Petter, 1974

Synonym: *Cucullanus stelmioides* Vessichelli, 1910; *Dacnitis stelmioides* Vessichelli

Site of Infection: Gills, gonads, liver, intestinal wall

Host: *Petromyzon marinus*: Wilson and Ronald 1967; 1961, 1962; upstream migrants; <1%; 8; stream associated with the Manitoulin Island-Bruce Peninsula area; llnk; lake stages; 3%; 10; five offshore areas associated with Manitoulin Island-Bruce Peninsula area, Michigan; llnk

Cystidicolidae (as in Anderson et al. 1975)

Cystidicola farionis Fischer, 1798

Synonym: *Cystidicola canadensis* Skinker, 1930; *Cystidicola stigmatura* of Skinker, 1931 *not* (Leidy, 1886), *Cystidicola stigmatura* of Ko and Anderson 1969 *not* (Leidy, 1886)

Site of Infection: Swim bladder

Host:

Osmerus mordax: Dechtiar et al. 1988; 1961-1971; 1%; L; lns; Ontario; llnk

Coregonus artedii: Dechtiar et al. 1988; 44%; minp; lns; Ontario

Coregonus clupeaformis: Dechtiar et al. 1988; 8%; minp; lns; Ontario

Coregonus clupeaformis: Lankester and Smith 1980; 1973-1978; 71%; 11; South Bay; 45°33'0"/-82°1'0"; Inner Basin, Ontario; llnk

Coregonus clupeaformis: Lankester and Smith 1980; 62%; 9; South Bay; Outer Basin, Ontario; llnk

Oncorhynchus gorboscha: Muzzall and Peebles 1986; September-October 1983, September-October 1984; pnp; minp; Albany Creek, Chippewa County, Michigan; 45°58'12"/-84°4'35"

Oncorhynchus kisutch: Dechtiar et al. 1988; 50%; minp; lns; Ontario

Oncorhynchus mykiss: Dextrase 1987; cdnp; 50%; 2; North Channel; Ontario; 46°4'59"/-83°0'0"

Oncorhynchus nerka: Dechtiar et al. 1988; 43%; minp; lns; Ontario

Oncorhynchus mykiss: Dechtiar et al. 1988; 17%; L; lns; Ontario

Table 14, continued.

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; pnp; minp; Albany Creek, Chippewa County, Michigan

Salvelinus fontinalis: Lankester and Smith 1980; 11%; 26; Burnt Island, Ontario; llnk

Salvelinus namaycush x *Salvelinus namaycush* x *Salvelinus fontinalis*: Dechtiar et al. 1988; 8%; L; lns; Ontario

Cystidicola stigmatura (Leidy, 1886) Ward and Magath, 1916

Synonym: *Filaria stigmatura* Leidy, 1886; *Ancyracanthus cystidicola* of Wright, 1879 *not* (Lamarck, 1801); *Cystidicola* sp. of White 1940; *Cystidicola farionis* of Ward and Magath 1916 *not* (Fischer, 1798); *Cystidicola cristivomeri* White, 1941

Site of Infection: Swim bladder

Host:

Osmerus mordax: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus artedi: Bangham 1955; 1951; 4%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus clupeaformis: Bangham 1955; 13%; minp; lns; Ontario; llnk

Coregonus clupeaformis: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Coregonus clupeaformis: Ko and Anderson 1969; cdpn; pnp; minp; South Baymouth, Ontario; 45°33'0"/-82°1'0"

Coregonus hoyi: Bangham 1955; 9%; minp; South Bay, Ontario

Coregonus hoyi: Lundahl and Hoerberling 1967; June and July 1965; 85%; 17; Thunder Bay, Michigan; 45°0'0"/-83°23'59"

Oncorhynchus nerka: Collins and Dechtiar 1974; 41%; minp; Georgian Bay; 45°30'0"/-81°0'0"; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario

Prosopium cylindraceum: Bangham 1955; 5%; minp; South Bay, Ontario southern shore of Manitoulin Island, Ontario; llnk

Salvelinus namaycush: Black 1983; 1894; 50%; minp; lns; llnk

Salvelinus fontinalis x *Salvelinus namaycush*: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario);

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 4%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Remarks: Black (1983) reported that *Cystidicola stigmatura* is apparently absent from the Great Lakes since 1925; the two *Salvelinus namaycush* examined by Black (1983) were collected before 1925; the above records of *Cystidicola stigmatura* in *Coregonus* spp. and *Osmerus mordax* may be erroneous since *Salvelinus* spp. are the only known hosts for *Cystidicola stigmatura* (see Black 1983).

Cystidicoloides ephemeridarum (Linstow, 1872) Moravec, 1981

Synonym: *Filaria ephemeridarum* Leidy, 1872; *Cystidicoloides tenuissima* (Zeder, 1800) Rasheed, 1965; *Sterliadochona tenuissima* (Zeder, 1800); *Metabronema salvelini* (Fujita, 1920), *Metabronema canadense* Skinker, 1931; *Cystidicoloides harwoodi* (Chandler, 1931)

Site of Infection: Intestine

Table 14, continued.

Host:

Coregonus clupeaformis: Dechtiar et al. 1988; 1961-1971; 31%; minp; lns; Ontario; llnk
Oncorhynchus kisutch: Dechtiar et al. 1988; 50%; minp; lns; Ontario
Oncorhynchus mykiss: Bangham 1955; 1951; 40%; minp; Blue Jay Creek; llnk; Manitou River; llnk; South Bay, Ontario; 45°33'0"/-82°1'0"
Oncorhynchus mykiss: Dechtiar et al. 1988; 4%; L; lns; Ontario
Oncorhynchus nerka: Dechtiar et al. 1988; 4%; minp; lns; Ontario
Prosopium cylindraceum: Dechtiar et al. 1988; 7%; minp; lns; Ontario
Salmo trutta: Dechtiar et al. 1988; 100%; L; lns; Ontario
Salvelinus fontinalis: Bangham 1955; 69%; minp; Blue Jay Creek, Ontario

Spinitectus carolini Holl, 1928

Synonym: None

Site of Infection: [Intestine]

Host:

Amia calva: Dechtiar et al. 1988; 1961-1971; 31%; minp; lns; Ontario; llnk
Morone chrysops: Bangham 1955; 1951; 33%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Morone chrysops: Dechtiar et al. 1988; 33%; L; lns; Ontario
Ambloplites rupestris: Bangham 1955; 81%; minp; lakes on Manitoulin Island, South Bay, Ontario
Lepomis gibbosus: Bangham 1955; 2%; minp; lake on Manitoulin Island, Ontario; llnk
Micropterus dolomieu: Bangham 1955; 55%; minp; Ontario
Micropterus salmoides: Bangham 1955; 20%; minp; South Bay; 45°33'0"/-82°1'0"; Thomas Bay, Ontario; 45°49'59"/-82°25'0"

Spinitectus gracilis Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host:

Acipenser fulvescens: Dechtiar et al. 1988; 1961-1971; 2%; L; lns; Ontario; llnk
Cyprinus carpio: Dechtiar et al. 1988; 12%; L; lns; Ontario
Notropis hudsonius: Bangham 1955; 1951; 1%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Ameiurus nebulosus: Bangham 1955; 14%; minp; South Bay, Ontario
Coregonus clupeaformis: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Oncorhynchus nerka: Collins and Dechtiar 1974; 4%; minp; Georgian Bay; 45°30'0"/-81°0'0"; North Channel; 46°4'59"/-83°0'0"; South Bay; southern shore of Manitoulin Island; llnk
Oncorhynchus nerka: Dechtiar et al. 1988; 3%; minp; lns; Ontario
Salvelinus fontinalis x *Salvelinus namaycush*: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 2%; minp; primarily South Bay; 45°33'0"/-82°1'0"; and other locations; Ontario; llnk
Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 2%; L; lns; Ontario

Table 14, continued.

Percopsis omiscomaycus: Bangham 1955; 5%; minp; South Bay, Ontario
Percopsis omiscomaycus: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Lota lota: Bangham 1955; 5%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk
Lota lota: Dechtiar et al. 1988; 8%; L; lns; Ontario
Ambloplites rupestris: Dechtiar et al. 1988; 11%; L; lns; Ontario
Pomoxis annularis: Dechtiar et al. 1988; 50%; L; lns; Ontario
Pomoxis nigromaculatus: Bangham 1955; 50%; minp; South Bay, Ontario
Perca flavescens: Bangham 1955; 4%; minp; South Bay; Manitoulin Island lakes, Ontario; llnk
Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Spinitectus sp.

Site of Infection: [Intestine]

Host: *Sander vitreus*: Bangham 1955; 1951; 2%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk

Philometridae Baylis and Daubney, 1926

Philometra cylindracea (Ward and Magath, 1916) Van Cleave and Mueller, 1934

Synonym: *Ichthyonema cylindraceum* Ward and Magath

Site of Infection: Intestine; body cavity, associated with testes, mesentery, and heart

Host:

Perca flavescens: Bangham 1955; 1951; <1%; minp; lns; Ontario; llnk

Perca flavescens: Dechtiar et al. 1988; 1961-1971; 4%; L; lns; Ontario; llnk

Perca flavescens: Rosinski et al. 1997; May-October 1992; 10-30%; 1; The Black Hole (43°48'06", 83°51'42"/7.5); 27-37%; 1-4; North Island (43°53'00", 83°26'00"/4.6); 10-30%; 1; Au Gres (43°58'58", 83° 39' 37"/10.1); 13-33%; 1-2; Fish Point (43°43'00", 83°33'30"/5.9), Michigan

Perca flavescens: Starr 1989; cdnp; 59% (combined prevalence for both *Philometra cylindracea* and *Eustrongylides* sp.); minp; near shore, Saginaw Bay; 43°45'0"/-83°33'29"; Huron County; 44°1'45"/-82°49'57"

Perca flavescens: Starr 1989; 24% (combined prevalence for both *Philometra cylindracea* and *Eustrongylides* sp.); minp; off shore, Saginaw Bay, Huron County

Philometroides huronensis Uhazy, 1976

Synonym: None

Site of Infection: Fins and peritoneum around swim bladder

Host: *Catostomus commersonii*: Uhazy 1976; cdnp; pnp; minp; southern portion of lake, Ontario; llnk

Table 14, continued.

Philometroides nodulosa (Thomas, 1929) Dailey, 1967

Synonym: *Philometra nodulosa* (Thomas, 1929)

Site of Infection: Subcutaneous tissue of head

Host:

Catostomus catostomus: Dechtiar et al. 1988; 1961-1971; 8%; L; Ins; Ontario; Ilnk

Catostomus commersonii: Dechtiar et al. 1988; 3%; L; Ins; Ontario

Quimperidae Baylis, 1930

Synonym: Haplonematidae Sudarikov and Ryzhikov, 1952

Haplonema hamulatum Moulton, 1931

Synonym: None

Site of Infection: [Intestine]

Host:

Lota lota: Bangham 1955, 1951; 38%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Lota lota: Dechtiar et al. 1988; 1961-1971; 31%; L; Ins; Ontario; Ilnk

Lota lota: Muzzall et al. 2003; July 1998; 87%; 11; Six Fathom Bank; 44°48'50"/-82°27'58"; 100%; 45; Yankee Reef, Michigan; 44°28'59"/-83°33'29"

Haplonema immutatum Ward and Magath, 1916

Synonym: None

Site of Infection: [Intestine]

Host: *Amia calva*: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Haplonema sp.

Site of Infection: Intestine

Host: *Myoxocephalus thompsoni*: Muzzall et al. 1997; 1995; 83%; 7; Alpena, Michigan; 45°3'42"/-82°25'57"; 53%; 2; Harbor Beach, Michigan; 43°50'30"/-82°38'29"

Rhabdochonidae Skrjabin, 1946

Rhabdochona canadensis Moravec and Arai, 1971

Synonym: None

Site of Infection: Intestine

Host:

Couesius plumbeus: Dechtiar et al. 1988; 1961-1971; 7%; L; Ins; Ontario, Ilnk

Rhinichthys cataractae: Dechtiar et al. 1988; 19%; L; Ins; Ontario

Semotilus atromaculatus: Dechtiar et al. 1988; 22%; L; Ins; Ontario

Table 14, continued.

Rhabdochona cascadilla Wigdor, 1918

Synonym: *Rhabdochona* sp. of Bangham, 1941 (partim) and of Bangham and Venard, 1946 (partim)

Site of Infection: Intestine

Host:

Luxilus cornutus: Bangham 1955; 1951; 75%; minp; Pleasant Creek; Ontario; llnk

Luxilus cornutus: Dechtiar et al. 1988; 1961-1971; 3%; L; lns; Ontario; llnk

Notropis hudsonius: Bangham 1955; 19%; minp; Providence Bay; llnk; South Bay, Ontario; 45°33'0"/-82°1'0"

Pimephales notatus: Bangham 1955; 6%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk

Semotilus atromaculatus: Bangham 1955; 3%; minp; Lake Manitou River; llnk; White Lake of Manitoulin Island; llnk; Manitou River, Ontario; llnk

Semotilus atromaculatus: Dechtiar et al. 1988; 11%; L; lns; Ontario

Catostomus commersonii: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Oncorhynchus nerka: Collins and Dechtiar 1974; 4%; minp; Georgian Bay; 45°30'0"/-81°0'0"; North Channel; 46°4'59"/-83°0'0"; South Bay; southern shore of Manitoulin Island, Ontario; llnk

Oncorhynchus nerka: Dechtiar et al. 1988; 3%; minp; lns; Ontario

Percopsis omiscomaycus: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Culaea inconstans: Dechtiar et al. 1988; 8%; L; lns; Ontario

Etheostoma exile: Bangham 1955; 20%; minp; Lily Lake on Manitoulin Island or South Bay, Ontario

Etheostoma nigrum: Bangham 1955; 3%; minp; lake on Manitoulin Island, Ontario

Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Remarks: Dechtiar et al. (1988) lists *Rhabdochona cascadilla* occurring in the liver.

Rhabdochona cotti Gustafson, 1949

Synonym: None

Site of Infection: Intestine

Host: *Cottus bairdi*: Dechtiar et al. 1988; 1961-1971; 4%; lns; Ontario; llnk

Rhabdochona decaturensis Gustafson, 1949

Synonym: None

Site of Infection: Intestine

Host:

Luxilus cornutus: Dechtiar et al. 1988; 1961-1971; 25%; L; lns; Ontario; llnk

Notropis hudsonius: Dechtiar et al. 1988; 17%; L; lns; Ontario

Table 14, continued.

Rhabdochona sp.

Site of Infection: Intestine

Host:

Couesius plumbeus: Bangham 1955; 1951; 50%; minp; lns; Ontario; llnk

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 2%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Etheostoma exile: Dechtiar et al. 1988; 1961-1971; 40%; L; lns; Ontario; llnk

Larval/Immature Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Contracaecum sp.

Site of Infection: Mesentery

Host: *Alosa pseudoharengus*: Muzzall 1994, May 1990-July 1992; 5%; 4; Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Hysterothylacium brachyurum Ward and Magath, 1916

Synonym: *Contracaecum brachyurum* Van Cleave and Mueller, 1934; *Thynnascaris brachyurum* Margolis and Arthur, 1979

Site of Infection: Liver

Host:

Notemigonus crysoleucas: Bangham 1955; 1951; 25%; minp; Lily Lake on Manitoulin Island, Ontario; 45°49'59"/-82°25'0"

Noturus flavus: Dechtiar et al. 1988; 1961-1971; 75%; M; lns; Ontario; llnk

Lota lota: Dechtiar et al. 1988; 33%; M; lns; Ontario

Hysterothylacium sp.

Site of Infection: Liver

Host: *Culaea inconstans*: Dechtiar et al. 1988; 1961-1971; 8%; L; lns; Ontario; llnk

Remarks: Larvae of *Contracaecum* and *Hysterothylacium* are difficult to separate and undoubtedly have been misidentified as one another.

Raphidascaris acus (Bloch, 1779) Railliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790; *Ascaris anguillae* Schrank, 1790; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris mucronata* Schrank, 1790 nec Froel., 1791; *Fusaria acus* (Bloch, 1779) Zeder, 1800; *Fusaria dentata* Zeder, 1800; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata* (Zeder, 1800) Rudolphi, 1809; *Ascaris labiata* Rudolphi, 1809; *Agamonema leucisci rutili* Diesing, 1851; *Trichina cyprinorum* Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris gracillima* Linstow, 1890; *Hysterothylacium cayugensis* Wigdor, 1918; *Ascaris lucii* Pearse, 1924;

Table 14, continued.

Raphidascaris cayugensis (Wigdor, 1918) Yorke and Maplstone, 1926; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928; *Raphidascaris canadensis* Smedley, 1933; *Raphidascaris gracillima* (Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937; *Raphidascaris laurentianus* Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Intestine

Host:

Ambloplites rupestris: Smith 1984; May 1979-June 1981; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Ictalurus punctatus: Smith 1984; 25%; minp; South Bay; Ontario

Raphidascaris acus (Bloch, 1779) Railliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790; *Ascaris anguillae* Schrank, 1790; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris mucronata* Schrank, 1790 nec Froel., 1791; *Fusaria acus* (Bloch, 1779) Zeder, 1800; *Fusaria dentata* Zeder, 1800; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata* (Zeder, 1800) Rudolphi, 1809; *Ascaris labiata* Rudolphi, 1809; *Agamonema leucisci rutili* Diesing, 1851; *Trichina cyprinorum* Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris gracillima* Linstow, 1890; *Hysterothylacium cayugensis* Wigdor, 1918; *Ascaris lucii* Pearse, 1924; *Raphidascaris cayugensis* (Wigdor, 1918) Yorke and Maplstone, 1926; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928; *Raphidascaris canadensis* Smedley, 1933; *Raphidascaris gracillima* (Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937; *Raphidascaris laurentianus* Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Liver, spleen (encysted)

Host:

Notropis heterolepis: Smith 1986; May-November 1979, May-November 1980; pnp; minp; Smoky Hollow Lake; lnk; Wickett Lake; lnk; Manitoulin Island, Ontario; 45°49'59"/-82°25'0"

Pimephales promelas: Smith 1986; pnp; minp; Smoky Hollow Lake; Wickett Lake, Manitoulin Island, Ontario

Coregonus clupeaformis: Dechtiar et al. 1988; 1961-1971; 19%; minp; lns; Ontario; lnk

Cottus bairdii: Dechtiar et al. 1988; 9%; L; lns; Ontario

Etheostoma exile: Smith 1986; pnp; minp; Wickett Lake, Manitoulin Island, Ontario

Perca flavescens: Dechtiar et al. 1988; 2%; L-M; lns; Ontario

Perca flavescens: Smith 1986; 97-100%; 34-243; Smoky Hollow Lake; 96-100%; 19-152; Wickett Lake, Manitoulin Island, Ontario,

Raphidascaris sp.

Site of Infection: Free in liver and encapsulated in liver, mesentery, and intestinal wall

Host: *Perca flavescens*: Rosinski et al. 1997; May and September/October 1992; pnp; minp; The Black Hole (43° 48 06, 83° 51 42 /7.5); North Island (43°53'00", 83°26'00"/4.6); Au Gres (43°58'58", 83°39'37" /10.7); Fish Point (43°43'00", 83°33'30"/5.9); Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Table 14, continued.

Camallanidae Railliet and Henry, 1913

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Encysted

Host: *Pomoxis nigromaculatus*: Bangham 1955; 1951; 50%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Camallanus sp.

Site of infection: Liver, gonads

Host: *Petromyzon marinus*: McClain 1952; 1949-1950; actively feeding lampreys; 10%; minp; northern Lake Huron; llnk; upstream migrants; <1%; minp; Ocqueoc River; 45°29'24"/-84°4'27"; Presque Isle County, Michigan; 45°21'0"/-83°56'0"

Capillariidae Neuve-Lemaire, 1936

Capillaria salvelini Polyansky, 1952

Synonym: *Capillaria baicalensis* Ryzhikov and Sudarikov, 1953; *Capillaria coregoni* Shulman-Albova, 1953; *Capillaria curilica* Zhukov, 1960; *Capillaria brevispicula* sensu Moravec and Ergens, 1970, nec Linstow, 1873; *Capillaria bakeri* sensu Meyer, 1954, nec Mueller and Van Cleave, 1932

Site of Infection: Stomach

Host: *Cottus cognatus*: Muzzall and Bowen 2002; June 1995; 2%; 1; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Capillaria sp.

Site of Infection: [Intestine]

Host: *Osmerus mordax*: Muzzall and Peebles 1988; April 1984, April 1985, April 1986; 1%; 2; Carp River area, Mackinaw County, Michigan; 46°1'29"/-84°41'33"

Cucullanidae Cobbold, 1864

Truttaedacnitis clitellarius (Ward and Magath, 1916) Petter, 1974

Synonym: *Cucullanus clitellarius* Ward and Magath, 1916

Site of Infection: Intestine

Host: *Acipenser fulvescens*: Bangham 1955; 1951; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Cystidicolidae (as in Anderson et al. 1975)

Cystidicola sp.

Site of Infection: Swim bladder

Host: *Osmerus mordax*: Muzzall and Peebles 1988; April 1984, April 1985, April 1986; 2%, 1, Carp River area, Mackinaw County, Michigan, 46°1'29"/-84°41'33"; 5%, 1, De Tour Village, Chippewa County, Michigan, 45°57'46"/-83°54'17"; 2%, 1, Hessel, Mackinaw County, Michigan, 46°0'15"/-84°25'33"; 4%, 1, Point Lookout, northwest Saginaw Bay, Michigan, 44°2'59"/-83°34'46"

Table 14, continued.

Spinitectus gracilis Ward and Magath, 1916

Synonym: None

Site of Infection: Site of cysts not given

Host:

Cyprinus carpio: Bangham 1955, 1951, 33%, minp, South Bay, Ontario, 45°33'0"/-82°1'0"

Osmerus mordax: Bangham 1955, 4%, minp, North Channel, 46°4'59"/-83°0'0"; South Bay, Ontario

Coregonus clupeaformis: Bangham 1955, 8%, minp, Mindemoya Lake on Manitoulin Island, Ontario, lnk

Micropterus dolomieu: Bangham 1955, <1%, minp, lns, Ontario, lnk

Diocotophymidae Railliet, 1915

Eustrongylides tubifex (Nitzsch, 1819) Jagerskiold, 1909

Synonym: None

Site of Infection: Mesentery, muscle

Host:

Micropterus dolomieu: Dechtiar et al. 1988; 1961-1971; 4%; L; lns; Ontario; lnk

Fundulus diaphanus: Dechtiar et al. 1988; 23%; L; lns; Ontario

Perca flavescens: Allison 1966; January 1956, January 1957, September 1958, September 1959, April 1964, March 1961, April 1963, April 1964; 39-86%; 15; Piconning, Michigan; lnk; 34-86%; 2-10; Tawas Bay, Michigan; 44°16'0"/-83°28'59"; 16-42%; 2-4; Alpena, Michigan; 45°3'42"/-82°25'57"

Perca flavescens: Dechtiar et al. 1988; 2%; L; lns; Ontario

Perca flavescens: Rosinski et al. 1997; May and September/October 1992; 87-90%; 6-13, The Black Hole (43°53'06", 83°51'42"/7.5); 70-90%; 4-5; North Island (43°53'00", 83°26'00"/4.6); 77-87%; 5-6; Au Gres (43°58'58", 83°39'37"/10.1); 60-83%; 5-6; Fish Point 43°43'00", 83°33'30"/5.9; Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Perca flavescens: Salz 1989; May-October 1986, May-October 1987; prevalence separated by fish age, month, and year; minp; Wildfowl Bay; lnk; The Blackhole; lnk; Au Gres, Saginaw Bay, Michigan; 44°2'55"/-83°41'44"

Sander vitreus: Muzzall and Haas 1998; September 1993; September 1994; 2%; 3; Inner Saginaw Bay; 43°45'0"/-83°33'29"; 3%; 2; Outer Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Remarks: Allison (1966) misidentified *Eustrongylides tubifex* as *Philometra cylindracea*.

Eustrongylides sp.

Site of Infection: [Body cavity, viscera]

Host:

Perca flavescens: Starr 1989; cdnp; 59% (combined prevalence for both *Eustrongylides* sp. and *Philometra cylindracea*); minp; near shore, Saginaw Bay, Huron County; 43°45'0"/-83°33'29"

Perca flavescens: Starr 1989; 24% (combined prevalence for both *Eustrongylides* sp. and *Philometra cylindracea*); minp; off shore, Saginaw Bay, Huron County

Table 14, continued.

Gnathostomatidae Lane, 1923

Spiroxys contortus (Rudolph, 1819)

Synonym: None

Site of Infection: Mesentery

Host: *Apollonia melanostoma*: Kvach and Stepien 2008b; October-November 2006; 13%; 1; 0.1; Saginaw River, Michigan; 43°38'49"/-83°51'1"

Spiroxys sp.

Site of Infection: Mesentery

Host:

Notropis heterolepis: Bangham 1955; 1951; 8%; minp; Lily Lake on Manitoulin Island, Ontario; 45°49'59"/-82°25'0"

Notropis heterolepis: Dechtiar et al. 1988; 40%; L; lns; Ontario

Umbra limi: Dechtiar et al. 1988; 1961-1971; 14%; L; lns; Ontario; llnk

Etheostoma nigrum: Bangham 1955; 5%; minp; lakes on Manitoulin Island, Ontario; llnk

Perca flavescens: Bangham 1955; <1%; minp; lns; Ontario; llnk

Philometridae Baylis and Daubney, 1926

Philometra sp.

Site of Infection: Mesentery

Host:

Osmerus mordax: Bangham 1955; 1951; 2%; minp; North Channel, Ontario; 46°4'59"/-83°0'0"

Coregonus artedii: Bangham 1955; 6%; minp; North Channel, South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus clupeaformis: Bangham 1955; 1%; minp; South Bay, Ontario

Prosopium cylindraceum: Bangham 1955; 5%; minp; South Bay, Ontario

Apollonia melanostoma: Kvach and Stepien 2008b; October-November 2006; 7%; 1; 0.1; Saginaw River, Michigan; 43°38'49"/-82°1'0"

Quimperidae Baylis, 1930

Synonym: Haplonematidae Sudarikov and Ryzikov, 1952

Haplonema hamulatum Moulton, 1931

Synonym: None

Site of Infection: Intestine

Host: *Cottus cognatus*: Muzzall and Bowen 2002; June 1995; 1%; 1; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Haplonema sp.

Site of Infection: Intestine

Host: *Oncorhynchus tshawytscha*: Muzzall and Peebles 1986; September-October 1983; September-October 1984; 1%; 3; Albany Creek, Chippewa County, Michigan; 45°58'12"/-84°4'35"

Table 14, continued.

Rhabdochoniidae Skrjabin, 1946

Rhabdochona sp.

Site of Infection: Intestine

Host:

Cottus cognatus: Muzzall and Bowen 2002, June 1995, 1%; 1; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Perca flavescens: Bangham 1955; 1951; 6%; minp; South Bay; 45°33'0"/-82°1'0"; Manitoulin Island lakes, Ontario; llnk

Diectophymidae Railliet, 1915 and/or Philometridae Baylis and Daunney, 1926

Redworm: Could be *Eustrongylides tubifex* (Nitzsch, 1819) and/or *Philometra cylindracea* (Ward and Magath, 1916) Van Cleave and Mueller, 1934

Synonym: *Ichthyonema cylindracea* Ward and Magath, 1916 for *Philometra cylindraceum*

Site of Infection: Mesentery, body cavity

Host: *Perca flavescens*: Fielder et al. 2000; 1989-1997; 63%; minp; Saginaw Bay, Michigan

Unknown Family

Agamonema sp.

Synonym: ?

Site of Infection: ?

Host:

Percopsis omiscomaycus: Bangham 1955; 1951; 5%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Lepomis gibbosus: Bangham 1955; 2%; minp; lake on Manitoulin Island, Ontario; llnk

Remarks: Yorke and Maplestone (1926) define *Agamonema* as a collective group for immature nematodes in fishes.

Agamospirura sp.

Synonym: ?

Site of Infection: Mesentery

Host: *Culaea inconstans*: Dechtiar et al. 1988; 1961-1971; 4%; M; lns; Ontario; llnk

Remarks: Yorke and Maplestone (1926) define *Agamospirura* as a collective group for immature Spiruroidea.

Unidentified Nematodes

Synonym: ?

Site of Infection: Intestinal wall

Host: *Petromyzon marinus*: Applegate 1950; 1947-1948; <1%; minp; Carp Creek, Hammond Bay; 45°30'30"/-84°5'0"

Table 14, continued.

Adult Acanthocephala (Acanthocephalans)

Echinorhynchidae Cobbold, 1876

Acanthocephalus dirus (Van Cleave, 1931) Van Cleave and Townsend, 1936

Synonym: *Echinorhynchus dirus* Van Cleave, 1931; *Acanthocephalus jacksoni* Bullock, 1962, *Acanthocephalus parksidei* Amin, 1975, 1977

Site of Infection: Intestine

Host:

Alosa pseudoharengus: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Alosa pseudoharengus: Dechtiar et al. 1988; 1961-1971; 22%; minp; lns; Ontario; llnk

Catostomus commersonii: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Osmerus mordax: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Coregonus clupeaformis: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Oncorhynchus nerka: Collin and Dechtiar 1974; 15%; minp; Georgian Bay; 45°30'0"/-81°0'0"; North Channel; 46°4'59"/-83°0'0"; South Bay, southern shore of Manitoulin Island; llnk

Oncorhynchus nerka: Dechtiar et al. 1988; 11%; minp; lns; Ontario

Salmo trutta: Dechtiar et al. 1988; 100%; L; lns; Ontario

Salvelinus namaycush: Dechtiar and Berst 1978; 1962-1974; 6%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Salvelinus fontinalis x *Salvelinus namaycush*: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 41%; M; lns; Ontario

Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Lota lota: Dechtiar et al. 1988; 8%; L; lns; Ontario

Culaea inconstans: Dechtiar et al. 1988; 4%; L; lns; Ontario

Pungitius pungitius: Dechtiar et al. 1988; 3%; L; lns; Ontario

Cottus bairdii: Dechtiar et al. 1988; 4%; L; lns; Ontario

Cottus ricei: Dechtiar et al. 1988; 10%; L; lns; Ontario

Echinorhynchus lateralis (Leidy, 1851) Golvan, 1969

Synonym: *Acanthocephalus lateralis* (Leidy, 1851) Petrochenko, 1956; *Metechinorhynchus lateralis* (Leidy, 1851) Golvan, 1969

Site of Infection: Intestine

Host: *Salvelinus fontinalis*: Dechtiar et al. 1988; 1961-1971; 5%; M; lns; Ontario; llnk

Echinorhynchus leidyi (Van Cleave, 1924) Golvan, 1969

Synonym: *Echinorhynchus salvelini* Linkins in Ward and Whipple, 1918; *Metechinorhynchus leidyi* (Van Cleave, 1924) Golvan, 1969

Site of Infection: Intestine

Table 14, continued.

Host:

Petromyzon marinus: McClain 1952; 1949-1950; upstream migrants; pnp; minp; Ocqueoc River; 45°29'24"/-84°4'27"; Presque Isle County, Michigan; 45°21'0"/-83°56'0"
Catostomus catostomus: Bangham 1955; 1951; 3%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Catostomus commersonii: Bangham 1955; <1%; minp; South Bay; Ontario
Coregonus hoyi: Bangham 1955; 1951; 9%; minp; west of South Baymouth, Ontario; 45°33'0"/-82°1'0"
Oncorhynchus mykiss: Bangham 1955; 13%; minp; Blue Jay Creek; lnk; Manitou River; lnk; South Bay, Ontario
Salvelinus namaycush: Bangham 1955; 17%; minp; South Bay, Ontario
Salvelinus namaycush: Dechtiar et al. 1988; 1961-1971; 60%; L-M; lns; Ontario; lnk
Lota lota: Bangham 1955; 14%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario

Echinorhynchus salmonis (Muller, 1784) Petrochenko, 1956

Synonym: *Echinorhynchus coregoni* Linkins in Van Cleave, 1919, *Echinorhynchus pachysomus*, *Echinorhynchus phoenix*, *Echinorhynchus inflatus*, *Echinorhynchus maraenae*, *Echinorhynchus murenae*, *Metechinorhynchus alpinus*, *Metechinorhynchus salmonis* (Muller, 1784) Petrochenko, 1956

Site of Infection: Intestine

Host:

Petromyzon marinus: Applegate 1950; 1947-1948; 20%; minp; Carp Creek; 45°30'30"/-84°5'0"; Ocqueoc River, Hammond Bay; 45°29'24"/-84°4'27"
Petromyzon marinus: Bangham 1955; 1951; 8%; minp; North Channel, Ontario; 46°4'59"/-83°0'0"
Petromyzon marinus: McClain 1952; 1949-1950; actively feeding lamprey; 14%; minp; northern Lake Huron; lnk; upstream migrants; pnp; minp; Ocqueoc River; 45°29'24"/-84°4'27"; Presque Isle County, Michigan; 45°21'0"/-83°56'0"
Petromyzon marinus: Wilson and Ronald 1967; 1961 and 1962; upstream migrants; 13%; 2; stream associated with Manitoulin Island-Bruce Peninsula area; lnk; lake stages; 5%; 1; five offshore areas associated with Manitoulin Island-Bruce Peninsula area, Michigan
Acipenser fulvescens: Bangham 1955; 100%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Acipenser fulvescens: Dechtiar et al. 1988; 1961-1971; 2%; minp; lns; Ontario; lnk
Alosa pseudoharengus: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Couesius plumbeus: Bangham 1955; 50%; minp; lns
Couesius plumbeus: Dechtiar et al. 1988; 5%; L; lns; Ontario
Notropis hudsonius: Bangham 1955; 1%; minp; South Bay, Ontario
Catostomus catostomus: Bangham 1955; 38%; minp; South Bay, Ontario
Catostomus catostomus: Dechtiar et al. 1988; 8%; M; lns; Ontario
Catostomus commersonii: Bangham 1955; 3%; minp; South Bay, Ontario
Catostomus commersonii: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Esox lucius: Bangham 1955; 21%; minp; South Bay; Thomas Bay; 45°49'59"/-82°25'0"; Sheguandah Bay; lnk; Bass Lake; lnk; Long Lake, Ontario; 49°31'59"/-86°49'59"
Esox lucius: Dechtiar et al. 1988; 37%; M; lns; Ontario

Table 14, continued.

Osmerus mordax: Allison 1949; cdpn; pnp; minp; Tawas area; 44°16'0"/-83°28'59"; to Alpena, Michigan; 45°3'42"/-82°25'57"

Osmerus mordax: Allison 1952; cdpn; pnp; minp; lns; llk

Osmerus mordax: Bangham 1955; 72%; minp; North Channel; South Bay, Ontario

Osmerus mordax: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Osmerus mordax: Dechtiar et al. 1988; 5%; L; lns; Ontario

Osmerus mordax: Muzzall and Peebles 1988; April 1984, April 1985, April 1986; 77%; 5; Carp River area; Mackinaw County, Michigan; 46°1'29"/-84°41'33"; 73%; 4; De Tour Village, Chippewa County, Michigan; 45°57'46"/-83°54'17"; 88%; 5; Hessel, Mackinaw County, Michigan; 46°0'15"/-84°25'33"; 87%; 8; Point Lookout, northwest Saginaw Bay, Michigan; 44°2'59"/-83°34'46"

Coregonus alpenae: Bangham 1955; 100%; minp; North Channel, Ontario

Coregonus artedi: Bangham 1955; 5%; minp; North Channel, South Bay, Ontario

Coregonus artedi: Dechtiar et al. 1988; 9%; minp; lns; Ontario

Coregonus clupeaformis: Bangham 1955; 69%; minp; North Channel, Ontario

Coregonus clupeaformis: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Coregonus clupeaformis: Dechtiar et al. 1988; 17%; minp; lns; Ontario

Coregonus hoyi: Bangham 1955; 38%; minp; North Channel; west of South Baymouth, Ontario; 45°33'0"/-82°1'0"

Coregonus hoyi: Dechtiar et al. 1988; 9%; minp; lns; Ontario

Coregonus hoyi: Lundahl and Hoerberling 1967; June-July 1965; 78%; 12; Thunder Bay, Michigan; 45°0'0"/-83°23'59"

Oncorhynchus gorbusha: Muzzall and Peebles 1986; September-October 1983, September-October 1984; pnp; minp; Albany Creek; Chippewa County, Michigan

Oncorhynchus kisutch: Dechtiar et al. 1988; 100%; minp; lns; Ontario

Oncorhynchus mykiss: Bangham 1955; 33%; minp; Blue Jay Creek; llk; Manitou River; llk; South Bay, Ontario

Oncorhynchus mykiss: Dechtiar et al. 1988; 4%; L; lns; Ontario

Oncorhynchus nerka: Collins and Dechtiar 1974; 61%; minp; Georgian Bay; 45°30'0"/-81°0'0"; North Channel; 46°4'59"/-83°0'0"; South Bay; southern shore of Manitoulin Island; llk

Oncorhynchus nerka: Dechtiar et al. 1988; 55%; minp; lns; Ontario

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; pnp; minp; Albany Creek, Chippewa County, Michigan; 45°58'12"/-84°4'35"

Prosopium cylindraceum: Bangham 1955; 23%; minp; North Channel, South Bay, Ontario

Prosopium cylindraceum: Dechtiar et al. 1988; 7%; minp; lns; Ontario

Salmo trutta: Dechtiar et al. 1988; 100%; H; lns; Ontario

Salvelinus namaycush: Bangham 1955; 83%; minp; South Bay; Lake Manitou of Manitoulin Island; llk; South Baymouth, Ontario

Salvelinus namaycush: Dechtiar et al. 1988; 100%; M; lns; Ontario

Salvelinus namaycush: Muzzall and Bowen 2000; May 1995; 100%; 164; Six Fathom Bank; 44°48'50"/-82°27'58"; Adams Point, Michigan; 45°24'52"/-83°42'59"

Salvelinus fontinalis x *Salvelinus namaycush*: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Table 14, continued.

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 57%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk
Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 82%; M; lns; Ontario
Percopsis omiscomaycus: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Lota lota: Bangham 1955; 14%; minp; South Bay, North Channel, Ontario
Lota lota: Dechtiar et al. 1988; 22%; M; lns; Ontario
Lota lota: Muzzall et al. 2003; July 1998; 100%; 41; Six Fathom Bank; 44°48'50"/-82°27'58"; 100%; 109; Yankee Reef; 44°28'59"/-83°33'29"
Cottus bairdii: Dechtiar et al. 1988; 19%; L; lns; Ontario
Cottus cognatus: Muzzall and Bowen 2002; June 1995; 61%; 5; Six Fathom Bank, Michigan
Myoxocephalus thompsonii: Bangham 1955; 100%; minp; South Bay, Ontario
Ambloplites rupestris: Bangham 1955; <1%; minp; South Bay, Ontario
Lepomis gibbosus: Bangham 1955; 2%; minp; South Bay, Ontario
Micropterus dolomieu: Bangham 1955; 8%; minp; several bays; llnk; Big Bay; 45°49'59"/-82°25'0"; Thomas Bay, Ontario
Micropterus dolomieu: Dechtiar et al. 1988; 3%; L; lns; Ontario
Micropterus salmoides: Bangham 1955; 20%; minp; South Bay or Thomas Bay, Ontario
Perca flavescens: Bangham 1955; 3%; minp; North Channel, Ontario
Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Perca flavescens: Dechtiar et al. 1988; 11%; L; lns; Ontario
Sander canadensis: Bangham 1955; 100%; minp; South Bay, Ontario

Neoechinorhynchidae Ward, 1917

Synonym: Hebesomidae Van Cleave, 1928; Hebesomatidae Yamaguti, 1963

Neoechinorhynchus crassus Van Cleave, 1919

Synonym: None

Site of Infection: [Intestine]

Host:

Catostomus catostomus: Bangham 1955; 1951; 38%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus catostomus: Dechtiar et al. 1988; 1961-1971; 5%; L; lns; Ontario; llnk

Catostomus commersonii: Bangham 1955; 34%; minp; South Bay; lakes on Manitoulin Island, Ontario; llnk

Catostomus commersonii: Dechtiar et al. 1988; 12%; L; lns; Ontario

Neoechinorhynchus cristatus Lynch, 1936

Synonym: None

Site of Infection: Intestine

Table 14, continued.

Host:

Catostomus catostomus: Dechtiar et al. 1988; 1961-1971; 8%; M; lns; Ontario; llnk

Catostomus commersonii: Dechtiar et al. 1988; 17%; L; lns; Ontario

Neoechinorhynchus cylindratus (Van Cleave, 1913) Van Cleave, 1919

Synonym: *Neorhynchus cylindratus* Van Cleave, 1913; *Eorhynchus cylindratus* (Van Cleave, 1913) Van Cleave, 1914

Site of Infection: [Intestine]

Host:

Esox lucius: Bangham 1955; 1951; 23%; minp; South Bay; 45°33'0"/-82°1'0"; Thomas Bay, Ontario; 44°48'50"/-82°27'58"

Lota lota: Bangham 1955; 10%; minp; North Channel; 46°4'59"/-83°0'0"; and/or South Bay, Ontario

Ambloplites rupestris: Bangham 1955; 41%; minp; lakes on Manitoulin Island; llnk

Ambloplites rupestri: Dechtiar et al. 1988; 1961-1971; 22%; L; lns; Ontario; llnk

Lepomis gibbosus: Bangham 1955; 4%; minp; lakes on Manitoulin Island, Ontario

Lepomis gibbosus: Dechtiar et al. 1988; 15%; L; lns; Ontario

Micropterus dolomieu: Bangham 1955; 63%; minp; South Bay; Big Bay; 45°49'59"/-82°25'0"; Thomas Bay; 45°49'59"/-82°25'0"; lakes on Manitoulin Island, Ontario

Micropterus dolomieu: Dechtiar et al. 1988; 36%; L; lns; Ontario

Micropterus salmoides: Bangham 1955; 100%; minp; South Bay and Thomas Bay, Ontario

Pomoxis nigromaculatus: Bangham 1955; 50%; minp; South Bay, Ontario

Pomoxis nigromaculatus: Dechtiar et al. 1988; 75%; L; lns; Ontario

Etheostoma nigrum: Bangham 1955; 3%; minp; lake on Manitoulin Island, Ontario; llnk

Perca flavescens: Bangham 1955; 3%; minp; South Bay; Manitoulin Island lakes, Ontario; llnk

Sander canadensis: Bangham 1955; 100%; minp; South Bay, Ontario

Sander vitreus: Bangham 1955; 37%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk

Neoechinorhynchus notemigoni Dechtiar, 1967

Synonym: None

Site of Infection: Intestine

Host: *Notemigonus crysoleucas*: Dechtiar et al. 1988; 1961-1971; 20%; L; lns; Ontario; llnk

Neoechinorhynchus pungitius Dechtiar, 1971

Synonym: None

Site of Infection: Intestine

Host:

Osmerus mordax: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Oncorhynchus nerka: Collins and Dechtiar 1974; 1%; minp; lns; Ontario; llnk

Oncorhynchus nerka: Dechtiar et al. 1988; 1961-1971; 2%; minp; lns; Ontario; llnk

Culaea inconstans: Dechtiar 1971a; 1968 and 1969; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Culaea inconstans: Dechtiar et al. 1988; 29%; M; lns; Ontario

Table 14, continued.

Pungitius pungitius: Dechtiar 1971a; 67%; minp; South Bay, Ontario
Pungitius pungitius: Dechtiar et al. 1988; 31%; L; lns; Ontario
Cottus cognatus: Muzzall and Bowen 2002; June 1995; 52%; 4; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"
Perca flavescens: Dechtiar 1971a; pnp; minp; South Bay, Ontario
Perca flavescens: Dechtiar et al. 1988; 2%; L; lns; Ontario

Neoechinorhynchus rutili (Muller, 1780), Hamann, 1892
Synonym: *Echinorhynchus tuberosus* Zider, 1803
Site of Infection: Intestine
Host:

Couesius plumbeus: Dechtiar et al. 1988; 1961-1971; 8%; L; lns; Ontario; llnk
Notemigonus crysoleucas: Dechtiar et al. 1988; 40%; L; lns; Ontario
Notropis hudsonius: Bangham 1955; 1951; 23%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Notropis hudsonius: Dechtiar et al. 1988; 23%; L; lns; Ontario
Phoxinus neogaeus: Dechtiar et al. 1988; 6%; L; lns; Ontario
Pimephales notatus: Dechtiar et al. 1988; 32%; M; lns; Ontario
Esox lucius: Bangham 1955; 3%; minp; South Bay; Thomas Bay, Ontario; 45°49'59"/-82°25'0"
Umbra limi: Bangham 1955; 25%; minp; stream of South Bay, Ontario
Osmerus mordax: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Osmerus mordax: Dechtiar et al. 1988; 38%; L; lns; Ontario
Coregonus hoyi: Dechtiar et al. 1988; 29%; minp; lns; Ontario
Oncorhynchus nerka: Collins and Dechtiar 1974; 1%; minp; lns; Ontario; llnk
Oncorhynchus nerka: Dechtiar et al. 1988; 3%; minp; lns; Ontario
Lota lota: Bangham 1955; 5%; minp; lns; Ontario
Culaea inconstans: Bangham 1955; 44%; minp; South Bay, Ontario
Culaea inconstans: Dechtiar et al. 1988; 3%; L; lns; Ontario
Pungitius pungitius: Bangham 1955; 100%; minp; South Bay, Ontario
Pungitius pungitius: Dechtiar et al. 1988; 4%; L; lns; Ontario
Cottus bairdii: Dechtiar et al. 1988; 38%; L; lns; Ontario
Cottus ricei: Dechtiar et al. 1988; 14%; L; lns; Ontario
Micropterus dolomieu: Bangham 1955; 1%; minp; lns; Ontario; llnk
Perca flavescens: Bangham 1955; 5%; minp; South Bay; Manitoulin Island lakes, Ontario; llnk
Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario
Perca flavescens: Dechtiar et al. 1988; 1%; L; lns; Ontario

Table 14, continued.

Neoechinorhynchus strigosus Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host:

Catostomus catostomus: Bangham 1955; 1951; 18%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus commersonii: Bangham 1955; 7%; minp; South Bay, Ontario

Catostomus commersonii: Dechtiar et al. 1988; 1961-1971; 10%; L; lns; Ontario; llnk

Neoechinorhynchus tenellus (Van Cleave, 1913) Van Cleave, 1919

Synonym: *Neorhynchus tenellus* Van Cleave, 1913

Site of Infection: Intestine

Host: *Esox lucius*: Dechtiar et al. 1988; 1961-1971; 26%; M; lns; Ontario; llnk

Neoechinorhynchus tumidus Van Cleave and Bangham, 1949

Synonym: None

Site of Infection: Intestine

Host:

Coregonus clupeaformis: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus clupeaformis: Dechtiar et al. 1988; 1961-1971; 13%; minp; lns; Ontario; llnk

Coregonus hoyi: Dechtiar et al. 1988; 5%; minp; lns; Ontario

Oncorhynchus nerka: Collins and Dechtiar 1974; 1%; minp; lns; Ontario; llnk

Oncorhynchus nerka: Dechtiar et al. 1988; 1%; minp; lns; Ontario

Prosopium cylindraceum: Bangham 1955; 1951; 9%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Prosopium cylindraceum: Dechtiar et al. 1988; 7%; minp; lns; Ontario

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 4%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 11%; L; lns; Ontario

Neoechinorhynchus sp.

Site of Infection: [Intestine]

Host:

Osmerus mordax: Dechtiar et al. 1988; 1961-1971; 6%; L; lns; Ontario; llnk

Salvelinus namaycush: Muzzall and Bowen 2000; May 1995; 1%; 1; Six Fathom Bank; 44°48'50"/-82°27'58"; Adams Point, Michigan; 45°24'52"/-83°42'59"

Percopsis omiscomaycus: Bangham 1955; 1951; 5%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Neoechinorhynchus sp. 1

Site of Infection: Intestine

Host: *Lota lota*: Muzzall et al. 2003; July 1998; 22%; 2; Six Fathom Bank; 44°48'50"/-82°27'58"; 20%; 2; Yankee Reef, Michigan; 44°28'59"/-83°33'29"

Table 14, continued.

Neoechinorhynchus sp. 2

Site of Infection: Intestine

Host: *Lota lota*: Muzzall et al. 2003; July 1998; 4%; 2; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"

Octospinifer macilentus Van Cleave, 1919

Synonym: *Octospinifer* sp. of Mudry and Arai, 1973; *Octospinifer* sp. of Mudry and Anderson, 1976

Site of Infection: Intestine

Host:

Catostomus commersonii: Bangham 1955; 1951; 4%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus commersonii: Dechtiar et al. 1988; 1961-1971; 11%; L; Ins; Ontario; llnk

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host:

Amia calva: Bangham 1955; 1951; 33%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Cyprinus carpio: Dechtiar et al. 1988; 1961-1971; 35%; M; Ins; Ontario; llnk

Notropis hudsonius: Bangham 1955; 11%; minp; South Bay, Ontario

Carpionodes cyprinus: Dechtiar et al. 1988; 100%; M; Ins; Ontario

Catostomus commersonii: Bangham 1955; 60%; minp; South Bay; lakes on Manitoulin Island, Ontario; llnk

Catostomus commersonii: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus commersonii: Dechtiar et al. 1988; 10%; M; Ins; Ontario

Ameiurus nebulosus: Bangham 1955; 7%; minp; South Bay, Ontario

Ameiurus nebulosus: Dechtiar et al. 1988; 15%; L; Ins; Ontario

Esox lucius: Bangham 1955; 2%; minp; South Bay, Ontario

Coregonus clupeaformis: Dechtiar et al. 1988; 2%; minp; Ins; Ontario

Oncorhynchus mykiss: Dechtiar et al. 1988; 18%; minp; Ins; Ontario

Oncorhynchus nerka: Collins and Dechtiar 1974; 1%; minp; Ins; Ontario; llnk

Oncorhynchus nerka: Dechtiar et al. 1988; 1%; minp; Ins; Ontario

Prosopium cylindraceum: Dechtiar et al. 1988; 7%; minp; Ins; Ontario

Salvelinus fontinalis x *Salvelinus namaycush*: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 6%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Salvelinus namaycush x *Salvelinus fontinalis*: Dechtiar et al. 1988; 39%; L; Ins; Ontario

Percopsis omiscomaycus: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Percopsis omiscomaycus: Dechtiar et al. 1988; 13%; L; Ins; Ontario

Lota lota: Bangham 1955; 5%; minp; Ins; Ontario

Cottus bairdii: Dechtiar et al. 1988; 6%; M; Ins; Ontario

Table 14, continued.

Ambloplites rupestris: Bangham 1955; 3%; minp; lakes on Manitoulin Island, Ontario
Ambloplites rupestris: Dechtiar et al. 1988; 11%; L; Ins; Ontario
Micropterus dolomieu: Bangham 1955; 1%; minp; Ins; Ontario
Micropterus dolomieu: Dechtiar et al. 1988; 3%; L; Ins; Ontario
Micropterus salmoides: Bangham 1955; 40%; minp; South Bay; and/or Thomas Bay, Ontario; 45°49'59"/-82°25'0"
Etheostoma nigrum: Dechtiar et al. 1988; 46%; L; Ins; Ontario
Perca flavescens: Bangham 1955; <1%; minp; South Bay, Ontario

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924
Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901
Site of Infection: Intestine
Host:
Amia calva: Bangham 1955; 1951; 67%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Amia calva: Dechtiar et al. 1988; 1961-1971; 31%; minp; Ins; Ontario; llnk
Notropis hudsonius: Bangham 1955; 1%; minp; South Bay, Ontario
Catostomus catostomus: Bangham 1955; 3%; minp; South Bay, Ontario
Catostomus catostomus: Dechtiar et al. 1988; 8%; minp; Ins; Ontario
Catostomus commersonii: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"
Ameiurus nebulosus: Bangham 1955; 6%; minp; Bass Lake on Manitoulin Island, Ontario; llnk
Ameiurus nebulosus: Dechtiar et al. 1988; 19%; L; Ins; Ontario
Noturus flavus: Dechtiar et al. 1988; 75%; L; Ins; Ontario
Esox lucius: Bangham 1955; 24%; minp; South Bay; Thomas Bay, Ontario; 45°49'59"/-82°25'0"
Oncorhynchus nerka: Collins and Dechtiar 1974; 2%; minp; Ins; Ontario; llnk
Oncorhynchus nerka: Dechtiar et al. 1988; <1%; minp; Ins; Ontario
Lota lota: Dechtiar et al. 1988; 31%; L; Ins; Ontario
Fundulus diaphanus: Dechtiar et al. 1988; 23%; L; Ins; Ontario
Morone chrysops: Bangham 1955; 33%; minp; South Bay, Ontario
Ambloplites rupestris: Bangham 1955; 28%; minp; lakes on Manitoulin Island, Ontario
Lepomis gibbosus: Bangham 1955; 11%; minp; Bass Lake; llnk; Lily Lake on Manitoulin Island, Ontario; 45°49'59"/-82°25'0"
Lepomis gibbosus: Dechtiar et al. 1988; 9%; L; Ins; Ontario
Micropterus dolomieu: Bangham 1955; 81%; minp; South Bay; lakes on Manitoulin Island; lake on Fitzwilliam Island, Ontario; 45°30'0"/-81°46'0"
Micropterus dolomieu: Dechtiar et al. 1988; 38%; L-M; Ins; Ontario
Etheostoma nigrum: Bangham 1955; 3%; minp; lake on Manitoulin Island, Ontario
Etheostoma nigrum: Dechtiar et al. 1988; 5%; L; Ins; Ontario
Perca flavescens: Bangham 1955; 10%; minp; North Channel; 46°4'59"/-83°0'0"; Manitoulin Island lakes, Ontario; llnk

Table 14, continued.

Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Perca flavescens: Dechtiar et al. 1988; 4%; L; Ins; Ontario

Sander vitreus: Bangham 1955; 27%; minp; Mindemoya Lake; lnk; Windfall Lake on Manitoulin Island, Ontario; lnk

Immature Acanthocephala (Acanthocephalans)

Echinorhynchidae Cobbold, 1876

Echinorhynchus salmonis Muller, 1784

Synonym: *Echinorhynchus coregoni* Linkins in Van Cleave, 1919; *Echinorhynchus pachysomus*; *Echinorhynchus phoenix*; *Echinorhynchus inflatus*; *Echinorhynchus maraenae*; *Echinorhynchus murenae*; *Metechinorhynchus alpinus*; *Metechinorhynchus salmonis*

Site of Infection: Stomach, intestine

Host: *Myoxocephalus thompsonii*: Muzzall et al. 1997; 1995; 12%; 2; Alpena, Michigan; 45°3'42"/-82°25'57"; 29%; 2; Harbor Beach, Michigan; 43°50'30"/-82°38'29"

Echinorhynchus salmonis Muller, 1784

Synonym: *Echinorhynchus coregoni* Linkins in Van Cleave, 1919; *Echinorhynchus pachysomus*; *Echinorhynchus phoenix*; *Echinorhynchus inflatus*; *Echinorhynchus maraenae*; *Echinorhynchus murenae*; *Metechinorhynchus alpinus*; *Metechinorhynchus salmonis*

Site of Infection: Encysted in mesentery, outside of liver, gonads and swim bladder

Host:

Osmerus mordax: Bangham 1955; 1951; 32%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Osmerus mordax: Muzzall and Peebles 1988; April 1984, April 1985, April 1986; 12%; 2; Carp River area, Mackinaw County, Michigan; 46°1'29"/-84°41'33"; 12%; 2; De Tour Village, Chippewa County, Michigan; 45°57'46"/-83°54'17"; 10%; 1; Hessel, Mackinaw County, Michigan; 46°0'15"/-84°25'33"; 26%; 1; Point Lookout, northwest Saginaw Bay, Michigan; 44°2'59"/-83°34'46"

Coregonus artedii: Bangham 1955; 8%; minp; North Channel, South Bay, Ontario

Remarks: Muzzall and Peebles (1988) reported that a few females of *Echinorhynchus salmonis* contained eggs.

Echinorhynchus sp.

Site of Infection: Intestine

Host: *Oncorhynchus tshawytscha*: Muzzall and Peebles 1986; September-October 1983, September-October 1984; pnp; minp; Albany Creek, Chippewa County, Michigan; 45°58'12"/-84°4'35"

Neoechinorhynchidae Ward, 1917

Synonym: Hebosomidae Van Cleave, 1928; Hebosomatidae Yamaguti, 1963

Neoechinorhynchus tumidus Van Cleave and Bangham, 1949

Synonym: None

Site of Infection: Intestine

Table 14, continued.

Host:

Oncorhynchus tshawytscha: Muzzall and Peebles 1986; September-October 1983, September-October 1984; pnp; minp; Albany Creek, Chippewa County, Michigan; 45°58'12"/-84°4'35"

Apollonia melanostoma: Kvach and Stepien 2008b; October-November 2006; 13%; 1; 0.1; Saginaw River, Michigan; 43°38'49"/-83°51'1"

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host: *Percina caprodes*: Dechtiar et al. 1988; 1961-1971; 50%; L; lns; Ontario; llnk

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Site of encystment not provided

Host:

Osmerus mordax: Bangham 1955; 1951; 2%; minp; Northern Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Umbra limi: Bangham 1955; 25%; minp; stream of South Bay, Ontario

Percopsis omiscomaycus: Bangham 1955; 11%; minp; South Bay, Ontario

Perca flavescens: Bangham 1955; <1%; minp; lns; Ontario; llnk

Percina caprodes: Bangham 1955; 100%; minp; South Bay, Ontario

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Encysted

Host:

Ameiurus nebulosus: Bangham 1955; 1951; 6%; minp; Bass Lake on Manitoulin Island, Ontario; llnk

Micropterus dolomieu: Bangham 1955; 1%; minp; lns; Ontario; llnk

Perca flavescens: Bangham 1955; 2%; minp; North Channel; 46°4'59"/-83°0'0"; Manitoulin Island lakes, Ontario; llnk

Table 14, continued.

Hirudinea (Leeches)

Glossiphoniidae Vaillant, 1890

Actinobdella inequiannulata Moore, 1901

Synonym: *Actinobdella triannulata* Moore, 1924; *Actinobdella triannulata* Daniels and Freeman, 1976

Site of Infection: Gill chambers

Host:

Catostomus catostomus: Bangham 1955; 1951; 3%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus catostomus: Dechtiar et al. 1988; 1961-1971; 5%; L; lns; Ontario; llnk

Catostomus commersonii: Bangham 1955; 7%; minp; South Bay, Ontario

Catostomus commersonii: Dechtiar et al. 1988; 3%; L; lns; Ontario

Actinobdella sp.

Site of Infection: Under operculum

Host: *Catostomus commersonii*: Bower and Woo 1977; 1975; 1%; 1; Sarnia, Ontario; 42°58'0"/-82°24'0"

Piscicolidae Johnston, 1865

Myzobdella lugubris Leidy, 1851

Synonym: *Cystobranchus virginicus* Paperna and Zwerner, 1974; *Ichthyobdella funduli* Verrill, 1872;

Ichthyobdella rapax Wass, 1972; *Ichthyobdella richardsoni* Meyer, 1940; *Illinobdella alba* Meyer, 1940;

Illinobdella elongata Meyer, 1940; *Illinobdella moorei* Meyer, 1940; *Myzobdella lugubris* Pearse, 1948;

Myzobdella alba Meyer, 1940; *Myzobdella moorei* (Meyer, 1940) Meyer and Moore, 1954

Site of Infection: Fins, body surface

Host:

Ambloplites rupestris: Bangham 1955; 1951; 3%; minp; lns; Ontario; llnk

Ambloplites rupestris: Dechtiar et al. 1988; 1961-1971; 4%; L; lns; Ontario; llnk

Micropterus dolomieu: Dechtiar et al. 1988; 4%; L; lns; Ontario

Perca flavescens: Bangham 1955; 3%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Perca flavescens: Dechtiar et al. 1988; 2%; L; lns; Ontario

Myzobdella sp.

Site of Infection: Fins

Host:

Esox lucius: Dechtiar et al. 1988; 1961-1971; 5%; L; lns; Ontario; llnk

Micropterus dolomieu: Bangham 1955; 1951; <1%; minp; lns; Ontario; llnk

Etheostoma exile: Bangham 1955; 20%; minp; Lily Lake; 45°49'59"/-82°25'0"; South Bay; Ontario; 45°33'0"/-82°1'0"

Etheostoma nigrum: Bangham 1955; 3%; minp; lake on Manitoulin Island, Ontario; llnk

Table 14, continued.

Piscicola milneri (Verrill, 1872) Ryerson, 1915

Synonym: *Ichthyobdella milneri*

Site of Infection: [External surface]

Host: *Petromyzon marinus*: Applegate 1950; 1947-1948; pnp; minp; Carp Creek, Hammond Bay; 45°30'30"/-84°5'0"

Piscicola punctata (Verrill, 1871) Moore, 1912

Synonym: *Ichthyobdella punctata* (Verrill, 1871) Moore, 1912

Site of Infection: Fins, skin

Host:

Osmerus mordax: Dechtiar et al. 1988; 1961-1971; 1%; L; lns; Ontario; llnk

Salvelinus fontinalis: Dechtiar et al. 1988; 5%; L; lns; Ontario

Percopsis omiscomaycus: Dechtiar et al. 1988; 11%; L; lns; Ontario

Cottus bairdii: Dechtiar et al. 1988; 4%; L; lns; Ontario

Copepoda (Copepods)

Argulidae Yamaguti, 1963

Argulus catostomi Dana and Herrick, 1837

Synonym: None

Site of Infection: Skin

Host:

Phoxinus neogaeus: Dechtiar et al. 1988; 1961-1971; 6%; L; lns; Ontario; llnk

Catostomus catostomus: Dechtiar et al. 1988; 5%; L; lns; Ontario

Moxostoma macrolepidotum: Dechtiar et al. 1988; 17%; L; lns; Ontario

Argulus japonicus Thiele, 1900

Synonym: *Argulus foliaceus* Nettowich; *Argulus pellucidus* Wagler

Site of Infection: Anal fin

Host: *Perca flavescens*: Hudson and Bowen 2002; July 1994; 2001; pnp; minp; Quanicassee River, Saginaw Bay; 43°35'30"/-83°40'39"

Argulus sp.

Site of Infection: [External surface]

Host:

Esox lucius: Dechtiar et al. 1988; 1961-1971; 5%; L; lns; Ontario; llnk

Coregonus artedi: Bangham 1955; 1951; 5%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Percopsis omiscomaycus: Bangham 1955; 5%; minp; South Bay, Ontario

Table 14, continued.

Ergasilidae Nordmann, 1832

Ergasilus caeruleus Wilson, 1911

Synonym: *Ergasilus confusus* Bere, 1931; *Ergasilus skrjabini* Mueller, 1937

Site of Infection: Gills

Host:

Petromyzon marinus: Wilson and Ronald 1967; 1961, 1962; upstream migrants; 23%; 4; four tributaries in the Manitoulin Island-Bruce Peninsula area; llnk; lake stages; 10%; 3; five offshore areas of the Manitoulin Island-Bruce Peninsula area, Michigan; llnk

Rhinichthys cataractae: Dechtiar et al. 1988; 1961-1971; 8%; M; lns; Ontario; llnk

Catostomus catostomus: Bangham 1955; 1951; 41%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus catostomus: Dechtiar et al. 1988; 16%; L; lns; Ontario

Catostomus commersonii: Bangham 1955; 7%; minp; South Bay, Ontario

Catostomus commersonii: Collins and Dechtiar 1974; 1966-1972; pnp; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus commersonii: Dechtiar et al. 1988; 3%; M; lns; Ontario

Moxostoma macrolepidotum: Dechtiar et al. 1988; 50%; L; lns; Ontario

Coregonus clupeaformis: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Oncorhynchus nerka: Collins and Dechtiar 1974; 1%; minp; lns; Ontario; llnk

Oncorhynchus nerka: Dechtiar et al. 1988; 7%; minp; lns; Ontario

Salvelinus namaycush: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Salvelinus fontinalis x *Salvelinus namaycush*: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Salvelinus fontinalis x *Salvelinus namaycush*: Dechtiar and Berst 1978; 1962-1974; 2%; minp; primarily South Bay; 45°33'0"/-82°1'0"; other locations, Ontario; llnk

Percopsis omiscomaycus: Bangham 1955; 37%; minp; South Bay, Ontario

Percopsis omiscomaycus: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Percopsis omiscomaycus: Dechtiar et al. 1988; 7%; M; lns; Ontario

Ambloplites rupestris: Bangham 1955; 3%; minp; lns; Ontario

Ambloplites rupestris: Dechtiar et al. 1988; 9%; L; lns; Ontario

Lepomis gibbosus: Bangham 1955; 2%; minp; lns; Ontario

Micropterus dolomieu: Bangham 1955; 1%; minp; lns; Ontario; llnk

Micropterus dolomieu: Dechtiar et al. 1988; 17%; M; lns; Ontario

Perca flavescens: Bangham 1955; 7%; minp; South Bay, Ontario

Perca flavescens: Collins and Dechtiar 1974; pnp; minp; South Bay, Ontario

Perca flavescens: Dechtiar et al. 1988; 11%; L; lns; Ontario

Sander vitreus: Bangham 1955; 24%; minp; South Bay; Mindemoya Lake on Manitoulin Island, Ontario; llnk

Sander vitreus: Dechtiar et al. 1988; 19%; L; lns; Ontario

Remarks: Records of *Ergasilus caeruleus* on fish hosts before Roberts (1970) should be treated with caution.

Table 14, continued.

Ergasilus celestis Mueller, 1936

Synonym: *Ergasilus osburni* Tidd and Bangham, 1945

Site of Infection: Gills

Host: *Lota lota*: Dechtiar et al. 1988; 1961-1971; 42%; L; lns; Ontario; llnk

Ergasilus luciopercarum Henderson, 1926

Synonym: *Ergasilus confusus* Bere, 1931; *Ergasilus skrjabini* Mueller, 1936; *Ergasilus caeruleus* Wilson in Mueller, 1936

Site of Infection: Gills

Host:

Alosa pseudoharengus: Muzzall 1994; May 1990-July 1992; 3%; 1; Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Salvelinus namaycush: Hudson et al. 1994; June 1992, September 1992; 89%; L; Thunder Bay, Michigan; 45°0'0"/-83°23'59"

Micropterus salmoides: Hudson et al. 1994; pnp; minp; Thunder Bay, Michigan

Perca flavescens: Dechtiar et al. 1988; 1961-1971; 11%; M; Lns; Ontario; llnk

Sander vitreus: Dechtiar et al. 1988; 58%; L; lns; Ontario

Sander vitreus: Muzzall and Haas 1998; September 1993, September 1994; 96%; 46; Inner Saginaw Bay; 43°45'0"/-83°33'29"; 100%; 43; Outer Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Ergasilus megaceros Wilson, 1916

Synonym: *Ergasilus fragilis* Mueller, 1936

Site of Infection: Olfactory sac

Host: *Petromyzon marinus*: Muzzall and Hudson 2004; May 2002; 2%; 1; Cheboygan River, Cheboygan County, Michigan; 45°39'22"/-84°27'55"

Ergasilus nerkae Roberts, 1963

Synonym: *Ergasilus caeruleus* of Bangham and Adams, 1954 (partim), *Ergasilus* sp. of Bangham and Adams, 1954 (partim)

Site of Infection: Gills

Host:

Salvelinus namaycush: Hudson et al. 1994; June 1992, September 1992; pnp; minp; Thunder Bay, Michigan; 45°0'0"/-83°23'59"

Prosopium cylindraceum: Hudson et al. 1994; <1%; L; Rogers City, Michigan; 45°25'17"/-83°49'5"; Thunder Bay, Michigan

Gasterosteus aculeatus: Hudson et al. 1994; 5%; L; Cheboygan, Michigan; 45°39'52"/-84°26'8"; Thunder Bay, Michigan

Pungitius pungitius: Hudson et al. 1994; 45%; L-M; Cheboygan, Michigan; Thunder Bay, Michigan

Micropterus salmoides: Hudson et al. 1994; pnp; minp; Cheboygan, Michigan; Thunder Bay, Michigan

Table 14, continued.

Ergasilus versicolor Wilson, 1911

Synonym: *Ergasilus elegans* Wilson, 1916

Site of Infection: Gills

Host:

Ameiurus nebulosus: Bangham 1955; 1951; 100%; minp; Thomas Bay, Ontario; 45°49'59"/-82°25'0"

Ameiurus nebulosus: Dechtiar et al. 1988; 1961-1971; 19%; L; Ins; Ontario; lnk

Ictalurus punctatus: Dechtiar et al. 1988; 67%; L; Ins; Ontario

Noturus flavus: Dechtiar et al. 1988; 50%; L; Ins; Ontario

Culaea inconstans: Dechtiar et al. 1988; 20%; L; Ins; Ontario

Ergasilus sp.

Site of Infection: Gills

Host:

Amia calva: Dechtiar et al. 1988; 1961-1971; 39%; minp; Ins; Ontario; lnk

Couesius plumbeus: Dechtiar et al. 1988; 8%; L; Ins; Ontario

Luxilus cornutus: Dechtiar et al. 1988; 12%; L; Ins; Ontario

Carpionodes cyprinus: Dechtiar et al. 1988; 100%; L; Ins; Ontario

Pungitius pungitius: Dechtiar et al. 1988; 31%; L; Ins; Ontario

Cottus ricei: Dechtiar et al. 1988; 43%; L; Ins; Ontario

Neoergasilus japonicus (Harada, 1930)

Synonym: None

Site of Infection: Dorsal, caudal, anal, pelvic and pectoral fins

Host:

Cyprinus carpio: Hudson and Bowen 2002; July 1994, 2001; 15%; 2; Saginaw Bay, Michigan; 43°45'0"/-83°33'29"

Pimephales promelas: Hudson and Bowen 2002; 100%; 22; Saginaw Bay, Michigan

Ictalurus punctatus: Hudson and Bowen 2002; 18%; 2; Saginaw Bay, Michigan

Ambloplites rupestris: Hudson and Bowen 2002; 39%; 9; Saginaw Bay, Michigan

Lepomis cyanellus: Hudson and Bowen 2002; 15%; 1; Saginaw Bay, Michigan

Lepomis gibbosus: Hudson and Bowen 2002; 57-67%; 4-7; Saginaw Bay, Michigan

Lepomis macrochirus: Hudson and Bowen 2002; 7%; 10; Saginaw Bay, Michigan

Micropterus dolomieu: Hudson and Bowen 2002; 14%; 1; Saginaw Bay, Michigan

Micropterus salmoides: Hudson and Bowen 2002; 33%; 1; Saginaw Bay, Michigan

Perca flavescens: Hudson and Bowen 2002; 31-86%; 3-15; Saginaw Bay, Michigan

Remarks: *Neoergasilus japonicus* is an exotic species.

Table 14, continued.

Lernaeidae Cobbold, 1879

Lernaea cruciata (LeSeuer, 1824)

Synonym: *Lernaeocera cruciata*

Site of Infection: [External surface, muscle]

Host: *Carassius auratus*, *Cyprinus carpio*, *Ictalurus punctatus*, *Fundulus diaphanus*, *Ambloplites rupestris*, *Lepomis gibbosus*, *Micropterus salmoides*, *Perca flavescens*: Hudson and Bowen 2002; July 1994, 2001; “common”; minp; Quanicassee River, Saginaw Bay, Michigan; 43°35'30"/-83°40'39"

Lernaea cyprinacea Linnaeus, 1758

Synonym: *Lernaea elegans* Leigh-Sharpe, 1925; *Lernaeocerca esocina* Hermann, 1783; *Lernaea carasii* Tidd, 1933; probably *Lernaea ranae* Stunkard and Cable, 1913

Site of Infection: Muscle

Host:

Cyprinus carpio: Dechtiar et al. 1988; 1961-1971; 12%; L; lns; Ontario; llnk

Carassius auratus, *Cyprinus carpio*, *Ictalurus punctatus*, *Fundulus diaphanus menona*, *Ambloplites rupestris*, *Lepomis gibbosus*, *Micropterus salmoides*, *Perca flavescens*: Hudson and Bowen 2002; July 1994, 2001; “common”; minp; Quanicassee River, Saginaw Bay, Michigan; 43°35'30"/-83°40'39"

Lernaeopodidae Olsson, 1869

Achtheres pimelodi Kroyer, 1863

Synonym: *Achtheres ambloplitis* Kellicott, 1880; *Achtheres micropteri* Wright, 1882

Site of Infection: Gills

Host:

Ambloplites rupestris: Bangham 1955 1951; 3%; minp; lake on Manitoulin Island, Ontario; llnk

Ambloplites rupestris: Dechtiar et al. 1988; 1961-1971; 11%; L; lns; Ontario; llnk

Micropterus dolomieu: Bangham 1955; 27%; minp; several bays; llnk; lakes on Manitoulin Island, Ontario; llnk

Micropterus dolomieu: Dechtiar et al. 1988; 3%; L; lns; Ontario

Salmincola edwardsii (Olsson, 1869) Wilson, 1915

Synonym: *Lernaeopoda fontinalis* Smith, 1874; for other synonyms, see Kabata (1969)

Site of Infection: Gills

Host: *Salvelinus fontinalis*: Dechtiar et al. 1988; 1961-1971; 14%; L; lns; Ontario; llnk

Table 14, continued.

Salmincola extensus (Kessler, 1868) Kabata, 1969

Synonym: *Achtheres coregoni* Baumann, 1911; *Lernaeopoda coregoni* Smith, 1874; *Lernaeopoda extensus* Kessler, 1868; *Lernaeopoda maraenae* Olsson, 1877; *Salmincola wisconsinensis* Tidd and Bangham, 1945

Site of Infection: Body surface, skin, gills

Host:

Coregonus artedi: Bangham 1955; 1951; 14%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus hoyi: Bangham 1955; 2%; minp; west of South Baymouth, Ontario; 45°33'0"/-82°1'0"

Prosopium cylindraceum: Bangham 1955; 5%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario

Salmincola extumescens (Gadd, 1901) Wilson, 1915

Synonym: *Achtheres corpulentus* Kellicott, 1880; *Salmincola corpulentus* (Kellicott, 1880); *Lernaeopoda extumescens* Gadd, 1901; *Lernaeopoda inermis* Wilson, 1911; *Salmincola inermis* (Wilson, 1911) Wilson, 1915; *Salmincola omuli* Messjatzeff, 1926

Site of Infection: Branchial rim (beneath the operculum), external surface of the operculum, gills

Host:

Coregonus artedi: Dechtiar et al. 1988; 1961-1971; 3%; minp; lns; Ontario; llnk

Coregonus clupeaformis: Bangham 1955; 1951; 2%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Coregonus clupeaformis: Dechtiar et al. 1988; 11%; minp; lns; Ontario

Coregonus hoyi: Bowen and Stedman 1990; September 1985, October 1985; 21%; minp; Six Fathom Bank, Michigan; 44°48'50"/-82°27'58"; 12%; minp; Au Sable Point, Michigan; 44°19'49"/-83°20'27"; 4%; minp; Harbor Beach, Michigan; 43°50'30"/-82°38'29"; 1%; minp; Goderich, Ontario; 43°43'59"/-81°42'0"

Prosopium cylindraceum: Dechtiar et al. 1988; 23%; minp; lns; Ontario

Salmincola inermis Wilson, 1911

Synonym: None

Site of Infection: Gill cavities

Host: *Coregonus artedi*: Bangham 1955; 1951; 24%; minp; North Channel; 46°4'59"/-83°0'0"; South Bay, Ontario; 45°33'0"/-82°1'0"

Salmincola siscowet (Smith, 1874) Wilson, 1915

Synonym: None

Site of Infection: Base of fins, other areas of body

Host:

Salvelinus namaycush: Anderson 1993; 1988-1992; 15-73%; 1-5; South Bay, Ontario; 45°33'0"/-82°1'0"

Salvelinus namaycush x *Salvelinus fontinalis*: Anderson 1993; 33-90%; 1-11; South Bay, Ontario; few-70%; 6; Heywood Island, Ontario; llnk

Table 14, continued.

Salmincola sp.

Site of Infection: [External surface]

Host: *Prosopium cylindraceum*: Bangham 1955; 1951; 36%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Mollusca

Unionidae Rafinesque, 1820

Anodontooides ferussacianus Lea, 1834

Synonym: None

Site of Infection: Gills

Host: *Petromyzon marinus*: Wilson and Ronald 1967; 1961, 1962; upstream migrants; 12%; 2; four streams in the Manitoulin Island-Bruce Peninsula area; llnk; lake stages; <1%; minp; five offshore areas of the Manitoulin Island-Bruce Peninsula area, Michigan; llnk

Unidentified Glochidia

Synonym: ?

Site of Infection: Fins, gills

Host:

Couesius plumbeus: Dechtiar et al. 1988; 1961-1971; 6%; L; lns; Ontario; llnk

Phoxinus neogaeus: Dechtiar et al. 1988; 6%; L; lns; Ontario

Semotilus atromaculatus: Dechtiar et al. 1988; 22%; L; lns; Ontario

Catostomus catostomus: Dechtiar et al. 1988; 8%; L; lns; Ontario

Catostomus commersonii: Bangham 1955; 1951; <1%; minp; South Bay, Ontario; 45°33'0"/-82°1'0"

Catostomus commersonii: Dechtiar et al. 1988; 10%; L; lns; Ontario

Lota lota: Dechtiar et al. 1988; 33%; L; lns; Ontario

Cottus ricei: Dechtiar et al. 1988; 14%; L; lns; Ontario

Morone chrysops: Dechtiar et al. 1988; 100%; L; lns; Ontario

Ambloplites rupestris: Dechtiar et al. 1988; 9%; L; lns; Ontario

Perca flavescens: Bangham 1955; 5%; minp; South Bay, Ontario

Perca flavescens: Dechtiar et al. 1988; 4%; L-M; lns; Ontario

Sander vitreus: Bangham 1955; 7%; minp; Mindemoya Lake on Manitoulin Island, Ontario; llnk

Table 15. Fishes by family from Lake Huron from which parasites were reported during 1914-2010 using parasite data from Table 14. References in parentheses following parasites refer to references for host records.

Petromyzontidae

***Petromyzon marinus* (sea lamprey)**

Adult Digenea: *Podocotyle lepomis*, (Wilson and Ronald 1967)

Larval/Immature Digenea: *Diplostomum huronense*, (Wilson and Ronald 1967); *Diplostomum* sp., (Bangham 1955)

Adult Cestoda: *Proteocephalus laruei*, (Bangham 1955); *Proteocephalus* sp., (Wilson and Ronald 1967); *Triaenophorus crassus*, (Wilson and Ronald 1967)

Larval/Immature Cestoda: *Eubothrium* sp., (Applegate 1950); *Proteocephalus* sp., (Bangham 1955); *Triaenophorus crassus*, (Applegate 1950; Bangham 1955; McClain 1952); unidentified cestode, (Applegate 1950)

Adult Nematoda: *Truttaedacnitis stelmooides*, (Wilson and Ronald 1967)

Larval/Immature Nematoda: *Camallanus* sp., (McClain 1952); unidentified nematode, (Applegate 1950)

Adult Acanthocephala: *Echinorhynchus leidyi*, (McClain 1952); *Echinorhynchus salmonis*, (Applegate 1950; Bangham 1955; McClain 1952; Wilson and Ronald 1967)

Hirudinea: *Piscicola milneri*, (Applegate 1950)

Mollusca: Glochidia of *Anodontides ferussacianus*, (Wilson and Ronald 1967)

Copepoda: *Ergasilus caeruleus*, (Wilson and Ronald 1967); *Ergasilus megaceros*, (Muzzall and Hudson 2004)

Acipenseridae

***Acipenser fulvescens* (lake sturgeon)**

Adult Digenea: *Skrjabinopsolus manteri*, (Dechtiar et al. 1988); *Crepidostomum lintoni*, (Bangham 1955; Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1955)

Monogenea: *Diclybothrium armatum*, (Dechtiar et al. 1988); *Diclybothrium hamulatum*, (Bangham 1955)

Adult Nematoda: *Spinitectus gracilis*, (Dechtiar et al. 1988)

Larval/Immature Nematoda: *Truttaedacnitis clitellarius*, (Bangham 1955)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955; Dechtiar et al. 1988)

Amiidae

***Amia calva* (bowfin)**

Adult Digenea: *Crepidostomum cornutum*, (Dechtiar et al. 1988); *Macroderoides typicus*, (Bangham 1955)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955)

Table 15, continued.

Adult Cestoda: *Haplobothrium globuliforme*, (Bangham 1955; Cooper 1914); *Proteocephalus perplexus*, (Bangham 1955; Dechtiar et al. 1988)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Dechtiar et al. 1988)

Adult Nematoda: *Spinitectus carolini*, (Dechtiar et al. 1988); *Haplonema immutatum*, (Bangham 1955)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Bangham 1955); *Leptorhynchoides thecatus*, (Bangham 1955; Dechtiar et al. 1988)

Copepoda: *Ergasilus* sp., (Dechtiar et al. 1988)

Clupeidae

***Alosa pseudoharengus* (alewife)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Collins and Dechtiar 1974; Dechtiar et al. 1988);

Diplostomum sp., (Muzzall 1994); *Ichthyocotylurus intermedia*, (Collins and Dechtiar 1974);

Ichthyocotylurus sp., (Dechtiar et al. 1988)

Larval/Immature Nematoda: *Contracaecum* sp., (Muzzall 1994)

Adult Acanthocephala: *Acanthocephalus dirus*, (Collins and Dechtiar 1974; Dechtiar et al. 1988);

Echinorhynchus salmonis, (Collins and Dechtiar 1974)

Copepoda: *Ergasilus luciopercarum*, (Muzzall 1994)

***Dorosoma cepedianum* (gizzard shad)**

Microspora: *Glugea cepedianae*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988)

Monogenea: *Mazocraeoides olentangiensis*, (Dechtiar et al. 1988)

Cyprinidae

***Carassius auratus* (goldfish)**

Copepoda: *Lernaea cruciata*, (Hudson and Bowen 2002); *Lernaea cyprinacea*, (Hudson and Bowen 2002)

***Couesius plumbeus* (lake chub)**

Adult Digenea: *Plagioporus cooperi*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988)

Monogenea: *Dactylogyrus banghami*, (Dechtiar et al. 1988); *Octomacrum semotili*, (Dechtiar et al. 1988); *Gyrodactylus couesius*, (Dechtiar et al. 1988)

Larval/Immature Cestoda: *Proteocephalus* sp., (Dechtiar et al. 1988)

Adult Nematoda: *Rhabdochona canadensis*, (Dechtiar et al. 1988); *Rhabdochona* sp., (Bangham 1955)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955; Dechtiar et al. 1988);

Neoechinorhynchus rutili, (Dechtiar et al. 1988)

Mollusca: Unidentified glochidia, (Dechtiar et al. 1988)

Copepoda: *Ergasilus* sp., (Dechtiar et al. 1988)

Table 15, continued.

***Cyprinus carpio* (common carp)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955)

Monogenea: *Dactylogyrus anchoratus*, (Dechtiar et al. 1988); *Dactylogyrus extensus*, (Bangham 1955; Dechtiar et al. 1988); *Pseudocolpenteron pavlovskii*, (Dechtiar 1971b; Dechtiar et al. 1988); *Gyrodactylus medius*, (Dechtiar et al. 1988)

Adult Nematoda: *Capillaria catostomi*, (Bell and Beverley-Burton 1981); *Spinitectus gracilis*, (Dechtiar et al. 1988)

Larval/Immature Nematoda: *Spinitectus gracilis*, (Bangham 1955)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar et al. 1988)

Copepoda: *Neogergasilus japonicus*, (Hudson and Bowen 2002); *Lernaea cruciata*, (Hudson and Bowen 2002); *Lernaea cyprinacea*, (Dechtiar et al. 1988; Hudson and Bowen 2002)

***Cyprinus carpio* x *Carassius auratus* (common carp-goldfish hybrid)**

Adult Nematoda: *Capillaria catostomi*, (Bell and Beverley-Burton 1981)

***Luxilus cornutus* (common shiner)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar et al. 1988)

Myxozoa: *Thelohanellus notatus*, (Dechtiar et al. 1988)

Adult Digenea: *Allocreadium lobatum*, (Bangham 1955; Dechtiar et al. 1988); *Crepidostomum cooperi*, (Bangham 1955); *Plagioporus cooperi*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar et al. 1988); *Neascus* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988); *Proalaria huronensis*, (La Rue 1927)

Monogenea: *Dactylogyrus cornutus*, (Dechtiar et al. 1988); *Dactylogyrus pollex*, (Dechtiar et al. 1988); *Octomacrum microconfibula*, (Dechtiar et al. 1988); *Gyrodactylus* sp., (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Adult Nematoda: *Rhabdochona cascadilla*, (Bangham 1955; Dechtiar et al. 1988); *Rhabdochona decaturensis*, (Dechtiar et al. 1988)

Copepoda: *Ergasilus* sp., (Dechtiar et al. 1988)

***Margariscus nachtriebi* (northern pearl dace)**

Monogenea: *Dactylogyrus banghami*, (Dechtiar et al. 1988); *Gyrodactylus margaritae*, (Dechtiar et al. 1988)

***Nocomis biguttatus* (hornyhead chub)**

Adult Digenea: *Allocreadium lobatum*, (Bangham 1955); *Plagioporus sinitsini*, (Bangham 1955)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955)

Table 15, continued.

***Notemigonus crysoleucas* (golden shiner)**

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955)

Monogenea: *Dactylogyrus aureus*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Larval/Immature Nematoda: *Hysterothylacium brachyurum*, (Bangham 1955)

Adult Acanthocephala: *Neoechinorhynchus notemigoni*, (Dechtiar et al. 1988); *Neoechinorhynchus rutili*, (Dechtiar et al. 1988)

***Notropis atherinoides* (emerald shiner)**

Myxozoa: Unidentified, (Bangham 1955)

Adult Digenea: *Plagioporus cooperi*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988)

Monogenea: *Dactylogyrus* sp., (Dechtiar et al. 1988); *Gyrodactylus* sp., (Dechtiar et al. 1988);

Gyrodactyloidea, (Bangham 1955)

***Notropis heterodon* (blackchin shiner)**

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955)

***Notropis heterolepis* (blacknose shiner)**

Larval/Immature Digenea: *Clinostomum complanatum*, (Dechtiar et al. 1988); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955);

Posthodiplostomum minimum, (Bangham 1955; Dechtiar et al. 1988); *Uvulifer ambloplitis*, (Dechtiar et al. 1988)

Monogenea: *Dactylogyrus heterolepis*, (Dechtiar et al. 1988); *Gyrodactyloides* sp., (Bangham 1955)

Larval/Immature Cestoda: *Ligula intestinalis*, (Dechtiar et al. 1988); *Proteocephalus* sp., (Bangham 1955; Dechtiar et al. 1988)

Larval/Immature Nematoda: *Raphidascaaris acus*, (Smith 1986); *Spiroxys* sp., (Bangham 1955; Dechtiar et al. 1988)

***Notropis hudsonius* (spottail shiner)**

Ciliophora: *Trichodina* sp., (Dechtiar et al. 1988)

Myxozoa: *Myxobolus bartai*, (Cone et al. 2004); *Myxobolus burti*, (Cone et al. 2004; Cone and Marcogliese 2010); *Myxobolus grandis*, (Dechtiar et al. 1988); *Myxobolus* sp., (Dechtiar et al. 1988); *Thelohanellus notatus*, (Beis and Cone 1990; Cone et al. 2004); *Zschokkella* sp., (Cone et al. 2004)

Adult Digenea: *Allocreadium lobatum*, (Bangham 1955); *Crepidostomum cooperi*, (Bangham 1955); *Bucephalus* sp., (Bangham 1955); *Lissorthis* sp., (Bangham 1955); *Plagioporus cooperi*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Bucephalus* sp., (Dechtiar et al. 1988); *Centrovarium lobotes*, (Dechtiar et al. 1988); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988); *Ichthyocotylurus* sp., (Bangham 1955; Dechtiar et al. 1988); *Proalaria huronensis*, (La Rue 1927)

Table 15, continued.

Monogenea: *Dactylogyrus* sp., (Dechtiar et al. 1988); *Octomacrum semotili*, (Dechtiar et al. 1988); *Gyrodactylus* sp., (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)
Larval/Immature Cestoda: *Ligula intestinalis*, (Bangham 1955); *Proteocephalus* sp., (Bangham 1955)
Adult Nematoda: *Spinitectus gracilis*, (Bangham 1955); *Rhabdochona cascadiella*, (Bangham 1955); *Rhabdochona decaturensis*, (Dechtiar et al. 1988)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955); *Neoechinorhynchus rutili*, (Bangham 1955; Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Bangham 1955); *Leptorhynchoides thecatus*, (Bangham 1955)

***Notropis rubellus* (rosyface shiner)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Posthodiplostomum minimum*, (Dechtiar et al. 1988)

***Notropis volucellus* (mimic shiner)**

Larval/Immature Digenea: *Centrovarium lobotes*, (Bangham 1955); *Diplostomum* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955)

***Phoxinus eos* (northern redbelly dace)**

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955); *Ichthyocotylurus* sp., (Bangham 1955)
Monogenea: Gyrodactyloidea, (Bangham 1955)

***Phoxinus neogaeus* (finscale dace)**

Ciliophora: *Trichodina* sp., (Dechtiar et al. 1988)
Myxozoa: *Myxobolus conspicuus*, (Dechtiar et al. 1988)
Larval/Immature Digenea: *Clinostomum complanatum*, (Dechtiar et al. 1988); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Posthodiplostomum minimum*, (Dechtiar et al. 1988)
Monogenea: *Dactylogyrus chrosomi*, (Dechtiar et al. 1988); *Gyrodactylus* sp., (Dechtiar et al. 1988)
Adult Acanthocephala: *Neoechinorhynchus rutili*, (Dechtiar et al. 1988)
Mollusca: Unidentified glochidia, (Dechtiar et al. 1988)
Copepoda: *Argulus catostomi*, (Dechtiar et al. 1988)

***Pimephales notatus* (bluntnose minnow)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar et al. 1988)
Myxozoa: *Thelohanellus notatus*, (Dechtiar et al. 1988; Mavor 1916); unidentified myxosporidia, (Bangham 1955)
Larval/Immature Digenea: *Centrovarium lobotes*, (Bangham 1955; Dechtiar et al. 1988); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988); *Proalaria huronensis*, (La Rue 1927)
Monogenea: *Dactylogyrus bifurcatus*, (Dechtiar et al. 1988); *Gyrodactylus* sp., (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Table 15, continued.

Larval/Immature Cestoda: *Ligula intestinalis*, (Dechtiar et al. 1988); *Proteocephalus* sp., (Dechtiar et al. 1988)

Adult Nematoda: *Rhabdochona cascadilla*, (Bangham 1955)

Adult Acanthocephala: *Neoechinorhynchus rutili*, (Dechtiar et al. 1988)

***Pimephales promelas* (fathead minnow)**

Larval/Immature Digenea: *Neascus* sp., (Bangham 1955; Dechtiar et al. 1988)

Monogenea: *Dactylogyrus bifurcatus*, (Dechtiar et al. 1988); *Gyrodactylus* sp., (Dechtiar et al. 1988)

Larval/Immature Nematoda: *Raphidascaris acus*, (Smith 1986)

Copepoda: *Neoergasilus japonicus*, (Hudson and Bowen 2002)

***Rhinichthys cataractae* (longnose dace)**

Adult Digenea: *Allocreadium lobatum*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar et al. 1988); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988)

Monogenea: *Dactylogyrus banghami*, (Dechtiar et al. 1988); *Gyrodactylus atratuli*, (Dechtiar et al. 1988); *Gyrodactylus dechtiari*, (Dechtiar et al. 1988)

Adult Nematoda: *Rhabdochona canadensis*, (Dechtiar et al. 1988)

Copepoda: *Ergasilus caeruleus*, (Dechtiar et al. 1988)

***Rhinichthys obtusus* (western blacknose dace)**

Larval/Immature Digenea: *Clinostomum complanatum*, (Dechtiar et al. 1988); *Ichthyocotylurus* sp., (Dechtiar et al. 1988)

Monogenea: *Dactylogyrus banghami*, (Dechtiar et al. 1988); *Gyrodactylus dechtiari*, (Dechtiar et al. 1988)

***Semotilus atromaculatus* (creek chub)**

Myxozoa: *Myxobolus pendula*, (Dechtiar et al. 1988); unidentified myxosporidia, (Bangham 1955)

Adult Digenea: *Allocreadium lobatum*, (Bangham 1955; Dechtiar et al. 1988)

Larval/Immature Digenea: *Bucephalus* sp., (Dechtiar et al. 1988); *Crassiphiala bulboglossa*, (Dechtiar et al. 1988); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988)

Monogenea: *Cleidodiscus brachus*, (Dechtiar et al. 1988); *Dactylogyrus attenuatus*, (Dechtiar et al. 1988); *Dactylogyrus lineatus*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Larval/Immature Cestoda: *Ligula intestinalis*, (Dechtiar et al. 1988)

Adult Nematoda: *Rhabdochona canadensis*, (Dechtiar et al. 1988); *Rhabdochona cascadilla*, (Bangham 1955; Dechtiar et al. 1988)

Mollusca: Unidentified glochidia, (Dechtiar et al. 1988)

Table 15, continued.

Catostomidae

***Carpiodes cyprinus* (quillback)**

Myxozoa: *Myxobolus rotundum*, (Dechtiar et al. 1988)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988)
Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar et al. 1988)
Copepoda: *Ergasilus* sp., (Dechtiar et al. 1988)

***Catostomus catostomus* (longnose sucker)**

Myxozoa: *Myxobolus bibullatum*, (Dechtiar et al. 1988); unidentified myxosporidia, (Bangham 1955)
Adult Digenea: *Phyllodistomum lysteri*, (Dechtiar et al. 1988); *Lissorchis simeri*, (Bangham 1955);
Sanguinicola sp., (Dechtiar et al. 1988)
Larval/Immature Digenea: *Diplostomum flexicaudum*, (Bangham 1955); *Diplostomum spathaceum*,
(Dechtiar et al. 1988); *Posthodiplostomum minimum*, (Bangham 1955)
Monogenea: *Acolpenteron catostomi*, (Dechtiar et al. 1988); *Pellucidhaptor catostomi*, (Dechtiar et al.
1988); *Octomacrum lanceatum*, (Dechtiar et al. 1988); *Anonchohaptor anomalus*, (Dechtiar and Dillon
1974; Dechtiar et al. 1988)
Adult Cestoda: *Glaridacris catostomi*, (Dechtiar et al. 1988); Cestodaria, (Bangham 1955)
Larval/Immature Cestoda: *Ligula intestinalis*, (Dechtiar et al. 1988); *Triaenophorus nodulosus*, (Dechtiar et
al. 1988); *Triaenophorus* sp., (Bangham 1955)
Adult Nematoda: *Philometroides nodulosa*, (Dechtiar et al. 1988)
Adult Acanthocephala: *Echinorhynchus leidyi*, (Bangham 1955); *Echinorhynchus salmonis*, (Bangham
1955; Dechtiar et al. 1988); *Neoechinorhynchus crassus*, (Bangham 1955; Dechtiar et al. 1988);
Neoechinorhynchus cristatus, (Dechtiar et al. 1988); *Neoechinorhynchus strigosus*, (Bangham 1955);
Leptorhynchoides thecatus, (Bangham 1955; Dechtiar et al. 1988)
Hirudinea: *Actinobdella inequiannualata*, (Bangham 1955; Dechtiar et al. 1988)
Mollusca: Unidentified glochidia, (Dechtiar et al. 1988)
Copepoda: *Argulus catostomi*, (Dechtiar et al. 1988); *Ergasilus caeruleus*, (Bangham 1955; Dechtiar et al.
1988)

***Catostomus commersonii* (white sucker)**

Mastigophora: *Cryptobia catostomi*, (Bower and Woo 1977); *Trypanoplasma borreli*, (Mavor 1916)
Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar et al. 1988); *Trichodina* sp., (Dechtiar et al. 1988)
Myxozoa: *Myxobolus bibullatum*, (Dechtiar et al. 1988); unidentified myxosporidia, (Bangham 1955)
Adult Digenea: *Phyllodistomum lysteri*, (Dechtiar et al. 1988); *Lissorchis attenuatus*, (Bangham 1955;
Dechtiar et al. 1988); *Plagioporus sinitsini*, (Bangham 1955); *Sanguinicola* sp., (Dechtiar et al. 1988)
Larval/Immature Digenea: *Diplostomum flexicaudum*, (Bangham 1955); *Diplostomum spathaceum*,
(Collins and Dechtiar 1974; Dechtiar et al. 1988); *Ichthyocotylurus intermedia*, (Collins and Dechtiar
1974); *Proalaria huronensis*, (La Rue 1927)
Monogenea: *Acolpenteron catostomi*, (Dechtiar et al. 1988); *Octomacrum lanceatum*, (Bangham 1955;
Dechtiar et al. 1988); *Gyrodactylus* sp., (Dechtiar et al. 1988); *Anonchohaptor anomalus*, (Dechtiar et al.
1988)

Table 15, continued.

Adult Cestoda: *Glaridacris catostomi*, (Bangham 1955; Dechtiar et al. 1988)
Larval/Immature Cestoda: *Ligula intestinalis*, (Bangham 1955; Dechtiar et al. 1988); *Triaenophorus nodulosus*, (Collins and Dechtiar 1974; Dechtiar et al. 1988)
Adult Nematoda: *Capillaria bakeri*, (Bangham 1955); *Capillaria catostomi*, (Bell and Beverley-Burton 1980; Bell and Beverley-Burton 1981); *Philometroides huronensis*, (Uhazy 1976); *Philometroides nodulosa*, (Dechtiar et al. 1988); *Rhabdochona cascadiella*, (Collins and Dechtiar 1974)
Adult Acanthocephala: *Acanthocephalus dirus*, (Collins and Dechtiar 1974); *Echinorhynchus leidyi*, (Bangham 1955); *Echinorhynchus salmonis*, (Bangham 1955; Collins and Dechtiar 1974); *Neoechinorhynchus crassus*, (Bangham 1955; Dechtiar et al. 1988); *Neoechinorhynchus cristatus*, (Dechtiar et al. 1988); *Neoechinorhynchus strigosus*, (Bangham 1955; Dechtiar et al. 1988); *Octospinifer macilentus*, (Bangham 1955; Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Bangham 1955; Collins and Dechtiar 1974; Dechtiar et al. 1988)
Hirudinea: *Actinobdella inequiannulata*, (Bangham 1955; Dechtiar et al. 1988); *Actinobdella* sp., (Bower and Woo 1977)
Mollusca: Unidentified glochidia, (Bangham 1955; Dechtiar et al. 1988)
Copepoda: *Ergasilus caeruleus*, (Bangham 1955; Collins and Dechtiar 1974; Dechtiar et al. 1988)

***Moxostoma macrolepidotum* (shorthead redhorse)**

Myxozoa: *Myxobolus* sp., (Dechtiar et al. 1988)
Adult Digenea: *Phyllodistomum lysteri*, (Dechtiar et al. 1988)
Monogenea: *Dactylogyrus duquesni*, (Dechtiar et al. 1988); *Pellucidhaptor* sp., (Dechtiar et al. 1988); *Pseudomurraytrema copulatum*, (Dechtiar et al. 1988)
Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Dechtiar et al. 1988)
Copepoda: *Argulus catostomi*, (Dechtiar et al. 1988); *Ergasilus caeruleus*, (Dechtiar et al. 1988)

Ictaluridae

***Ameiurus nebulosus* (brown bullhead)**

Myxozoa: *Henneguya exilis*, (Dechtiar et al. 1988)
Adult Digenea: *Crepidostomum cornutum*, (Bangham 1955); *Megalogonia ictaluri*, (Bangham 1955; Dechtiar et al. 1988); *Azygia angusticauda*, (Bangham 1955); *Acetodextra amiuri*, (Bangham 1955; Dechtiar et al. 1988); *Glossidium geminum*, (Bangham 1955); *Phyllodistomum staffordi*, (Bangham 1955; Dechtiar et al. 1988); *Microphallus opacus*, (Bangham 1955; Dechtiar et al. 1988)
Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1955; Dechtiar et al. 1988); *Centrovarium lobotes*, (Bangham 1955); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Proalaria huronensis*, (La Rue 1927)
Monogenea: *Ligictaluridus monticellii*, (Dechtiar et al. 1988); *Ligictaluridus pricei*, (Dechtiar et al. 1988); *Gyrodactylus nebulosus*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)
Adult Cestoda: *Corallobothrium fimbriatum*, (Bangham 1955; Dechtiar et al. 1988); *Corallotaenia minutia*, (Dechtiar et al. 1988)
Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1955); *Proteocephalus pearsei*, (Bangham 1955)
Adult Nematoda: *Dichelyne robusta*, (Bangham 1955); *Spinitectus gracilis*, (Bangham 1955)

Table 15, continued.

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Bangham 1955; Dechtiar et al. 1988);
Leptorhynchoides thecatus, (Bangham 1955; Dechtiar et al. 1988)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham 1955)

Copepoda: *Ergasilus versicolor*, (Bangham 1955; Dechtiar et al. 1988)

***Ictalurus punctatus* (channel catfish)**

Adult Digenea: *Megalogonia ictaluri*, (Bangham 1955; Dechtiar et al. 1988); *Azygia angusticauda*,
(Bangham 1955); *Alloglossidium corti*, (Bangham 1955; Dechtiar et al. 1988); *Microphallus opacus*,
(Bangham 1955)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham
1955)

Monogenea: *Ligictaluridus floridanus*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Adult Cestoda: *Megathylacoides giganteum*, (Bangham 1955; Dechtiar et al. 1988)

Larval/Immature Cestoda: *Bothriocephalus* sp., (Bangham 1955)

Larval/Immature Nematoda: *Raphidascaris acus*, (Smith 1984)

Copepoda: *Ergasilus versicolor*, (Dechtiar et al. 1988); *Neoergasilus japonicus*, (Hudson and Bowen
2002); *Lernaea cruciata*, (Hudson and Bowen 2002); *Lernaea cyprinacea*, (Hudson and Bowen 2002)

***Noturus flavus* (stonecat)**

Monogenea: *Ligictaluridus pricei*, (Dechtiar et al. 1988)

Adult Cestoda: *Corallobothrium fimbriatum*, (Dechtiar et al. 1988)

Larval/Immature Nematoda: *Hysterothylacium brachyurum*, (Dechtiar et al. 1988)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Dechtiar et al. 1988)

Copepoda: *Ergasilus versicolor*, (Dechtiar et al. 1988)

Esocidae

***Esox lucius* (northern pike)**

Myxozoa: *Myxidium lieberkuhnii*, (Mavor 1916)

Adult Digenea: *Azygia longa*, (Bangham 1955; Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham
1955); *Uvulifer ambloplites*, (Dechtiar et al. 1988); *Ichthyocotylurus* sp., (Dechtiar et al. 1988)

Monogenea: *Gyrodactylus* sp., (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955); *Tetraonchus
monenteron*, (Dechtiar 1972b; Dechtiar et al. 1988)

Adult Cestoda: *Proteocephalus pinguis*, (Bangham 1955; Dechtiar et al. 1988); *Triaenophorus crassus*,
(Bangham 1955; Dechtiar et al. 1988); *Triaenophorus nodulosus*, (Dechtiar et al. 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Bangham 1955; Dechtiar et al. 1988); *Raphidascaris
acus*, (Smith 1984, 1986; Dechtiar et al. 1988)

Table 15, continued.

Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955; Dechtiar et al. 1988);
Neoechinorhynchus cylindratus, (Bangham 1955); *Neoechinorhynchus rutili*, (Bangham 1955);
Neoechinorhynchus tenellus, (Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Bangham 1955);
Leptorhynchoides thecatus, (Bangham 1955)
Copepoda: *Argulus* sp., (Dechtiar et al. 1988)

***Esox masquinongy* (muskellunge)**

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1955)
Adult Cestoda: *Proteocephalus pinguis*, (Bangham 1955)
Adult Nematoda: *Hysterothylacium brachyurum*, (Bangham 1955)

Umbridae

***Umbra limi* (central mudminnow)**

Ciliophora: *Trichodina* sp., (Dechtiar et al. 1988)
Adult Digenea: *Bunoderina eucaliae*, (Bangham 1955; Dechtiar et al. 1988); *Creptotrema funduli*,
(Bangham 1955; Dechtiar et al. 1988); *Phyllodistomum brevicecum*, (Dechtiar et al. 1988)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham
1955); *Neascus* sp., (Bangham 1955); *Ichthyocotylurus* sp., (Bangham 1955; Dechtiar et al. 1988)
Larval/Immature Nematoda: *Spiroxys* sp., (Dechtiar et al. 1988)
Adult Acanthocephala: *Neoechinorhynchus rutili*, (Bangham 1955)
Immature Acanthocephala: *Pomphorhynchus bulbocolli*, (Bangham 1955)

Osmeridae

***Osmerus mordax* (rainbow smelt)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Collins and Dechtiar 1974; Muzzall and Peebles
1988; Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Ichthyocotylurus intermedia*, (Collins and
Dechtiar 1974)
Adult Cestoda: *Cyathocephalus truncatus*, (Dechtiar et al. 1988; Muzzall and Peebles 1988)
Larval/Immature Cestoda: *Eubothrium* sp., (Muzzall and Peebles 1988); *Protoecephalus* sp., (Dechtiar et
al. 1988; Muzzall and Peebles 1988)
Adult Nematoda: *Cystidicola farionis*, (Dechtiar et al. 1988); *Cystidicola stigmatura*, (Collins and Dechtiar
1974)
Larval/Immature Nematoda: *Capillaria* sp., (Muzzall and Peebles 1988); *Cystidicola* sp., (Muzzall and
Peebles 1988); *Spinitectus gracilis*, (Bangham 1955); *Philometra* sp., (Bangham 1955)
Adult Acanthocephala: *Acanthocephalus dirus*, (Collins and Dechtiar 1974); *Echinorhynchus salmonis*,
(Allison 1949, 1952; Bangham 1955; Collins and Dechtiar 1974; Dechtiar et al. 1988; Muzzall and Peebles
1988); *Neoechinorhynchus pungitius*, (Collins and Dechtiar 1974); *Neoechinorhynchus rutili*, (Collins and
Dechtiar 1974; Dechtiar et al. 1988); *Neoechinorhynchus* sp., (Dechtiar et al. 1988)

Table 15, continued.

Immature Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955; Muzzall and Peebles 1988);
Pomphorhynchus bulbocolli, (Bangham 1955)
Hirudinea: *Piscicola punctata*, (Dechtiar et al. 1988)

Salmonidae

***Coregonus alpenae* (longjaw chub/cisco)**

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1955)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955)

***Coregonus artedi* (lake herring/cisco)**

Myxozoa: *Henneguya zschokkei*, (Dechtiar et al. 1988); unidentified myxospora, (Bangham 1955)
Adult Digenea: *Phyllodistomum* sp., (Dechtiar et al. 1988)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Ichthyocotylurus intermedia*, (Hughes 1928; Dechtiar et al. 1988)
Monogenea: *Discocotyle sagittata*, (Bangham 1955)
Adult Cestoda: *Eubothrium crassum*, (Bangham 1955); *Cyathocephalus truncatus*, (Dechtiar et al. 1988); *Proteocephalus exiguus*, (Bangham 1955; Dechtiar et al. 1988); *Proteocephalus laruei*, (Bangham 1955; Dechtiar et al. 1988)
Larval/Immature Cestoda: *Diphyllobothrium ditremum*, (Dechtiar et al. 1988); *Diphyllobothrium laruei*, (Vergeer 1942); *Diphyllobothrium* sp., (Bangham 1955); *Triaenophorus crassus*, (Bangham 1955; Dechtiar et al. 1988)
Adult Nematoda: *Cystidicola farionis*, (Dechtiar et al. 1988); *Cystidicola stigmatura*, (Bangham 1955)
Larval/Immature Nematoda: *Philometra* sp., (Bangham 1955)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955; Dechtiar et al. 1988)
Immature Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955)
Copepoda: *Argulus* sp., (Bangham 1955); *Salmincola extensus*, (Bangham 1955); *Salmincola extumescens*, (Dechtiar et al. 1988); *Salmincola inermis*, (Bangham 1955)

***Coregonus clupeaformis* (lake whitefish)**

Adult Digenea: *Crepidostomum farionis*, (Collins and Dechtiar 1974); *Phyllodistomum coregoni*, (Dechtiar et al. 1988)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Diplostomum* sp. or *Tylodelphys* sp., (La Rue et al. 1926); *Ichthyocotylurus intermedia*, (Collins and Dechtiar 1974; Dechtiar et al. 1988)
Monogenea: *Discocotyle sagittata*, (Dechtiar et al. 1988)
Adult Cestoda: *Cyathocephalus truncatus*, (Bangham 1955; Cooper 1919; Dechtiar and Loftus 1965; Dechtiar et al. 1988; French et al. 2005); *Proteocephalus exiguus*, (Bangham 1955); *Proteocephalus laruei*, (Bangham 1955; Dechtiar et al. 1988)
Larval/Immature Cestoda: *Diphyllobothrium* sp., (Bangham 1955; Dechtiar et al. 1988); *Triaenophorus crassus*, (Bangham 1955; Dechtiar et al. 1988)

Table 15, continued.

Adult Nematoda: *Capillaria catostomi*, (Bell and Beverley-Burton 1981); *Cystidicola farionis*, (Dechtiar et al. 1988; Lankester and Smith 1980); *Cystidicola stigmatura*, (Bangham 1955; Collins and Dechtiar 1974; Ko and Anderson 1969); *Cystidicoloides ephemeridarum*, (Dechtiar et al. 1988); *Spinitectus gracilis*, (Collins and Dechtiar 1974)

Larval/Immature Nematoda: *Raphidascaris acus*, (Dechtiar et al. 1988); *Spinitectus gracilis*, (Bangham 1955); *Philometra* sp., (Bangham 1955)

Adult Acanthocephala: *Acanthocephalus dirus*, (Collins and Dechtiar 1974); *Echinorhynchus salmonis*, (Bangham 1955; Collins and Dechtiar 1974; Dechtiar et al. 1988); *Neoechinorhynchus tumidus*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Dechtiar et al. 1988)

Copepoda: *Ergasilus caeruleus*, (Collins and Dechtiar 1974); *Salmincola extumescens*, (Bangham 1955; Dechtiar et al. 1988)

***Coregonus hoyi* (bloater)**

Adult Digenea: Unidentified digenean, (Lundahl and Hoerberling 1967); *Phyllodistomum* sp., (Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Ichthyocotylurus intermedia*, (Dechtiar et al. 1988)

Monogenea: *Discocotyle sagittata*, (Bangham 1955; Dechtiar et al. 1988)

Adult Cestoda: *Cyathocephalus truncatus*, (Dechtiar et al. 1988; French et al. 2005; Lundahl and Hoerberling 1967); *Proteocephalus exiguus*, (Bangham 1955); *Proteocephalus laruei*, (Bangham 1955); *Proteocephalus* sp., (Lundahl and Hoerberling 1967)

Larval/Immature Cestoda: *Diphyllobothrium* sp., (Bangham 1955; Dechtiar et al. 1988; Lundahl and Hoerberling 1967); *Triaenophorus crassus*, (Bangham 1955; Dechtiar et al. 1988);

Adult Nematoda: *Cystidicola stigmatura*, (Bangham 1955; Lundahl and Hoerberling 1967)

Adult Acanthocephala: *Echinorhynchus leidyi*, (Bangham 1955); *Echinorhynchus salmonis*, (Bangham 1955; Dechtiar et al. 1988; Lundahl and Hoerberling 1967); *Neoechinorhynchus rutili*, (Dechtiar et al. 1988); *Neoechinorhynchus tumidus*, (Dechtiar et al. 1988)

Copepoda: *Salmincola extensus*, (Bangham 1955); *Salmincola extumescens*, (Bowen and Stedman 1990)

***Oncorhynchus gorbuscha* (pink salmon)**

Adult Cestoda: *Eubothrium salvelini*, (Muzzall and Peebles 1986); *Cyathocephalus truncatus*, (Muzzall and Peebles 1986)

Larval/Immature Cestoda: *Diphyllobothrium* sp., (Muzzall and Peebles 1986)

Adult Nematoda: *Cystidicola farionis*, (Muzzall and Peebles 1986)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall and Peebles 1986)

***Oncorhynchus kisutch* (coho salmon)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988)

Adult Nematoda: *Cystidicola farionis*, (Dechtiar et al. 1988); *Cystidicoloides ephemeridarum*, (Dechtiar et al. 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar et al. 1988)

Table 15, continued.

***Oncorhynchus mykiss* (rainbow trout)**

Adult Digenea: *Phyllodistomum lachancei*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Ichthyocotylurus* sp., (Dechtiar et al. 1988)

Adult Cestoda: *Eubothrium crassum*, (Bangham 1955)

Larval/Immature Cestoda: *Diphyllobothrium* sp., (Bangham 1955); *Proteocephalus* sp., (Bangham 1955)

Adult Nematoda: *Cystidicola farionis*, (Dechtiar et al. 1988; Dextrase 1987); *Cystidicoloides ephemeridarum*, (Bangham 1955; Dechtiar et al. 1988)

Adult Acanthocephala: *Echinorhynchus leidyi*, (Bangham 1955); *Echinorhynchus salmonis*, (Bangham 1955; Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Dechtiar et al. 1988)

***Oncorhynchus nerka* (kokanee, sockeye salmon)**

Adult Digenea: *Crepidostomum farionis*, (Collins and Dechtiar 1974; Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Ichthyocotylurus intermedia*, (Collins and Dechtiar 1974; Dechtiar et al. 1988)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Collins and Dechtiar 1974; Dechtiar et al. 1988)

Adult Nematoda: *Capillaria catenata*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Cystidicola farionis*, (Dechtiar et al. 1988); *Cystidicola stigmatura*, (Collins and Dechtiar 1974); *Cystidicoloides ephemeridarum*, (Dechtiar et al. 1988); *Spinitectus gracilis*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Rhabdochona cascadilla*, (Collins and Dechtiar 1974; Dechtiar et al. 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Echinorhynchus salmonis*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Neoechinorhynchus pungitius*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Neoechinorhynchus rutili*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Neoechinorhynchus tumidus*, (Bangham 1955; Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Leptorhynchoides thecatus*, (Collins and Dechtiar 1974; Dechtiar et al. 1988)

Copepoda: *Ergasilus caeruleus*, (Collins and Dechtiar 1974; Dechtiar et al. 1988)

***Oncorhynchus tshawytscha* (Chinook salmon)**

Adult Cestoda: *Eubothrium salvelini*, (Muzzall and Peebles 1986)

Larval/Immature Cestoda: *Diphyllobothrium* sp., (Muzzall and Peebles 1986)

Adult Nematoda: *Capillaria salvelini*, (Muzzall and Peebles 1986); *Cystidicola farionis*, (Muzzall and Peebles 1986)

Larval/Immature Nematoda: *Haplonema* sp., (Muzzall and Peebles 1986)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall and Peebles 1986)

Immature Acanthocephala: *Echinorhynchus* sp., (Muzzall and Peebles 1986); *Neoechinorhynchus tumidus*, (Muzzall and Peebles 1986)

***Prosopium coulteri* (pygmy whitefish)**

Larval/Immature Digenea: *Ichthyocotylurus intermedia*, (Hughes 1928)

Table 15, continued.

***Prosopium cylindraceum* (round whitefish)**

Adult Digenea: *Crepidostomum farionis*, (Bangham 1955); *Phyllodistomum* sp., (Dechtiar et al. 1988)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Ichthyocotylurus* sp., (Dechtiar et al. 1988)
Monogenea: *Discocotyle sagittata*, (Bangham 1955); *Tetraonchus variabilis*, (Dechtiar 1972b; Dechtiar et al. 1988)
Adult Cestoda: *Cyathocephalus truncatus*, (Dechtiar et al. 1988; French et al. 2005); *Proteocephalus exiguus*, (Bangham 1955)
Larval/Immature Cestoda: *Triaenophorus crassus*, (Dechtiar et al. 1988); *Triaenophorus nodulosus*, (Dechtiar et al. 1988)
Adult Nematoda: *Cystidicola stigmatura*, (Bangham 1955); *Cystidicoloides ephemeridarum*, (Dechtiar et al. 1988)
Larval/Immature Nematoda: *Philometra* sp., (Bangham 1955)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955; Dechtiar et al. 1988); *Neoechinorhynchus tumidus*, (Bangham 1955; Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Dechtiar et al. 1988)
Copepoda: *Ergasilus nerkae*, (Hudson et al. 1994); *Salmincola extensus*, (Bangham 1955); *Salmincola extumescens*, (Dechtiar et al. 1988); *Salmincola* sp., (Bangham 1955)

***Salmo trutta* (brown trout)**

Adult Nematoda: *Cystidicoloides ephemeridarum*, (Dechtiar et al. 1988)
Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar et al. 1988); *Echinorhynchus salmonis*, (Dechtiar et al. 1988)

***Salvelinus fontinalis* (brook trout)**

Adult Digenea: *Crepidostomum farionis*, (Dechtiar et al. 1988); *Phyllodistomum lachancei*, (Dechtiar et al. 1988)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955)
Adult Cestoda: *Cyathocephalus truncatus*, (Muzzall and Bowen 2000); *Proteocephalus* sp., (Bangham 1955)
Adult Nematoda: *Cystidicoloides ephemeridarum*, (Bangham 1955)
Adult Acanthocephala: *Echinorhynchus lateralis*, (Dechtiar et al. 1988)
Hirudinea: *Piscicola punctata*, (Dechtiar et al. 1988)
Copepoda: *Salmincola edwardsii*, (Dechtiar et al. 1988)

***Salvelinus namaycush* (lake trout)**

Adult Digenea: *Crepidostomum farionis*, (Collins and Dechtiar 1974)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955; Muzzall and Bowen 2000); *Ichthyocotylurus intermedia*, (Collins and Dechtiar 1974)
Adult Cestoda: *Eubothrium salvelini*, (Bangham 1955; Muzzall and Bowen 2000)

Table 15, continued.

Adult Nematoda: *Capillaria salvelini*, (Muzzall and Bowen 2000); *Cystidicola stigmatura*, (Black 1983)

Adult Acanthocephala: *Echinorhynchus leidyi*, (Bangham 1955; Dechtiar et al. 1988); *Echinorhynchus salmonis*, (Bangham 1955; Dechtiar et al. 1988; Muzzall and Bowen 2000); *Neoechinorhynchus* sp., (Muzzall and Bowen 2000)

Copepoda: *Ergasilus caeruleus*, (Collins and Dechtiar 1974); *Ergasilus luciopercarum*, (Hudson et al. 1994); *Ergasilus nerkae*, (Hudson et al. 1994); *Salmincola siscowet*, (Anderson 1993)

***Salvelinus fontinalis* x *Salvelinus namaycush* (splake)**

Adult Digenea: *Crepidostomum farionis*, (Dechtiar and Berst 1978; Collins and Dechtiar 1974)

Larval/Immature Digenea: *Diplostomum flexicaudum*, (Dechtiar and Berst 1978); *Diplostomum spathaceum*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Ichthyocotylurus intermedia*, (Collins and Dechtiar 1974; Dechtiar and Berst 1978; Dechtiar et al. 1988)

Monogenea: *Discocotyle sagittata*, (Dechtiar and Berst 1978; Dechtiar et al. 1988)

Adult Cestoda: *Eubothrium salvelini*, (Dechtiar and Berst 1978); *Cyathocephalus truncatus*, (Dechtiar and Berst 1978; Dechtiar et al. 1988); *Proteocephalus* sp., (Dechtiar and Berst 1978; Dechtiar et al. 1988)

Larval/Immature Cestoda: *Eubothrium salvelini*, (Dechtiar et al. 1988); *Diphyllobothrium* sp., (Dechtiar and Berst 1978); *Proteocephalus* sp., (Dechtiar and Berst 1978; Dechtiar et al. 1988); *Triaenophorus nodulosus*, (Dechtiar and Berst 1978; Dechtiar et al. 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Berst 1978; Dechtiar et al. 1988); *Capillaria salvelini*, (Dechtiar and Berst 1978); *Cystidicola farionis*, (Dechtiar et al. 1988; Lankester and Smith 1980); *Cystidicola stigmatura*, (Collins and Dechtiar 1974; Dechtiar and Berst 1978); *Spinitectus gracilis*, (Collins and Dechtiar 1974; Dechtiar and Berst 1978; Dechtiar et al. 1988); *Rhabdochona* sp., (Dechtiar and Berst 1978)

Adult Acanthocephala: *Acanthocephalus dirus*, (Collins and Dechtiar 1974; Dechtiar and Berst 1978; Dechtiar et al. 1988); *Echinorhynchus salmonis*, (Collins and Dechtiar 1974; Dechtiar and Berst 1978; Dechtiar et al. 1988); *Neoechinorhynchus tumidus*, (Dechtiar and Berst 1978; Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Collins and Dechtiar 1974; Dechtiar and Berst 1978; Dechtiar et al. 1988)

Copepoda: *Ergasilus caeruleus*, (Collins and Dechtiar 1974; Dechtiar and Berst 1978); *Salmincola siscowet*, (Anderson 1993)

Percopsidae

***Percopsis omiscomaycus* (trout-perch)**

Myxozoa: *Myxobolus procercum*, (Dechtiar et al. 1988)

Adult Digenea: *Crepidostomum isostomum*, (Bangham 1955; Dechtiar et al. 1988)

Larval/Immature Digenea: *Centrovarium lobotes*, (Dechtiar et al. 1988); *Diplostomum spathaceum*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988); *Ichthyocotylurus intermedia*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Ichthyocotylurus* sp., (Bangham 1955); *Proalaria huronensis*, (La Rue 1927)

Table 15, continued.

Monogenea: *Urocleidus baldwini*, (Dechtiar 1974a; Dechtiar et al. 1988); *Gyrodactylus* sp., (Dechtiar 1974a; Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Adult Cestoda: *Bothriocephalus formosus*, (Bangham 1955); *Cyathocephalus truncatus*, (French et al. 2005)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Collins and Dechtiar 1974)

Adult Nematoda: *Hysterothylacium brachyurum*, (Bangham 1955; Dechtiar et al. 1988); *Spinitectus gracilis*, (Bangham 1955; Collins and Dechtiar 1974); *Rhabdochona cascadiella*, (Collins and Dechtiar 1974)

Larval/immature Nematoda: *Agamonema* sp., (Bangham 1955)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Collins and Dechtiar 1974); *Neoechinorhynchus* sp., (Bangham 1955); *Pomphorhynchus bulbocolli*, (Collins and Dechtiar 1974; Dechtiar et al. 1988)

Immature Acanthocephala: *Pomphorhynchus bulbocolli*, (Bangham 1955)

Hirudinea: *Piscicola punctata*, (Dechtiar et al. 1988)

Copepoda: *Argulus* sp., (Bangham 1955); *Ergasilus caeruleus*, (Bangham 1955; Collins and Dechtiar 1974; Dechtiar et al. 1988)

Gadidae

***Lota lota* (burbot)**

Ciliophora: *Trichodina* sp., (Muzzall et al. 2003); *Epistylis* sp., (Muzzall et al. 2003)

Myxozoa: *Myxobolus* sp., (Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955; Muzzall et al. 2003); *Ichthyocotylurus* sp., (Dechtiar et al. 1988)

Adult Cestoda: *Eubothrium crassum*, (Bangham 1955); *Eubothrium rugosum*, (Dechtiar et al. 1988; Muzzall et al. 2003); *Cyathocephalus truncatus*, (Muzzall et al. 2003)

Larval/Immature Cestoda: *Bothriocephalus* sp., (Bangham 1955); *Sparganum pseudosegmentatum*, (Vergeer 1942); unidentified plerocercoid, (Muzzall et al. 2003)

Adult Nematoda: *Spinitectus gracilis*, (Bangham 1955; Dechtiar et al. 1988); *Haplonema hamulatum*, (Bangham 1955; Muzzall et al. 2003)

Larval/Immature Nematoda: *Hysterothylacium brachyurum*, (Dechtiar et al. 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar et al. 1988); *Echinorhynchus leidyi*, (Bangham 1955); *Echinorhynchus salmonis*, (Bangham 1955; Dechtiar et al. 1988; Muzzall et al. 2003); *Neoechinorhynchus cylindratus*, (Bangham 1955); *Neoechinorhynchus rutili*, (Bangham 1955); *Neoechinorhynchus* spp., (Muzzall et al. 2003); *Pomphorhynchus bulbocolli*, (Bangham 1955); *Leptorhynchoides thecatus*, (Dechtiar et al. 1988)

Mollusca: Unidentified glochidia, (Dechtiar et al. 1988)

Copepoda: *Ergasilus celestis*, (Dechtiar et al. 1988)

Table 15, continued.

Fundulidae

***Fundulus diaphanus* (banded killifish)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Posthodiplostomum minimum*, (Dechtiar et al. 1988); *Tylodelphy scheuringi*, (Dechtiar et al. 1988)

Monogenea: *Salsuginus fundulus*, (Dechtiar et al. 1988); *Gyrodactylus funduli*, (Dechtiar et al. 1988)

Larval/Immature Nematoda: *Eustrongylides tubifex*, (Dechtiar et al. 1988)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Dechtiar et al. 1988)

Copepoda: *Lernaea cruciata*, (Hudson and Bowen 2002); *Lernaea cyprinacea*, (Hudson and Bowen 2002)

Gasterosteidae

***Culaea inconstans* (brook stickleback)**

Microspora: *Glugea anomala*, (Dechtiar et al. 1988)

Adult Digenea: *Bunoderina eucaliae*, (Bangham 1955; Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum baeri eucaliae*, (Dechtiar et al. 1988); *Diplostomum spathaceum* (Dechtiar et al. 1988); *Diplostomum* sp. (Bangham 1955); *Neascus* sp. (Bangham 1955); *Posthodiplostomum minimum* (Bangham 1955; Dechtiar et al. 1988)

Monogenea: *Dactylogyrus eucalius*, (Dechtiar et al. 1988); *Gyrodactylus eucaliae*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Dechtiar et al. 1988)

Adult Nematoda: *Rhabdochona cascadilla*, (Dechtiar et al. 1988)

Larval/Immature Nematoda: *Hysterothylacium* sp., (Dechtiar et al. 1988); *Agamospirura* sp., (Dechtiar et al. 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar et al. 1988); *Neoechinorhynchus pungitius*, (Dechtiar 1971a; Dechtiar et al. 1988); *Neoechinorhynchus rutili*, (Bangham 1955; Dechtiar et al. 1988)

Copepoda: *Ergasilus versicolor*, (Dechtiar et al. 1988)

***Gasterosteus aculeatus* (threespine stickleback)**

Copepoda: *Ergasilus nerkae*, (Hudson et al. 1994)

***Pungitius pungitius* (ninespine stickleback)**

Microspora: *Glugea anomala*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988)

Monogenea: *Gyrodactylus eucaliae*, (Dechtiar et al. 1988)

Adult Cestoda: *Cyathocephalus truncatus*, (French et al. 2005)

Larval/Immature Cestoda: *Schistocephalus solidus*, (Dechtiar et al. 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar et al. 1988); *Neoechinorhynchus pungitius*, (Dechtiar 1971a; Dechtiar et al. 1988); *Neoechinorhynchus rutili*, (Bangham 1955; Dechtiar et al. 1988)

Copepoda: *Ergasilus nerkae*, (Hudson et al. 1994); *Ergasilus* sp., (Dechtiar et al. 1988)

Cottidae

***Cottus bairdii* (mottled sculpin)**

Adult Digenea: *Phyllodistomum undulans*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Ichthyocotylurus* sp., (Bangham 1955; Dechtiar et al. 1988)

Monogenea: *Dactylogyrus buddi*, (Dechtiar 1974b; Dechtiar et al. 1988); *Gyrodactylus bairdi*, (Dechtiar et al. 1988)

Adult Cestoda: *Cyathocephalus truncatus*, (Dechtiar et al. 1988); *Proteocephalus pearsei*, (Dechtiar et al. 1988)

Larval/Immature Cestoda: *Schistocephalus solidus*, (Dechtiar et al. 1988)

Adult Nematoda: *Rhabdochona cotti*, (Dechtiar et al. 1988)

Larval/Immature Nematoda: *Raphidascaris acus*, (Dechtiar et al. 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar et al. 1988); *Echinorhynchus salmonis*, (Dechtiar et al. 1988); *Neoechinorhynchus rutili*, (Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Dechtiar et al. 1988)

Hirudinea: *Piscicola punctata*, (Dechtiar et al. 1988)

***Cottus cognatus* (slimy sculpin)**

Ciliophora: *Epistylis* sp., (Muzzall and Bowen 2002); *Trichodina* sp., (Muzzall and Bowen 2002)

Microspora: *Pleistophora* sp., (Muzzall and Bowen 2002)

Myxozoa: *Myxobolus cognati*, (Muzzall and Bowen 2002)

Adult Digenea: *Crepidostomum farionis*, (Muzzall and Bowen 2002)

Larval/Immature Digenea: *Diplostomum* sp., (Muzzall and Bowen 2002); *Ichthyocotylurus* sp., (Muzzall and Bowen 2002)

Monogenea: *Dactylogyrus buddi*, (Dechtiar 1974b; Muzzall and Bowen 2002); *Gyrodactylus* sp., (Dechtiar 1974b; Muzzall and Bowen 2002)

Adult Cestoda: *Cyathocephalus truncatus*, (Muzzall and Bowen 2002); *Proteocephalus pearsei*, (Muzzall and Bowen 2002)

Larval/Immature Cestoda: *Eubothrium* sp., (Muzzall and Bowen 2002)

Larval/Immature Nematoda: *Capillaria salvelini*, (Muzzall and Bowen 2002); *Haplonema hamulatum*, (Muzzall and Bowen 2002); *Rhabdochona* sp., (Muzzall and Bowen 2002)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Muzzall and Bowen 2000); *Neoechinorhynchus pungitius*, (Muzzall and Bowen 2002)

***Cottus ricei* (spoonhead sculpin)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Dechtiar et al. 1988); *Ichthyocotylurus* sp., (Dechtiar et al. 1988)

Monogenea: *Dactylogyrus buddi*, (Dechtiar et al. 1988)

Adult Cestoda: *Cyathocephalus truncatus*, (Dechtiar et al. 1988); *Proteocephalus pearsei*, (Dechtiar et al. 1988)

Table 15, continued.

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar et al. 1988); *Neoechinorhynchus rutili*, (Dechtiar et al. 1988)

Mollusca: Unidentified glochidia, (Dechtiar et al. 1988)

Copepoda: *Ergasilus* sp., (Dechtiar et al. 1988)

***Myoxocephalus thompsonii* (deepwater sculpin)**

Ciliophora: *Trichodina* sp., (Muzzall et al. 1997)

Larval/Immature Cestoda: *Eubothrium salvelini*, (Muzzall et al. 1997); *Cyathocephalus truncatus*, (Muzzall et al. 1997)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955)

Immature Acanthocephala: *Echinorhynchus salmonis*, (Muzzall et al. 1997)

Moronidae

***Morone chrysops* (white bass)**

Ciliophora: *Capriniana* sp., (Dechtiar et al. 1988)

Adult Digenea: *Bucephalus* sp., (Bangham 1955; Dechtiar et al. 1988); *Allacanthochoasmus artus*, (Bangham 1955; Dechtiar et al. 1988); *Allacanthochoasmus varius*, (Bangham 1955; Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955)

Monogenea: *Onchocleidus chrysops*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1955; Dechtiar et al. 1988); *Proteocephalus pearsei*, (Bangham 1955)

Adult Nematoda: *Spinitectus carolini*, (Bangham 1955; Dechtiar et al. 1988)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Bangham 1955)

Mollusca: Unidentified glochidia, (Dechtiar et al. 1988)

Centrarchidae

***Ambloplites rupestris* (rock bass)**

Myxozoa: *Myxobolus* sp., (Dechtiar et al. 1988)

Adult Digenea: *Crepidostomum cooperi*, (Bangham 1955; Dechtiar et al. 1988); *Crepidostomum cornutum*, (Bangham 1955); *Azygia angusticauda*, (Bangham 1955); *Proterometra macrostoma*, (Bangham 1955); *Cryptogonimus chili*, (Bangham 1955; Dechtiar et al. 1988); *Microphallus opacus*, (Bangham 1955)

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1955; Dechtiar et al. 1988); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988); *Uvulifer ambloplitis*, (Dechtiar et al. 1988); *Proalaria huronensis*, (La Rue 1927)

Monogenea: *Lyrodiscus minimus*, (Dechtiar et al. 1988); *Lyrodiscus rupestris*, (Dechtiar 1973; Dechtiar et al. 1988); *Onchocleidus chautauquaensis*, (Dechtiar et al. 1988); *Urocleidus alatus*, (Dechtiar et al. 1988); *Gyrodactylus goerani*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Adult Cestoda: *Bothriocephalus claviceps*, (Bangham 1955; Dechtiar et al. 1988)

Table 15, continued.

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1955; Dechtiar et al. 1988); *Proteocephalus pearsei*, (Bangham 1955)
Adult Nematoda: *Hysterothylacium brachyurum*, (Bangham 1955); *Camallanus oxycephalus*, (Bangham 1955); *Dichelyne cotylophora*, (Bangham 1955); *Spinitectus carolini*, (Bangham 1955); *Spinitectus gracilis*, (Dechtiar et al. 1988)
Larval/Immature Nematoda: *Raphidascaris acus*, (Smith 1984)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955); *Neoechinorhynchus cylindratus*, (Bangham 1955; Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Bangham 1955; Dechtiar et al. 1988); *Leptorhynchoides thecatus*, (Bangham 1955)
Hirudinea: *Myzobdella lugubris*, (Bangham 1955; Dechtiar et al. 1988)
Mollusca: Unidentified glochidia, (Dechtiar et al. 1988)
Copepoda: *Ergasilus caeruleus*, (Bangham 1955; Dechtiar et al. 1988); *Neoergasilus japonicus*, (Hudson and Bowen 2002); *Lernaea cruciata*, (Hudson and Bowen 2002); *Lernaea cyprinacea*, (Hudson and Bowen 2002); *Achtheres pimelodi*, (Bangham 1955; Dechtiar et al. 1988)

***Lepomis cyanellus* (green sunfish)**

Copepoda: *Neoergasilus japonicus*, (Hudson and Bowen 2002)

***Lepomis gibbosus* (pumpkinseed)**

Adult Digenea: *Crepidostomum cooperi*, (Bangham 1955; Dechtiar et al. 1988); *Crepidostomum cornutum*, (Bangham 1955; Dechtiar et al. 1988); *Azygia angusticauda*, (Bangham 1955); *Proterometra macrostoma*, (Bangham 1955; Dechtiar et al. 1988)
Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1955; Dechtiar et al. 1988); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988); *Uvulifer ambloplitis*, (Dechtiar et al. 1988); *Ichthyocotylurus* sp., (Dechtiar et al. 1988); *Proalaria huronensis*, (La Rue 1927)
Monogenea: *Actinocleidus recurvatus*, (Dechtiar et al. 1988); *Cleidodiscus robustus*, (Dechtiar et al. 1988); *Haploleidus dispar*, (Dechtiar et al. 1988); *Onchocleidus ferox*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)
Adult Cestoda: *Bothriocephalus claviceps*, (Bangham 1955)
Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1955; Dechtiar et al. 1988); *Proteocephalus pearsei*, (Bangham 1955)
Adult Nematoda: *Spinitectus carolini*, (Bangham 1955)
Larval/Immature Nematoda: *Agamonema* sp., (Bangham 1955)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955); *Neoechinorhynchus cylindratus*, (Bangham 1955; Dechtiar et al. 1988); *Leptorhynchoides thecatus*, (Bangham 1955; Dechtiar et al. 1988)
Copepoda: *Neoergasilus japonicus*, (Hudson and Bowen 2002); *Lernaea cruciata*, (Hudson and Bowen 2002); *Lernaea cyprinacea*, (Hudson and Bowen 2002)

Table 15, continued.

***Lepomis macrochirus* (bluegill)**

Copepoda: *Neoergasilus japonicus*, (Hudson and Bowen 2002)

***Micropterus dolomieu* (smallmouth bass)**

Myxozoa: Unidentified myxosporidia, (Bangham 1955)

Adult Digenea: *Crepidostomum cooperi*, (Bangham 1955; Dechtiar et al. 1988); *Crepidostomum cornutum*, (Bangham 1955); *Azygia angusticaudum*, (Dechtiar et al. 1988); *Rhipidocotyle papillosum*, (Bangham 1955); *Cryptogonimus chili*, (Bangham 1955; Dechtiar et al. 1988); *Phyllodistomum lohrenzi*, (Dechtiar et al. 1988); *Microphallus opacus*, (Bangham 1955)

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1955; Dechtiar et al. 1988); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988); *Uvulifer ambloplitis*, (Dechtiar et al. 1988)

Monogenea: *Clavunculus bursatus*, (Dechtiar et al. 1988); *Haploleidus dispar*, (Dechtiar et al. 1988); *Leptocleidus megalonchus*, (Dechtiar et al. 1988); *Synclathrium fusiformis*, (Dechtiar et al. 1988); *Tetracleidus banghami*, (Dechtiar et al. 1988); *Acolpenteron ureteroectes*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Adult Cestoda: *Proteocephalus ambloplitis*, (Bangham 1955; Dechtiar et al. 1988); *Proteocephalus fluviatilis*, (Dechtiar et al. 1988)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1955; Dechtiar et al. 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Bangham 1955; Dechtiar et al. 1988); *Raphidascaris acus*, (Smith 1984); *Camallanus oxycephalus*, (Bangham 1955; Dechtiar et al. 1988); *Dichelyne cotylophora*, (Bangham 1955); *Spinitectus carolini*, (Bangham 1955)

Larval/Immature Nematoda: *Spinitectus gracilis*, (Bangham 1955); *Eustrongylides tubifex*, (Dechtiar et al. 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955; Dechtiar et al. 1988); *Neoechinorhynchus cylindratus*, (Bangham 1955; Dechtiar et al. 1988); *Neoechinorhynchus rutili*, (Bangham 1955); *Pomphorhynchus bulbocolli*, (Bangham 1955; Dechtiar et al. 1988); *Leptorhynchoides thecatus*, (Bangham 1955; Dechtiar et al. 1988)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham 1955)

Hirudinea: *Myzobdella lugubris*, (Dechtiar et al. 1988); *Myzobdella* sp., (Bangham 1955)

Copepoda: *Ergasilus caeruleus*, (Bangham 1955; Dechtiar et al. 1988); *Neoergasilus japonicus*, (Hudson and Bowen 2002); *Achtheres pimelodi*, (Bangham 1955; Dechtiar et al. 1988)

***Micropterus salmoides* (largemouth bass)**

Adult Digenea: *Crepidostomum cornutum*, (Bangham 1955); *Azygia angusticaudum*, (Bangham 1955); *Caecincola parvulus*, (Bangham 1955); *Microphallus opacus*, (Bangham 1955)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1955); *Proalaria huronensis*, (La Rue 1927)

Monogenea: Gyrodactyloidea, (Bangham 1955)

Adult Cestoda: *Proteocephalus ambloplitis*, (Bangham 1955)

Adult Nematoda: *Hysterothylacium brachyurum*, (Bangham 1955); *Dichelyne cotylophora*, (Bangham 1955); *Spinitectus carolini*, (Bangham 1955)

Table 15, continued.

Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955); *Neoechinorhynchus cylindratus*, (Bangham 1955); *Pomphorhynchus bulbocolli*, (Bangham 1955)

Copepoda: *Ergasilus luciopercarum*, (Hudson et al. 1994); *Ergasilus nerkae*, (Hudson et al. 1994); *Neoergasilus japonicus*, (Hudson and Bowen 2002); *Lernaea cruciata*, (Hudson and Bowen 2002); *Lernaea cyprinacea*, (Hudson and Bowen 2002)

***Pomoxis annularis* (white crappie)**

Adult Cestoda: *Proteocephalus pearsei*, (Bangham 1955)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1955); *Spinitectus gracilis*, (Dechtiar et al. 1988)

***Pomoxis nigromaculatus* (black crappie)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Dechtiar et al. 1988)

Monogenea: *Tetracleidus capax*, (Dechtiar et al. 1988); *Tetracleidus longus*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Larval/Immature Cestoda: *Proteocephalus pearsei*, (Bangham 1955)

Adult Nematoda: *Spinitectus gracilis*, (Bangham 1955)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Bangham 1955)

Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Bangham 1955; Dechtiar et al. 1988)

Percidae

***Etheostoma exile* (Iowa darter)**

Adult Digenea: *Azygia angusticauda*, (Bangham 1955)

Larval/Immature Digenea: *Posthodiplostomum minimum*, (Bangham 1955); *Ichthyocotylurus* sp., (Bangham 1955)

Monogenea: *Dactylogyrus* sp., (Dechtiar et al. 1988); *Gyrodactylus* sp., (Dechtiar et al. 1988)

Adult Cestoda: *Bothriocephalus formosus*, (Bangham 1955)

Larval/Immature Cestoda: *?Hymenolepis* sp., (Bangham 1955)

Adult Nematoda: *Hysterothylacium brachyurum*, (Bangham 1955); *Rhabdochona cascadilla*, (Bangham 1955); *Rhabdochona* sp., (Dechtiar et al. 1988)

Larval/Immature Nematoda: *Raphidascaris acus*, (Smith 1986)

Hirudinea: *Myzobdella* sp., (Bangham 1955)

***Etheostoma nigrum* (Johnny darter)**

Adult Digenea: *Crepidostomum cooperi*, (Bangham 1955); *Crepidostomum isostomum*, (Bangham 1955; Dechtiar et al. 1988)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955; Dechtiar et al. 1988); *Ichthyocotylurus* sp., (Bangham 1955; Dechtiar et al. 1988)

Monogenea: *Gyrodactylus etheostomae*, (Dechtiar et al. 1988); *Gyrodactylus stunkardi*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Table 15, continued.

Adult Cestoda: *Bothriocephalus formosus*, (Bangham 1955; Dechtiar et al. 1988)
Larval/Immature Cestoda: *Ligula intestinalis*, (Dechtiar et al. 1988)
Adult Nematoda: *Dichelyne* sp., (Bangham 1955); *Rhabdochona cascadilla*, (Bangham 1955)
Larval/Immature Nematoda: *Spiroxys* sp., (Bangham 1955)
Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Bangham 1955); *Pomphorhynchus bulbocolli*, (Dechtiar et al. 1988); *Leptorhynchoides thecatus*, (Bangham 1955; Dechtiar et al. 1988)
Hirudinea: *Myzobdella* sp., (Bangham 1955)

***Perca flavescens* (yellow perch)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar et al. 1988); *Trichodina urinaria*, (Dechtiar et al. 1988)
Myxozoa: *Henneguya doori*, (Dechtiar et al. 1988)
Adult Digenea: *Bunodera sacculata*, (Bangham 1955; Dechtiar et al. 1988); *Crepidostomum cooperi*, (Bangham 1955; Dechtiar et al. 1988); *Crepidostomum farionis*, (Collins and Dechtiar 1974); *Azygia angusticauda*, (Bangham 1955; Dechtiar et al. 1988); *Bucephalus elegans*, (Bangham 1955); *Centrovarium lobotes*, (Dechtiar et al. 1988); *Phyllodistomum superbum*, (Dechtiar et al. 1988)
Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1955; Dechtiar et al. 1988); *Crassiphiala bulboglossa*, (Dechtiar et al. 1988); *Diplostomum spathaceum*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955); *Posthodiplostomum minimum*, (Bangham 1955); *Apophallus brevis*, (Dechtiar et al. 1988); *Ichthyocotylurus intermedia*, (Collins and Dechtiar 1974); *Ichthyocotylurus* sp., (Bangham 1955)
Monogenea: *Urocleidus adspectus*, (Dechtiar et al. 1988); *Gyrodactylus freemani*, (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)
Adult Cestoda: *Cyathocephalus truncatus*, (Dechtiar and Loftus 1965; Dechtiar et al. 1988); *Proteocephalus pearsei*, (Bangham 1955)
Larval/Immature Cestoda: *Bothriocephalus* sp., (Bangham 1955); *Ligula intestinalis*, (Dechtiar et al. 1988); *Proteocephalus ambloplitis*, (Bangham 1955); *Triaenophorus nodulosus*, (Collins and Dechtiar 1974; Dechtiar et al. 1988)
Adult Nematoda: *Camallanus oxycephalus*, (Rosinski et al. 1997); *Dichelyne cotylophora*, (Bangham 1955; Dechtiar et al. 1988; Rosinski et al. 1997; Smedley 1934); *Spinitectus gracilis*, (Bangham 1955; Collins and Dechtiar 1974); *Philometra cylindracea*, (Bangham 1955; Dechtiar et al. 1988; Rosinski et al. 1997; Starr 1989; Fielder et al. 2000); *Rhabdochona cascadilla*, (Collins and Dechtiar 1974)
Larval/Immature Nematoda: *Raphidascaris acus*, (Dechtiar et al. 1988; Smith 1986); *Raphidascaris* sp., (Rosinski et al. 1997); *Eustrongylides tubifex*, (Allison 1966; Dechtiar et al. 1988; Rosinski et al. 1997; Salz 1989; Fielder et al. 2000); *Spiroxys* sp., (Bangham 1955); *Rhabdochona* sp., (Bangham 1955)
Adult Acanthocephala: *Acanthocephalus dirus*, (Collins and Dechtiar 1974); *Echinorhynchus salmonis*, (Bangham 1955; Collins and Dechtiar 1974; Dechtiar et al. 1988); *Neoechinorhynchus cylindratus*, (Bangham 1955); *Neoechinorhynchus pungitius*, (Dechtiar 1971a; Dechtiar et al. 1988); *Neoechinorhynchus rutili*, (Bangham 1955; Collins and Dechtiar 1974; Dechtiar et al. 1988); *Pomphorhynchus bulbocolli*, (Bangham 1955); *Leptorhynchoides thecatus*, (Bangham 1955; Collins and Dechtiar 1974; Dechtiar et al. 1988)
Immature Acanthocephala: *Pomphorhynchus bulbocolli*, (Bangham 1955); *Leptorhynchoides thecatus*, (Bangham 1955)
Hirudinea: *Myzobdella lugubris*, (Bangham 1955; Dechtiar et al. 1988)
Mollusca: Unidentified glochidia, (Bangham 1955; Dechtiar et al. 1988)

Table 15, continued.

Copepoda: *Argulus japonicus*, (Hudson and Bowen 2002); *Ergasilus caeruleus*, (Collins and Dechtiar 1974; Dechtiar et al. 1988); *Ergasilus luciopercarum*, (Dechtiar et al. 1988); *Neoergasilus japonicus*, (Hudson and Bowen 2002); *Lernaea cruciata*, (Hudson and Bowen 2002); *Lernaea cyprinacea*, (Hudson and Bowen 2002)

***Percina caprodes* (logperch)**

Myxozoa: *Myxobolus scleroperca*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Proalaria huronensis*, (La Rue 1927)

Monogenea: *Aethyceron malleus*, (Dechtiar et al. 1988); *Gyrodactylus* sp., (Dechtiar et al. 1988); Gyrodactyloidea, (Bangham 1955)

Adult Cestoda: *Proteocephalus pearsei*, (Dechtiar et al. 1988)

***Sander canadensis* (sauger)**

Adult Digenea: *Centrovarium lobotes*, (Bangham 1955)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1955); *Neascus* sp., (Bangham 1955)

Adult Cestoda: *Bothriocephalus cuspidatus*, (Bangham 1955)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham 1955); *Neoechinorhynchus cylindratus*, (Bangham 1955)

***Sander vitreus* (walleye)**

Ciliophora: *Trichodina* sp., (Muzzall and Haas 1998)

Adult Digenea: *Bucephalopsis pusilla*, (Bangham 1955; Dechtiar et al. 1988; Woodhead 1930); Bucephalidae, (Muzzall and Haas 1998); *Sanguinicola occidentalis*, (Dechtiar et al. 1988)

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar et al. 1988); *Diplostomum spathaceum*, (Dechtiar et al. 1988); *Diplostomum* sp., (Bangham 1955; Muzzall and Haas 1998)

Monogenea: *Urocleidus aculeatus*, (Dechtiar et al. 1988; Muzzall and Haas 1998); Gyrodactyloidea, (Bangham 1955)

Adult Cestoda: *Bothriocephalus cuspidatus*, (Bangham 1955; Dechtiar et al. 1988; Muzzall and Haas 1998); *Proteocephalus stizostethi*, (Bangham 1955; Dechtiar et al. 1988); *Triaenophorus stizostedionis*, (Bangham 1955)

Larval/Immature Cestoda: *Proteocephalus* sp., (Muzzall and Haas 1998)

Adult Nematoda: *Hysterothylacium brachyurum*, (Bangham 1955; Dechtiar et al. 1988); *Dichelyne cotylophora*, (Bangham 1955); *Spinitectus* sp., (Bangham 1955)

Larval/Immature Nematoda: *Eustrongylides tubifex*, (Muzzall and Haas 1998)

Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Bangham 1955); *Leptorhynchoides thecatus*, (Bangham 1955)

Mollusca: Unidentified glochidia, (Bangham 1955)

Copepoda: *Ergasilus confusus*, (Bangham 1955); *Ergasilus caeruleus*, (Dechtiar et al. 1988); *Ergasilus luciopercarum*, (Dechtiar et al. 1988; Muzzall and Haas 1998)

Table 15, continued.

Gobiidae

***Apollonia melanostoma* (round goby)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Kvach and Stepien 2008b); Digenea gen. sp., (Kvach and Stepien 2008b)

Adult Cestoda: *Cyathocephalus truncatus*, (French et al. 2005)

Larval/Immature Nematoda: *Philometra* sp., (Kvach and Stepien 2008b); *Spiroxys contortus*, (Kvach and Stepien 2008b)

Immature Acanthocephala: *Neoechinorhynchus tumidus*, (Kvach and Stepien 2008b)

Table 16. Numbers and percentages (in parentheses) of parasite species in each major parasite group reported for five major fish families from Lake Huron during 1914-2010. Parasite group abbreviations are Ci (Ciliophora), My (Myxozoa), Dt (Digenea), Mo (Monogenea), Ce (Cestoda), Ne (Nematoda), Ac (Acanthocephala), Hi (Hirudinea), Co (Copepoda), and Mol (Mollusca). If a parasite in a group did not infect fish, the parasite group was not included in the table.

| Fish family | Parasite group | | | | | | | | | | Total | |
|---------------|----------------|----------|----------|------------|------------|------------|------------|-----------|----------|-----------|----------|-----|
| | Ma | Ci | My | Dt | Mo | Ce | Ne | Ac | Hi | Co | | Mol |
| Cyprinidae | 0 | 2 (3) | 6 (9) | 15 (23) | 22 (33) | 2 (3) | 8 (12) | 5 (8) | 0 | 5 (8) | 1 (1) | 66 |
| Catostomidae | 2 (4) | 2 (4) | 2 (4) | 10 (23) | 7 (16) | 3 (7) | 5 (11) | 9 (21) | 1 (2) | 2 (4) | 1 (2) | 44 |
| Centrarchidae | 0 | 0 | 1 (2) | 16 (31) | 16 (31) | 4 (8) | 7 (14) | 5 (10) | 1 (2) | 0 | 1 (2) | 51 |
| Percidae | 0 | 2 (3) | 2 (3) | 18 (28) | 7 (11) | 10 (15) | 9 (14) | 7 (11) | 1 (2) | 7 (11) | 1 (2) | 64 |
| Salmonidae | 0 | 0 | 1 (2) | 7 (14) | 2 (4) | 9 (18) | 12 (24) | 9 (18) | 1 (2) | 9 (18) | 0 | 50 |

Table 17. Jaccard coefficients of parasite-community similarity based on the presence of parasites in five major fish families from Lake Huron, 1914-2010.

| Fish family | Cyprinidae | Catostomidae | Salmonidae | Centrarchidae |
|---------------|------------|--------------|------------|---------------|
| Cyprinidae | 1.0000 | 0.1473 | 0.1165 | 0.2038 |
| Catostomidae | 0.1473 | 1.0000 | 0.1518 | 0.0869 |
| Salmonidae | 0.1165 | 0.1518 | 1.0000 | 0.1145 |
| Centrarchidae | 0.2038 | 0.0869 | 0.1145 | 1.0000 |
| Percidae | 0.2403 | 0.1797 | 0.1789 | 0.2872 |

ST. CLAIR SYSTEM (ST. CLAIR RIVER, LAKE ST. CLAIR, DETROIT RIVER)

The St. Clair system consists of the St. Clair River, Lake St. Clair, and the Detroit River. Water flows through this system from Lake Huron into Lake Erie via the St. Clair River, Lake St. Clair, and the Detroit River.

St. Clair River—Results and Discussion

The only two studies published on the parasites of fish from the St. Clair River (Muzzall et al. 1995; Pronin et al. 1997) were on one species, *Apollonia melanostoma* and 10 parasite species (1 Ciliophora, 1 Myxozoa, 3 larval Digenea, 1 immature Cestoda, 1 larval Cestoda, 2 larval Nematoda, glochidia of unidentified Mollusca) were found (Table 10). Most of the helminth species (*Rhipidocotyle* sp., *Clinostomum complanatum*, *Diplostomum spathaceum*, *Diplostomum* sp., *Proteocephalus ambloplitis*, *Scolex pleuronectis*, *Raphidascaris acus*, *Eustrongylides tubifex*) were larval stages encysted in non-intestinal sites. *Rhipidocotyle* sp., *P. ambloplitis*, and *Raphidascaris acus* mature in fish. *Clinostomum complanatum*, *Diplostomum spathaceum*, *Diplostomum* sp., and *Eustrongylides tubifex* mature in piscivorous birds. Parasite data on *Apollonia melanostoma* from the St. Clair River are in Table 19.

Lake St. Clair—Results and Discussion

Eleven studies from 1895 through 2010 have been published on the parasites of fish from Lake St. Clair (Ward 1895; La Rue 1914; Ward and Magath 1916; Appy and Cone 1982; Muzzall et al. 1995; Pronin et al. 1997; Synnestvedt 1997; Thomas and Haas 2004; Kvach and Stepien 2008b; Cone et al. 2004; Cone and Marcogliese 2010). The only fish species examined for parasites from this lake were *Acipenser fulvescens*, *Amia calva*, *Notropis hudsonius*, *Coregonus artedi*, *C. clupeaformis*, *Salvelinus namaycush*, *Micropterus dolomieu*, *Micropterus* sp., *Perca flavescens*,

Percina caprodes, *Sander vitreus*, *Apollonia melanostoma*, *Proterorhinus marmoratus*, and “several fish species.”

Thirty species of parasites (3 Ciliophora, 2 Myxozoa, 1 adult Digenea, 3 larval Digenea, 1 adult Cestoda, 1 larval Cestoda, 7 adult Nematoda, 5 immature/larval Nematoda, 1 immature Nematoda, 1 adult Acanthocephala, 3 immature Acanthocephala, 2 Hirudinea) have been reported from fish in this lake (Table 18). Three of the studies only reported on the parasites of *Apollonia melanostoma* (13 species) and *Proterorhinus marmoratus* (11 species). *Neochasmus umbellus*, *Proteocephalus* sp., *Raphidascaris acus*, *Spinitectus* sp., *Philometra* sp., *Neoechinorhynchus tumidus*, and *Leptorhynchoides thecatus* mature in fish. *Spiroxys contortus* and *Spiroxys* sp. mature in turtles. *Diplostomum spathaceum*, *Diplostomum* sp., *Ichthyocotylurus pileatus*, *Contracaecum* sp., and *Eustrongylides tubifex* mature in birds. The fish hosts from Lake St. Clair with their parasites are detailed in Table 19.

Thomas and Haas (2004) collected 61 fish species plus one hybrid (*Cyprinus carpio* x *Carassius auratus*) in American waters of Lake St. Clair from 1996-2001. Only five of these species (*Acipenser fulvescens*, *Coregonus clupeaformis*, *Micropterus salmoides*, *Perca flavescens*, *Proterorhinus marmoratus*) have been examined for parasites. *Coregonus artedi*, *Amia calva*, and *Apollonia melanostoma* examined for parasites in earlier studies were not collected by Thomas and Haas (2004).

Detroit River—Results and Discussion

Only one study (Marcogliese 2008) has reported on the parasites of a fish species from the Detroit River. He found the Asian fish tapeworm (*Bothriocephalus acheilognathi*) infecting one *Pimephales promelas* (Table 18). In an unpublished personal observation, two species of *Myxobolus* were found infecting *Notropis atherinoides* (PM, Michigan State University, personal observation, 2008). The fish hosts with their parasites from the Detroit River are documented in Table 19.

All the parasite species reported from the St. Clair system have been found in Lakes Huron and Erie, except for *Scolex pleuronectis* occurring in the St. Clair River, *Neochasmus umbellus* in Lake St. Clair, and *Bothriocephalus acheilognathi* in the Detroit River. Also, *N. umbellus* has not been reported from Lake Huron.

Table 18. Parasites reported in fishes from the St. Clair River, Lake St Clair, and Detroit River, 1895-2010. Host documentation, in order, consists of references, when observed (cdnp = collection date not provided), prevalence defined as the percentage (%) of fish infected (pnp = prevalence not provided), mean intensity defined as the mean number of parasites per infected fish (minp = mean intensity not provided), mean abundance defined as the mean number of parasites per examined fish, location (lns = location not specified), latitude and longitude (llnk = latitude/location not known).

ST CLAIR RIVER

Ciliophora (Ciliates)

Epistylidae Kahl, 1935

Apiosoma sp.

Site of Infection: Fins, skin

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 20%; "few"; Port Huron, Michigan; 42°58'15"/-82°25'29"; 10%; "few"; Marine City, Michigan; 42°43'10"/-82°29'31"

Myxozoa (Myxosporans)

Sphaerosporidae Davis, 1917

Sphaeromyxa sevastopoli Naidenova, 1970

Synonym: None

Site of Infection: Gall bladder

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 25%; "few"; Port Huron, Michigan; 42°58'15"/-82°25'29"

Remarks: *Sphaeromyxa sevastopoli* is an exotic species reported for the first time in North America by Pronin et al. (1977).

Larval/Immature Digenea (Digenetic Trematodes)

Bucephalidae Poche, 1907

Rhipidocotyle sp.

Site of Infection: Gills

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 10%; 1; Marine City, Michigan; 42°43'10"/-82°29'31"

Table 18, continued.

Clinostomidae Luhe, 1901

Clinostomum complanatum (Rudolphi, 1814) Braun, 1899

Synonym: *Clinostomum marginatum* (Rudolphi, 1819) Braun 1899; ?*Clinostomum gracile* of Stafford (1904); ?*Distomum gracile* of Wright (1879)

Site of Infection: Mucosa of oral cavity

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 5%; 1; Marine City, Michigan; 42°43'10"/-82°29'31"

Remarks: Dzikowski et al. (2004) reported *Clinostomum complanatum* and *Clinostomum marginatum* were distinct species based on differences in ribosomal DNA.

Diplostomidae Poirier, 1886

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Synonym: *Diplostomulum spathaceum* (Rudolphi, 1819); *Diplostomum volvens* Nordmann, 1833 of Cooper (1915)

Site of Infection: Lens

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 10%; 2; Marine City, Michigan; 42°43'10"/-82°29'31"; 65%; 2; Port Huron, Michigan; 42°58'15"/-82°25'29"

Diplostomum sp.

Site of Infection: Lens

Host: *Apollonia melanostoma*: Muzzall et al. 1995; July and August 1994; 11%; 2; Marine City, Michigan; 42°43'10"/-82°29'31"

Larval/Immature Cestoda (Cestodes)

Proteocephalidae La Rue, 1911

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Intestine

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 10%; 1; Marine City, Michigan; 42°43'10"/-82°29'31"; 5%; 1; Port Huron, Michigan; 42°58'15"/-82°25'29"

Unknown Family

Scolex pleuronectis Muller, 1788

Synonym: ?

Site of Infection: Intestinal wall

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 10%; 2; Marine City, Michigan; 42°43'10"/-82°29'31"

Remarks: *Scolex pleuronectis* is an exotic species reported for the first time from North America by Pronin et al. (1997).

Table 18, continued.

Larval/Immature Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Raphidascaris acus (Bloch, 1779) Ralliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790; *Ascaris anguillae* Schrank, 1790; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris mucronata* Schrank, 1790 nec Froel., 1791; *Fusaria acus* (Bloch, 1779) Zeder, 1800; *Fusaria dentata* Zeder, 1800; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata* (Zeder, 1800) Rudolphi, 1809; *Ascaris labiata* Rudolphi, 1809; *Agamonema leucisci rutili* Diesing, 1851; *Trichina cyprinorum* Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris gracillima* Linstow, 1890; *Hysterothylacium cayugensis* Wigdor, 1918; *Ascaris lucii* Pearse, 1924; *Raphidascaris cayugensis* (Wigdor, 1918) Yorke and Maplstone, 1926; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928; *Raphidascaris canadensis* Smedley, 1933; *Raphidascaris gracillima* (Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937; *Raphidascaris laurentianus* Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Liver

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 10%; 1; Marine City; 42°43'10"/-82°29'31"; 15%; 2; Port Huron, Michigan; 42°58'15"/-82°25'29"

Remarks: Pronin et al. (1997) referred to this nematode as *Raphidascaris* sp. in the article.

Diectophymidae Railliet, 1915

Eustrongylides tubifex (Nitzsch, 1909) Jagerskiold, 1909

Synonym: None

Site of Infection: Intestinal wall

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 5%; 4; Marine City; 42°43'10"/-82°29'31"; 10%; 1; Port Huron, Michigan; 42°58'15"/-82°25'29"

Mollusca (Molluscs)

Unknown Family

Unidentified glochidia

Synonym: ?

Site of Infection: Gills

Host: *Apollonia melanostoma*: Muzzall et al. 1995; July and August 1994; 1%; minp; Marine City, Michigan; 42°43'10"/-82°29'31"

Table 18, continued.

LAKE ST CLAIR

Ciliophora (Ciliates)

Epistylidae Kahl, 1935

Apiosoma sp.

Site of Infection: Fins, skin

Host: *Proterorhinus marmoratus*: Pronin et al. 1997; August 1994; 5%; “few”; Marine City; 42°43'10"/-82°29'31"; Port Huron, Michigan; 42°58'15"/-82°25'29"

Chilodonellidae Deroux, 1970

Chilodonella sp.

Site of Infection: Gills

Host: *Proterorhinus marmoratus*: Pronin et al. 1997; August 1994; 5%; “few”; Lake St. Clair, Michigan; 42°25'0"/-82°39'59"

Trichodinidae Raabe, 1959

Trichodina sp.

Site of Infection: Gills

Host: *Proterorhinus marmoratus*: Muzzall et al. 1995; August and September, 1994; 2%; minp; Anchor Bay, Michigan; 42°39'0"/-82°45'59"

Myxozoa (Myxosporans)

Myxobolidae Thelohan, 1892

Myxobolus burti Cone and Marcogliese 2010

Synonym: *Myxobolus* sp. of Cone et al. 2004

Site of infection: Intracellular in striated muscle

Host: *Notropis hudsonius*: Cone et al. 2004; July 1994; 20%; minp; Beller River Beach (42°30'N, 82°47'W); Cone and Marcogliese 2010, same infection data and information as in Cone et al. 2004

Sphaerosporidae Davis, 1917

Sphaeromyxa sevastopoli Naidenova, 1970

Synonym: None

Site of Infection: Gall bladder

Table 18, continued.

Host:

Apollonia melanostoma: Pronin et al. 1997; August 1994; 25%; “few”; Port Huron; 42°58'15"/-82°25'29"; 17%; “few”; Lake St. Clair, Michigan; 42°25'0"/-82°39'59"

Proterorhinus marmoratus: Pronin et al. 1997; 5%; “few”; Lake St. Clair, Michigan

Remarks: *Sphaeromyxa sevastopoli* is an exotic species reported for the first time from North America by Pronin et al. (1997).

Adult Digenea (Digenetic Trematodes)

Unknown Family

Unidentified Trematodes

Synonym: ?

Site of Infection: Not reported

Host: “Several fish species”: Ward 1895; cdnp; pnp; minp; lns; Michigan; llnk

Larval/Immature Digenea (Digenetic Trematodes)

Cryptogonimidae (Ward, 1917) Ciurea, 1933

Neochasmus umbellus Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Brain, eye, muscle

Host: *Apollonia melanostoma*: Kvach and Stepien 2008b; October-November 2006; 7%; 2; 0.1; Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Diplostomidae Poirier, 1886

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Synonym: *Diplostomulum spathaceum* (Rudolphi, 1819); *Diplostomum volvens* Nordmann, 1833 of Cooper (1915)

Site of Infection: Lens

Host:

Apollonia melanostoma: Kvach and Stepien 2008b; October-November 2006; 20%; 3.7; 0.7; Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Apollonia melanostoma: Pronin et al. 1997; August 1994; 34%; 6; south of Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Diplostomum sp.

Site of Infection: Lens

Host: *Apollonia melanostoma*: Muzzall et al. 1995; August and September 1994; 89%; 10; Anchor Bay; 42°39'0"/-82°45'59"; Huron Point; 42°25'0"/-82°38'59"; Middle Channel, Michigan; 42°35'23"/-82°38'34"

Table 18, continued.

Strigeidae Railliet, 1819

Ichthyocotylurus pileatus (Rudolphi, 1802) Odening, 1969

Synonym: *Tetracotyle diminuta* Hughes, 1928

Site of Infection: Body cavity

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 34%; 1; south of Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Remarks: Pronin et al. (1997) stated their report of *Ichthyocotylurus pileatus* was the first one from North America; however, Dechtiar and Lawrie (1988) reported *Ichthyocotylurus pileatus* from *Perca flavescens* and *Sander vitreus* from Lake Superior.

Unknown Family

Digenea gen. sp.

Synonym: ?

Site of Infection: Mesentery

Host: *Apollonia melanostoma*: Kvach and Stepien 2008b; October-November 2006; 13%; 1; 0.1; Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Adult Cestoda (Adult Cestodes)

Proteocephalidae La Rue 1911

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Intestine

Host:

Amia calva: La Rue 1914; cdnp; pnp; minp; lns; llnk

Micropterus dolomieu: La Rue 1914; cdnp; pnp; minp; lns; llnk

Unknown Family

Unidentified cestodes

Synonym: ?

Site of Infection: Not reported

Host: "Several fish species": Ward 1895; cdnp; pnp; minp; lns; Michigan; llnk

Larval/Immature Cestoda (Cestodes)

Proteocephalidae La Rue, 1911

Proteocephalus sp.

Site of Infection: Intestine

Host: *Proterorhinus marmoratus*: Pronin et al. 1997; August 1994; 5%; 1; south of Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Table 18, continued.

Unknown Family

Scolex pleuronectis Muller, 1788

Synonym: ?

Site of Infection: Intestinal wall

Host: *Apollonia melanostoma*: Pronin et al. 1997; August 1994; 17%; 1; south of Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Remarks: *Scolex pleuronectis* is an exotic species reported for the first time from North America by Pronin et al. (1997).

Nematoda (Adult Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Hysterothylacium brachyurum Ward and Magath, 1916

Synonym: *Contracaecum brachyurum* Van Cleave and Mueller, 1934; *Thynnascaris brachyurum* Margolis and Arthur, 1979

Site of Infection: Stomach

Host: *Micropterus* sp.: Ward and Magath 1916; cdnp; pnp; minp; lns; llnk

Cucullanidae Cobbold, 1864

Dichelyne cotylophora Ward and Magath, 1916

Synonym: *Dacnitoides cotylophora* Ward and Magath, 1916; *Cucullanellus cotylophora* (Ward and Magath, 1916) Petter, 1974

Site of Infection: Intestine

Host:

Perca flavescens: Ward and Magath 1916; cdnp; pnp; minp; lns; llnk

Sander vitreus: Ward and Magath 1916; pnp; minp; lns

Truttaedacnitis clitellarius (Ward and Magath, 1916) Petter, 1974

Synonym: *Cucullanus clitellarius* Ward and Magath, 1916

Site of Infection: Intestine

Host: *Acipenser fulvescens*: Ward and Magath 1916; cdnp; pnp; minp; lns; llnk

Cystidicolidae (as in Anderson et al. 1975)

Cystidicola stigmatura (Leidy, 1886) Ward and Magath, 1916

Synonym: *Filaria stigmatura* Leidy, 1886; *Ancyracanthus cystidicola* of Wright, 1879 not Lamarck, 1801; *Cystidicola* sp. of White 1940; *Cystidicola farionis* of Ward and Magath 1917 not Fischer, 1798; *Cystidicola cristivomeri* White and Cable, 1942

Site of Infection: Swim bladder

Host:

Coregonus artedi: Ward and Magath 1916; cdnp; pnp; minp; lns; llnk

Coregonus clupeaformis: Ward and Magath 1916; pnp; minp; lns

Table 18, continued.

Salvelinus namaycush: Ward and Magath 1916; pnp; minp; lns

Remarks: Black (1983) reported that *Cystidicola stigmatura* is apparently absent from the Great Lakes since 1925; the above records of *Cystidicola stigmatura* in *Coregonus* spp. maybe erroneous since Black (1983) stated that *Salvelinus* spp. are the only known hosts for *Cystidicola stigmatura*.

Philometridae Baylis and Daubney, 1926

Philometra cylindraceum (Ward and Magath, 1916) Van Cleave and Mueller, 1934

Synonym: *Ichthyonema cylindraceum* Ward and Magath 1916

Site of Infection: Abdominal cavity

Host: *Perca flavescens*: Ward and Magath 1916; cdnp; pnp; minp; lns; llnk

Quimperidae Baylis, 1930

Synonym: Haplomatidae Sudarikova and Ryzikov, 1952

Haplomena immutatum Moulton, 1931

Synonym: None

Site of Infection: Intestine

Host: *Amia calva*: Ward and Magath 1916; cdnp; pnp; minp; lns; llnk

Rhabdochonidae Skrjabin, 1946

Rhabdochona decaturensis Gustafson, 1949

Synonym: None

Site of Infection: Intestine

Host: *Apollonia melanostoma*: Muzzall et al. 1995; August and September 1994; 21%; 4; Anchor Bay; 42°39'0"/-82°45'59"; Huron Point; 42°25'0"/-82°39'59"; Middle Channel, Michigan; 42°35'23"/-82°38'34"

Unknown Family

Unidentified nematode

Synonym: ?

Site of Infection: Not provided

Host: "Several fish species": Ward 1895; cdnp; pnp; minp; lns; Michigan; llnk

Larval/Immature Nematoda

Anisakidae Skrjabin and Karokhin, 1945

Contracaecum sp.

Site of Infection: Encysted in liver

Host: *Proterorhinus marmoratus*: Muzzall et al. 1995; June and August 1994; 4%; 2; Goosebay, Michigan; 42°35'4"/-82°40'44"

Table 18, continued.

Raphidascaris acus (Bloch, 1779) Railliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790; *Ascaris anguillae* Schrank, 1790; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris mucronata* Schrank, 1790 nec Froel., 1791; *Fusaria acus* (Bloch, 1779); Zeder, 1800; *Fusaria dentata* Zeder, 1800; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata* (Zeder, 1800) Rudolphi, 1809; *Ascaris labiata* Rudolphi, 1809; *Agamonema leucisci rutili* Diesing, 1851; *Trichina cyprinorum* Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris gracillima* Linstow, 1890; *Hysterothylacium cayugensis* Wigdor, 1918; *Ascaris lucii* Pearse, 1924; *Hysterothylacium cayugensis* Wigdor, 1918; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928; *Raphidascaris canadense* Smedley, 1933; *Raphidascaris gracillima* (Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937; *Raphidascaris cayugensis* (Wigdor, 1918) Yorke and Maplestone, 1926; *Raphidascaris laurentianus* Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Liver

Host:

Apollonia melanostoma: Pronin et al. 1997; August 1994; 50%; 2; south of Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Proterorhinus marmoratus: Pronin et al. 1997; 15%; 1; Michigan

Diectophymidae Railliet, 1915

Eustrongylides tubifex (Nitzsch, 1819) Jagerskiold, 1909

Synonym: None

Site of Infection: Encysted in mesentery

Host:

Apollonia melanostoma: Muzzall et al. 1995; June and August 1994; 2%; 1; Anchor Bay, Michigan; 42°39'0"/-82°45'59"

Perca flavescens: Synnestvedt 1997; May-October 1993; monthly prevalence varied from 1-36; minp; Michigan

Cystidicolidae (as in Anderson et al. 1975)

Spinitectus sp.

Site of Infection: Intestine

Host: *Apollonia melanostoma*: Muzzall et al. 1995; June and August 1994; 2%; 2; Goosebay, Michigan; 42°35'4"/-82°40'44"

Gnathostomatidae Lane, 1923

Spiroxys contortus (Rudolph, 1819)

Synonym: None

Site of Infection: Mesentery

Host: *Proterorhinus marmoratus*: Kvach and Stepien 2008b; October-November 2006; 10%; 1; 0.1; Clinton River mouth; 42°35'41"/-82°46'31"

Table 18, continued.

Spiroxys sp.

Site of Infection: Encysted in mesentery

Host:

Apollonia melanostoma: Muzzall et al. 1995; August and September 1994; 5%; 1; Anchor Bay, Michigan; 42°39'0"/-82°45'59"

Proterorhinus marmoratus: Muzzall et al. 1995; June and August 1994; 2%; 1; Anchor Bay, Michigan; 42°39'0"/-82°45'59"

Philometridae Baylis and Daubney, 1926

Philometra sp.

Site of Infection: Mesentery

Host: *Apollonia melanostoma*: Kvach and Stepien 2008b; October-November 2006; 7%; 1; 0.1; Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Diectophymidae Railliet, 1915 and/or Philometridae Baylis and Daubney, 1926

Redworm: Could be *Eustrongylides tubifex* (Nitzsch, 1819) and/or *Philometra cylindracea* (Ward and Magath, 1916) Van Cleave and Mueller, 1934

Synonym: *Ichthyonema cylindraceum* Ward and Magath, 1916 for *Philometra cylindraceum*

Site of Infection: Mesentery, body cavity

Host: *Perca flavescens*: Thomas and Haas 2004; 1996-2001; 4%; minp; Lake St. Clair, Michigan

Adult Acanthocephala

Unknown Family

Unidentified acanthocephalan

Synonym: ?

Site of Infection: Not reported

Host: "Several fish species": Ward 1895; cdnp; pnp; minp; lns; Michigan; llnk

Immature Acanthocephala

Neoechinorhynchidae Ward, 1917

Synonym: Hebosomatidae Van Cleave, 1928; Hebosomatidae Yamaguti, 1963

Neoechinorhynchus tumidus Van Cleave and Bangham, 1949

Synonym: None

Site of Infection: Mesentery

Host: *Apollonia melanostoma*: Kvach and Stepien 2008b; October-November 2006; 13%; 2; 0.3; Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Table 18, continued.

Neoechinorhynchus sp.

Site of Infection: Encysted in liver

Host: *Proterorhynchus marmoratus*: Muzzall et al. 1995; June and August 1994; 2%; 1; Goosebay, Michigan; 42°35'4"/-82°40'44"

Polymorphidae Meyer, 1931

Southwellina hispida (Van Cleave, 1925)

Synonym: ?

Site of Infection: Mesentery

Host: *Proterorhynchus marmoratus*: Kvach and Stepien 2008b; October-November 2006; 10%; 1; 0.1; Clinton River mouth, Michigan; 42°35'41"/-82°46'31"

Remarks: This maybe the only report of *Southwellina hispida* in a fish from the Great Lakes.

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus oricola* Linstow, 1901; *Echinorhynchus thecatus* Linton, 1891

Site of Infection: Mesentery

Host:

Apollonia melanostoma: Muzzall et al. 1995; August and September 1994; 2%; 3; Anchor Bay, Michigan; 42°39'0"/-82°45'59"

Proterorhynchus marmoratus: Pronin et al. 1997; August 1994; 5%; 1; south of Clinton River mouth; Michigan; 42°35'41"/-82°46'31"

Hirudinea (Leeches)

Piscicolidae Johnston, 1865

Myzobdella lugubris Leidy, 1851

Synonym: *Cystobranchus virginicus* Paperna and Zwerner, 1974; *Ichthyobdella funduli* Verrill, 1872; *Ichthyobdella rapax* Waas, 1972; *Ichthyobdella richardsoni* Meyer, 1940; *Ichthyobdella alba* Meyer, 1940; *Myzobdella alba* Meyer, 1940; *Illinobdella elongata* Meyer 1940; *Illinobdella moorei* Meyer, 1940; *Myzobdella lugubris* Pearse, 1948; *Myzobdella moorei* (Meyer, 1940) Meyer and Moore, 1954

Site of Infection: Fins

Host: *Percina caprodes*: Appy and Cone 1982; 1980; 43%; minp; Tremblay, Ontario; 42°18'N, 82°31' W

Piscicolaria reducta Meyer, 1940

Synonym: None

Site of Infection: [Fins]

Host: *Percina caprodes*: Appy and Cone 1982; 1980; pnp; minp; Tremblay, Ontario; 42°18'N, 82°31' W

Table 18, continued.

DETROIT RIVER

Myxozoa (Myxosporans)

Myxobolidae Thelohan, 1892

Myxobolus sp.

Site of Infection: Abdominal muscle

Host: *Notropis atherinoides*: PM, Michigan State University, personal observation, 2008; 100%; minp; Grassy Island, Wyandotte, Michigan; 42°13'27"/-83°8'4"

Myxobolus sp.

Site of Infection: Eye

Host: *Notropis atherinoides*: PM, Michigan State University, personal observation, 2008; 83%; minp; Grassy Island, Wyandotte, Michigan; 42°13'27"/-83°8'4"

Adult Cestoda (Cestodes)

Bothriocephalidae Blanchard, 1849

Bothriocephalus acheilognathi Yamaguti, 1934

Synonym: *Bothriocephalus gowkongensis* Yeh, 1955; *Bothriocephalus opsariichthidis* Yamaguti, 1934

Site of Infection: Intestine

Host: *Pimephales notatus*: Marcogliese 2008; September 2002; pnp; minp; Grosse Ile, Michigan; 42°5'42"/-83°11'22"

Remarks: *Bothriocephalus acheilognathi* is an exotic species and is reported for the first time from the Great Lakes area.

Table 19. Fishes by family from the St. Clair River, Lake St. Clair, and Detroit River from which parasites have been reported during 1895-2010 using parasite data in Table 18. References in parentheses following parasites refer to reference for host records.

ST. CLAIR RIVER

Gobiidae

***Apollonia melanostoma* (round goby)**

Ciliophora: *Apiosoma* sp., (Pronin et al. 1997)

Myxozoa: *Sphaeromyxa sevastopolis*, (Pronin et al. 1997)

Larval/Immature Digenea: *Rhipidocotyle* sp., (Pronin et al. 1997); *Clinostomum complanatum*, (Pronin et al. 1997); *Diplostomum spathaceum*, (Pronin et al. 1997); *Diplostomum* sp., (Muzzall et al. 1995)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Pronin et al. 1997); *Scolex pleuronectis*, (Pronin et al. 1997)

Larval/Immature Nematoda: *Raphidascaris acus*, (Pronin et al. 1997); *Eustrongylides tubifex*, (Pronin et al. 1997)

Mollusca: Unidentified glochidia, (Muzzall et al. 1995)

LAKE ST CLAIR

Acipenseridae

***Acipenser fulvescens* (lake sturgeon)**

Adult Nematoda: *Truttaedacnitis clitellarius*, (Ward and Magath 1916)

Amiidae

***Amia calva* (bowfin)**

Adult Cestoda: *Proteocephalus ambloplitis*, (La Rue 1914)

Adult Nematoda: *Haplonema immutatum*, (Ward and Magath 1916)

Cyprinidae

***Notropis hudsonius* (spottail shiner)**

Myxozoa: *Myxobolus burti* (Cone et al. 2004, Cone and Marcogliese 2010)

Table 19, continued.

Salmonidae

***Coregonus artedi* (lake herring/cisco)**

Adult Nematoda: *Cystidicola stigmatura*, (Ward and Magath 1916)

***Coregonus clupeaformis* (lake whitefish)**

Adult Nematoda: *Cystidicola stigmatura*, (Ward and Magath 1916)

***Salvelinus namaycush* (lake trout)**

Adult Nematoda: *Cystidicola stigmatura*, (Ward and Magath 1916)

Centrarchidae

***Micropterus dolomieu* (smallmouth bass)**

Adult Cestoda: *Proteocephalus ambloplitis*, (La Rue 1914)

***Micropterus* sp. (bass)**

Adult Nematoda: *Hysterothylacium brachyurum*, (Ward and Magath 1916)

Percidae

***Perca flavescens* (yellow perch)**

Adult Nematoda: *Dichelyne cotylophora*, (Ward and Magath 1916); *Philometra cylindraceum*, (Ward and Magath 1916); redworm, (adult *Philometra cylindracea* and or larval *Eustrongylides tubifex*); (Thomas and Haas 2004)

Larval Nematoda: *Eustrongylides tubifex*, (Synnestvedt 1997)

***Percina caprodes* (logperch)**

Hirudinea: *Piscicolaria reducta*, (Appy and Cone 1982); *Myzobdella lugubris*, (Appy and Cone 1982)

***Sander vitreus* (walleye)**

Adult Nematoda: *Dichelyne cotylophora*, (Ward and Magath 1916)

Gobiidae

***Apollonia melanostoma* (round goby)**

Myxozoa: *Sphaeromyxa sevastopoli*, (Pronin et al. 1997)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Kvach and Stepien 2008b; Pronin et al. 1997);

Diplostomum sp., (Pronin et al. 1997); *Neochasmus umbellus*, (Kvach and Stepien 2008b);

Ichthyocotylurus pileatus, (Pronin et al. 1997); Digenea gen. sp., (Kvach and Stepien 2008b)

Larval/Immature Cestoda: *Scolex pleuronectis*, (Pronin et al. 1997)

Adult Nematoda: *Rhabdochona decaturensis*, (Muzzall et al. 1995)

Table 19, continued.

Larval/Immature Nematoda: *Raphidascaris acus*, (Pronin et al. 1997); *Eustrongylides tubifex*, (Muzzall et al. 1995); *Philometra* sp., (Kvach and Stepien 2008b); *Spinitectus* sp., (Muzzall et al. 1995); *Spiroxys* sp., (Muzzall et al. 1995)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Muzzall et al. 1995); *Neoechinorhynchus tumidus*, (Kvach and Stepien 2008b)

***Proterorhinus marmoratus* (tubenose goby)**

Ciliophora: *Apiosoma* sp., (Pronin et al. 1997); *Chilodonella* sp., (Pronin et al. 1997); *Trichodina* sp., (Pronin et al. 1997)

Myxozoa: *Sphaeromyxa sevastopoli*, (Pronin et al. 1997)

Larval/Immature Cestoda: *Proteocephalus* sp., (Pronin et al. 1997)

Larval/Immature Nematoda: *Contraecaecum* sp., (Muzzall et al. 1995); *Raphidascaris acus*, (Pronin et al. 1997); *Spiroxys contortus*, (Kvach and Stepien 2008b); *Spiroxys* sp., (Muzzall et al. 1995)

Immature Acanthocephala: *Neoechinorhynchus* sp., (Muzzall et al. 1995); *Leptorhynchoides thecatus*, (Pronin et al. 1997); *Southwellina hispida*, (Kvach and Stepien 2008b)

Unknown Family

Unidentified fish species

Adult Digenea: Unidentified trematodes, (Ward 1895)

Adult Cestoda: Unidentified cestodes, (Ward 1895)

Adult Nematoda: Unidentified nematodes, (Ward 1895)

Adult Acanthocephala: Unidentified acanthocephalans, (Ward 1895)

DETROIT RIVER

Cyprinidae

***Notropis atherinoides* (emerald shiner)**

Myxozoa: *Myxobolus* spp., (PM, Michigan State University, personal observation, 2008)

***Pimephales promelas* (fathead minnow)**

Adult Cestoda: *Bothriocephalus acheilognathi*, (Marcogliese 2008)

LAKE ERIE

Results

Parasite Species—Overview

A total of 69 studies were found that reported a parasite species infecting one or more fish species from Lake Erie. These studies were conducted during 1914-2010, and the most studies by 10-yr period were done in 1970-1979 (Table 4). A total of 229 parasite species (1 Mastigophora, 5 Ciliophora, 22 Myxozoa, 2 Microspora, 46 adult Digenea, 13 larval/immature Digenea, 1 Aspidobothrea, 55 Monogenea, 24 adult Cestoda, 3 larval/immature Cestoda, 21 adult Nematoda, 4 larval/immature Nematoda, 14 adult Acanthocephala, 6 Hirudinea, 13 Copepoda, 1 Mollusca) have been found in Lake Erie fish (Table 2). Although *Allocreadium* sp., *Crepidostomum* sp., *Leuceruthrus* sp., *Proterometra* sp., *Bucephalus elegans*, *Allacanthochoasmus varius*, *Neochasmus umbellus*, *Sanguinicola* sp., *Centrovarium lobotes*, *Macroderoides* sp., *Eubothrium crassum*, *Bothriocephalus cuspidatus*, *Proteocephalus ambloplitis*, *P. pearsei*, *P. pinguis*, *P. stizostethi*, *Triaenophorus nodulosus*, *T. stizostedionis*, *Hysterothylacium brachyurum*, *Raphidascaris acus*, *Camallanus oxycephalus*, *Philometra cylindracea*, *Rhabdochona* sp., *Acanthocephalus dirus*, *Neoechinorhynchus cylindratus*, *Neoechinorhynchus* sp., *Leptorhynchoides thecatus*, and *Pomphorhynchus bulbocolli* were represented in both adult and larval/immature groups, they are included in the adult category and only counted once. The parasites by taxonomic group and family, infecting fish from Lake Erie, are listed in Table 20.

Protozoans

Only one species of mastigophoran (*Trypanoplasma catostomi*) was found in one fish species, *Catostomus commersonii*. Four species of ciliates (*Ichthyophthirius multifiliis*, *Trichodina domerguei*, *Trichodina urinaria*, *Capriniana piscium*) occurred on the fins, gills and external surface of fish, except for *T. urinaria* in the ureters. *Ichthyophthirius multifiliis* infected 13 fish species.

Twenty-two species of myxozoans in three families were found. Five species of *Henneguya* and 13 species of *Myxobolus* in the Myxobolidae have been documented. Many species, such as *Henneguya doori*, *Henneguya rupestris*, *Myxobolus rotundum*, are host specific to only one fish species or to a fish family such as *Henneguya exilis* and *Myxobolus osburni*. Unidentified myxosporans have been found in 38 fish species. All myxozoans occurred in non-intestinal sites. Only two species of microsporans were found—*Glugea cepedianae* is host specific to *Dorosoma cepedianum* and *Glugea hertwigi* to *Osmerus mordax*.

Digenetic Trematodes

Forty-six species of adult trematodes in 12 families have been found in Lake Erie fish. Most species occurred in the digestive tract, except for *Bucephalus* sp. (gills), *Acetodextra amiuri* (reproductive organs, swim bladder), *Phyllodistomum* spp. (ureters and/or urinary bladder), *Alloglossidium corti* (also ureters), and *Sanguinicola occidentalis* (circulatory system). Twelve species are in the Allocreadiidae with species in the genera *Allocreadium* and *Crepidostomum* being most common. *Crepidostomum cooperi* infected 10 fish species. *Plagioporus cooperi* infected 14 fish species, mostly cyprinids. Six species of *Phyllodistomum* have been reported from fish in five families. Several species, such as *Allocreadium boleosomi*, *A. corti*, *Crepidostomum illionoiense*, *Polyekithum ictaluri*, *Paurorhynchus hiodontis*, *Phyllodistomum fausti*, *Allancanthochasmus artus*, *Lissorchis attenuatus*, and *Macroderoides spiniferus*, are host-specific to one fish species or family.

Twenty-two species of larval/immature digenetic trematodes in 10 families have been reported. Six of these species occurred as immature forms and 14 species occurred as larvae encysted in several non-intestinal sites. Five larval digenean species were found in each of the Diplostomidae and Strigeidae. *Clinostomum complanatum* was reported from 18 fish species, *Diplostomum flexicaudum* from 11 species, *Diplostomum spathaceum* from 10 species, *Neascus* sp. from 44 species, and *Posthodiplostomum minimum* from 36 fish species. The fish hosts for these larval trematode species represent several families. Unidentified species of *Diplostomum* have been reported from 53 fish species. Both *Bucephalus elegans* and *Neochasmus umbellus* occurred as larval and immature stages.

Aspidobothreans

Only one species of aspidogastrid, *Cotylogaster occidentalis*, was reported from the large intestine of only one fish species, *Aplodinotus grunniens*, in three studies.

Monogeneans

Fifty-five species of monogeneans representing 10 families were reported, and 38 of these species were in the Dactylogyridae. The genus *Dactylogyrus* is represented with six species. Most monogenean species occurred on the gills, except for *Lyrodiscus longibasus* (nasal cavity, skin), *Lyrodiscus rupestris* (fins, nasal cavity, skin), *Lyrodiscus seminolensis* (fins, skin), *Lyrodiscus* sp. (fins, nasal cavity, skin), *Acolpenteron catostomi* (ureters, urinary bladder), *Dactylogyrus* sp. (skin, also gills), *Icelanonchaptor fyviei* (fins, skin), *Icelanonchaptor microcotyle* (fins, skin), *Pellucidhaptor angularis* (fins, skin), *Pellucidhaptor eremitus* (fins), *Pellucidhaptor microcanthus* (fins), *Pseudocolpenteron pavlovskii* (skin), *Gyrodactylus macrochiri* (fins), *Anonchaptor anomalus* (fins, nasal, cavity, also gills), and *Anonchaptor muelleri* (fins). Most monogenean species are host-specific to one fish species or family.

Cestodes

Twenty-four species of adult cestodes in eight families have been documented from the digestive tract of Lake Erie fish. Five species of caryophyllid cestodes in the Capingentidae, Caryophyllaeidae, and Lytocestidae were found in one cyprinid and several catostomid species. Twelve cestode species are in the Proteocephalidae (10 species of *Proteocephalus*). *Bothriocephalus cuspidatus* was reported from 8 species, *Corallobothrium fimbriatum* from 6 species, and *Proteocephalus pearsei* from 9 fish species. Many cestode species (e.g. *Bothriocephalus formosus*, *Haplobothrium globuliforme*, *C. fimbriatum*, *Proteocephalus exiguus*, *P. singularis*, *Triaenophorus nodulosus*, caryophyllid cestodes) are host-specific to one or two fish species or to one fish family.

At least 12 species of larval/immature cestodes in six families have been reported. *Bothriocephalus* sp., *Glaridacris* sp., *Proteocephalus pearsei*, *Proteocephalus pinguis*, *Proteocephalus* sp., and *Triaenophorus* sp. occurred as immature stages in the intestine. Bothriocephalid plerocercoids, and larval stages of *Diphyllobothrium laruei*, *Ligula intestinalis*, *Schistocephalus* sp., *Sparganum pseudosegmentatum*, and *Triaenophorus nodulosus* were encysted in several non-intestinal sites. *Eubothrium crassum*, *Bothriocephalus cuspidatus*, *Proteocephalus ambloplitis*, *P. stizostethi*, and *Triaenophorus* sp. occurred as both larval stages encysted in non-intestinal sites and immature stages in the intestine. Larval/immature *Bothriocephalus cuspidatus* was reported from 8 fish species, immature *Triaenophorus nodulosus* from 15 species, larval *Ligula intestinalis* from 9 species, and larval *Proteocephalus ambloplitis* from 29 fish species.

Nematodes

Twenty-one species of adult nematodes in eight families were found in Lake Erie fish. Several adult species (e.g., *Raphidascaris acus*, *Camallanus ancyloDIRUS*, *Truttaedacnitis clitellarius*, *Cystidicoloides ephemeridarum*, *Haplonema hamulatum*, *H. immutatum*) are host-specific occurring in one fish species or in one family. Other nematode species, however, infected a large number of fish species—*Dichelyne cotylophora* (9 fish species), *Spinitectus carolini* (12 species), *S. gracilis* (17 species), *Rhabdochona cascadiella* (11 species), and *Camallanus oxycephalus* (39 species). All species occurred in the digestive tract, except for *Cystidicola stigmatura* (swim bladder), *Philometra cylindracea* (body cavity), *Philometra* sp. (body cavity, eye), and *Philometroides nodulosa* (cheek galleries, fins).

Eleven species of larval/immature nematodes in seven families have been reported. *Hysterothylacium brachyurum*, *Raphidascaris acus*, *Dioctophyma* sp., *Eustrongylides* sp., *Spiroxys* sp., and *Philometra cylindracea* occurred as larval stages encysted in non-intestinal sites. Larval *Eustrongylides tubifex* occurred in non-intestinal sites of six fish species. *Camallanus oxycephalus* occurred as both larval stages (encysted in coelom and mesentery) and immature stages (occurring in intestine) in nine fish species. Immature *Capillaria catenata*, *Philonema* sp., and *Rhabdochona* sp. infected the digestive tract.

Acanthocephalans

Fourteen species of adult acanthocephalans representing four families were found in the intestine. Three species are in the Echinorhynchidae, with *Echinorhynchus salmonis* occurring in five fish species. Eight species are in the Neoechinorhynchidae, with *Neoechinorhynchus cylindratus* reported from eight fish species. *Pomphorhynchus bulbocolli* and *Leptorhynchoides thecatus* infected 18 and 20 fish species, respectively. *Neoechinorhynchus carpiodi*, *N. crassus*, *N. cristatus*, *N. tumidus*, and *Octospinifer macilentus* are host-specific to one fish species or one family.

Six species of immature acanthocephalans have been reported. *Acanthocephalus dirus*, *Echinorhynchus* sp., *Neoechinorhynchus cylindratus*, and *Pomphorhynchus bulbocolli* infected the digestive tract. *Neoechinorhynchus* sp. and *Leptorhynchoides* sp. occurred in both the liver and mesentery. *Leptorhynchoides thecatus* occurred in the mesentery and intestine of 17 fish species. *Pomphorhynchus bulbocolli* was also found in the mesentery.

Leeches

Five species of leeches representing three families have been reported from several external sites on Lake Erie fish. *Myzobdella lugubris* and *Piscicola punctata* occurred on 5 and 10 fish species, respectively.

Crustaceans

Thirteen species of copepods in four families were documented in Lake Erie fish. Four species are in the Ergasilidae, with *Ergasilus caeruleus* reported from 21 fish species and *E. centrarchidarum* reported from seven species. *Lernaea cyprinacea* and *Achtheres pimelodi* each has been reported from six fish species. All copepods occurred on the external surface or on the gills or gill arches.

Molluscs

Glochidia of *Anodonta* sp. occurred on the gills of *Lepomis gibbosus*. Unidentified glochidia were found on the gills of 24 fish species.

Fish Species—Parasite Analyses Overview

Parasites have been reported from 89 (83%) of the 107 established fish species (24 families) in Lake Erie (Table 21). Most of these species (66) were in six families—Cyprinidae (23), Catostomidae (9), Ictaluridae (7), Centrarchidae (10), Percidae (13), Salmonidae (4). The individual fish species with the most-reported parasite species were *Perca flavescens* (46), *Micropterus dolomieu* (43), *Ambloplites rupestris* (39), *Carpiodes cyprinus* (36), *Catostomus commersonii* (34), *Ictalurus punctatus* (34), *Morone chrysops* (31), and *Notropis hudsonius* (23).

Parasitological studies have been done only once on 19 Lake Erie fish species (*Anguilla rostrata*, *Lythrurus umbratilis*, *Moxostoma anisurum*, *M. erythrurum*, *Esox masquinongy*, *Erimyzon sucetta*, *Ameiurus natalis*, *Noturus miurus*, *Lepomis cyanellus*, *L. humilis*, *Etheostoma caeruleum*, *E. exile*, *Nocomis micropogon*, *Umbra limi*, *Salvelinus fontinalis*, *S. namaycush*, *Notropis anogenus*, *Cottus cognatus*, and *Morone americana*) and 27 other species have been studied only twice (*Acipenser fulvescens*, *Moxostoma macrolepidotum*, *Noturus gyrinus*, *Campostoma anomalum*, *Notemigonus crysoleucas*, *Notropis buccatus*, *N. heterodon*, *Opsopoeodus emiliae*, *Pimephales notatus*, *P. promelas*, *Rhinichthys cataractae*, *R. obtusus*, *Hypentelium nigricans*, *Ameiurus melas*, *Esox americanus*, *Fundulus diaphanus*, *Labidesthes sicculus*, *Lepomis megalotis*, *Ammocrypta pellucida*, *Etheostoma blennioides*, *E. flabellare*, *E. nigrum*, *Percina caprodes*, *P. maculata*, *Minytrema melanops*, *Moxostoma aureolum*, *Apollonia melanostoma*). Nine studies have been performed on the parasites of *Micropterus dolomeui*, 10 studies each on *Osmerus mordax* and *Aplodinotus grunniens*, 13 studies on *Morone chrysops*, and 19 studies have reported on the parasites of *Perca flavescens*.

Parasitological studies have not yet been conducted on the following 29 fish species from Lake Erie: *Ichthyomyzon fossor*, *I. unicuspis*, *Petromyzon marinus*, *Lepisosteus oculatus*, *Hybopsis hankinsoni*, *Luxilus chrysocephalus*, *Margariscus margarita*, *Nocomis biguttatus*, *Notropis rubellus*, *Phoxinus eos*, *Scardinius erythrophthalmus*, *Catostomus catostomus*, *Erimyzon oblongus*, *Ictiobus cyprinellus*, *Moxostoma duquesnei*, *M. valenciennesi*, *Noturus stigmosus*, *Pylodictis olivaris*, *Oncorhynchus gorboscha*, *O. kisutch*, *O. mykiss*, *O. tshawytscha*, *Salmo trutta*, *Aphredoderus sayanus*, *Gasterosteus aculeatus*, *Myoxocephalus thompsonii*, *Chaenobryttus gulosus*, *Percina shumardi*, and *Proterorhinus marmoratus*.

Fish Families—Parasite Species-Richness, Parasite Analyses

The values for parasite species-richness and number of fish species examined (in parentheses) regardless of stage for each of the five major fish families were Centrarchidae (76, 10), Cyprinidae (47, 23), Catostomidae (54, 9), Percidae (64, 13), and Salmonidae (14, 4). The correlation coefficient between species-richness and number of fish species examined for each family using these values for all five families was nonsignificant ($r_s = 0.300$).

Parasites only found in centrarchids were protozoans (*Trichodina domerguei*, *Chloromyxum gibbosum*, *Henneguya ohioensis*, *Myxobolus gibbosus*, *M. inornatus*, *M. kostiri*, *M. osburni*), adult digenetic trematodes (*Caecinicola parvulus*, *Phyllodistomum lohrenzi*, *Proterometra macrostoma*, *Rhipidocotyle papillosum*), monogeneans (*Actinocleidus bakeri*, *A. oculatus*, *A. recurvatus*, *Clavunculus unguis*, *Cleidodiscus alatus*, *C. similis*, *C. uniformis*, *C. venardi*, *Gyrodactylus macrochiri*, *Lyrodiscus longibasus*, *L. rupestris*, *Onchocleidus chautauquaensis*, *O. ferox*, *O. helicis*, *Synclithrium fusiformis*, *Tetracleidus banghami*, *T. capax*, *T. longus*, *T. stentor*), adult cestodes (*Proteocephalus fluviatilis*), larval/immature nematodes (*Spiroxys* sp.), adult acanthocephalans (*Pomphorhynchus rocci*), leeches (*Placobdella montifera*), copepods (*Lernaea cruciata*), and molluscs (*Anondonta* sp.). Parasite species only found in cyprinids were protozoans (*Ceratomyxa* sp., *Myxobolus algonquiensis*, *M. aureatus*, *M. burti*, *Myxobolus pendula*, *Thelohanellus notatus*, *Zschokkella* sp.), adult digenetic trematodes (*Allocreadium*

lobatum), larval/immature digenetic trematodes (*Neascus rhinichthys*), monogeneans (*Cleidodiscus brachus*, *Dactylogyrus anchoratus*, *D. extensus*, *D. vastator*, *Pseudocolpenteron pavlovskii*), adult cestodes (*Khawia iowensis*), and adult nematodes (*Skrjabinocapillaria bakeri*). Parasites only found in catostomids were protozoans (*Trypanoplasma catostomi*, *Myxobolus bibullatum*, *M. conspicuus*, *M. rotundum*), adult digenetic trematodes (*Lissorhis attenuatus*, *Phyllodistomum lysteri*), monogeneans (*Acolpenteron catostomi*, *Anonchhaptor anomalus*, *A. muelleri*, *Cleidodiscus pricei*, *Dactylogyrus urus*, *Gyrodactylus spathulatus*, *Icelanonchhaptor fyviei*, *I. microcotyle*, *Neodiscocotyle carpioditis*, *Octomacrum lanceatum*, *Pellucidhaptor angularis*, *P. eremitus*, *P. microcanthus*, *Pseudomurraytrema copulatum*, *P. moxostomi*), adult cestodes (*Biacetabalum* sp., *Glaridacris catostomi*, *Hypocaryophyllaeus parataris*, *Spartoides wardi*), adult nematodes (*Camallanus ancyloDIRUS*, *Philometroides nodulosa*, *Rhabdochona milleri*, *R. ovifilamenta*), larval nematodes (*Philonema* sp.); adult acanthocephalans (*Neoechinorhynchus carpiodi*, *N. crassus*, *N. cristatus*, *Octospinifer macilentus*), and leeches (*Actinobdella inequiannulata*). Parasites only found in percids were protozoans (*Trichodina urinaria*, *Henneguya doori*, *Myxobolus scleroperca*), adult digenetic trematodes (*Allocreadium boleosomi*, *Bunodera sacculata*, *B. lucioperca*, *Prosorhynchoides pusilla*), larval digenetic trematodes (*Apophallus brevis*, *Tylodelphys scheuringi*), monogeneans (*Aethycteron malleus*, *Urocleidus aculeatus*, *U. adspectus*), adult cestodes (*Bothriocephalus formosus*, *Triaenophorus stizostedionis*), larval/immature nematodes (*Hysterothylacium brachyurum*, *Raphidascaris acus*), and copepods (*Ergasilus luciopercarum*). Parasites only found in salmonids were adult cestodes (*Proteocephalus exiguus*, *P. wickliffi*), larval cestodes (*Diphyllobothrium laruei*, *Eubothrium crassum*, *Schistocephalus* sp.), adult nematodes (*Cystidicola stigmatura*, *Cystidicoloides ephemeridarum*), and adult acanthocephalans (*Neoechinorhynchus tumidus*).

The parasite taxonomic groups, by numbers and percentages, for each of the five major fish families from Lake Erie are in Table 22. The parasite group(s) (in parentheses) most common in each fish family were: Cyprinidae (digenetic trematodes followed by myxozoans), Catostomidae (monogeneans followed by digenetic trematodes), Centrarchidae (digenetic trematodes and monogeneans), Percidae (digenetic trematodes followed by cestodes), and Salmonidae (cestodes followed by digenetic trematodes).

The numbers and percentages of autogenic and allogenic helminth species (in parentheses) for each fish family, respectively, were Centrarchidae (32 species, 76%; 10 species, 24%), Cyprinidae (17 species, 71%; 7 species, 29%), Catostomidae (22 species, 76%; 7 species, 24%), Percidae (37 species; 77%, 11 species, 23%), and Salmonidae (7 species, 64%; 4 species, 36%).

Jaccard Coefficients of Parasite Communities—Fish Families

The fish families and the species (in parentheses) involved in calculating Jaccard coefficients of parasite-community similarity were Centrarchidae (*Ambloplites rupestris*, *Lepomis cyanellus*, *L. gibbosus*, *L. humilis*, *L. macrochirus*, *L. megalotis*, *Micropterus dolomieu*, *M. salmoides*, *Pomoxis annularis*, *P. nigromaculatus*), Cyprinidae (*Campostoma anomalum*, *Carassius auratus*, *Cyprinella spiloptera*, *C. whipplei*, *Cyprinus carpio*, *Luxilus cornutus*, *Lythrurus umbratilis*, *Macrhybopsis storeriana*, *Nocomis micropogon*, *Notemigonus crysoleucas*, *Notropis anogenus*,

N. atherinoides, *N. buccatus*, *N. heterodon*, *N. hudsonius*, *N. stramineus*, *N. volucellus*, *Opsopoeodus emiliae*, *Pimephales notatus*, *P. promelas*, *Rhinichthys cataractae*, *R. obtusus*, *Semotilus atromaculatus*), Catostomidae (*Carpiodes cyprinus*, *Catostomus commersonii*, *Erimyzon sucetta*, *Hypentelium nigricans*, *Minytrema melanops*, *Moxostoma anisurum*, *M. aureolum*, *M. erythrum*, *M. macrolepidotum*), Percidae (*Ammocrypta pellucida*, *Etheostoma blennioides*, *E. caeruleum*, *E. exile*, *E. flabellare*, *E. nigrum*, *Perca flavescens*, *Percina caprodes*, *P. copelandi*, *P. maculata*, *Sander canadensis*, *S. glaucum*, *S. vitreus*), and Salmonidae (*Coregonus artedi*, *C. clupeaformis*, *Salvelinus fontinalis*, *S. namaycush*).

The range of Jaccard coefficients among fish family pairs was 0.0140 (Percidae and Salmonidae) to 0.3168 (Centrarchidae and Percidae) (Table 23). The next highest coefficient was between Percidae and Cyprinidae (0.2375). Salmonids shared the fewest parasite species with fish in the other families.

Parasite species or a specific genus found in two or more fish families (in parentheses) were protozoans—*Ichthyophthirius multifiliis* (6); adult digenetic trematodes—*Allacanthochoasmus varius* (2), *Azygia angusticauda* (3), *Bucephalus elegans* (3), *Centrovarium lobotes* (3), *Crepidostomum cooperi* (5), *C. cornutum* (3), *Cryptogonimus chili* (2), *Leuceruthus micropteri* (5), *Megalogonia ictaluri* (3), *Microphallus opacus* (4), *Neoechasmus umbellus* (2), *Plagioporus cooperi* (2); *Sanguinicola occidentalis* (2), larval/immature digenetic trematodes—*B. elegans* (3), *C. lobotes* (2), *Clinostomum complanatum* (6), *Crassiphiala bulboglossa* (2), *Diplostomum flexicaudum* (6), *D. spathaceum* (9), *Ichthyocotylurus pileatus* (2), *I. platycephalus* (2), *Neoechasmus umbellus* (3), *Posthodiplostomum minimum* (10), *Uvulifer ambloplitis* (3); adult cestodes—*Eubothrium crassum* (2), *Bothriocephalus claviceps* (4), *B. cuspidatus* (4), *Haplobothrium globuliforme* (2), *Proteocephalus ambloplitis* (3), *P. pearsei* (4); larval/immature cestodes—*B. cuspidatus* (5), *Ligula intestinalis* (2), *Proteocephalus ambloplitis* (9), *P. pearsei* (3), *P. pinguis* (2), *Triaenophorus nodulosus* (5); adult nematodes—*Hysterothylacium brachyurum* (2), *Camallanus oxycephalus* (12), *Dichelyne cotylophora* (5), *Philometra cylindracea* (2), *Rhabdochona cascadiella* (4), *Spinitectus carolini* (4), *S. gracilis* (7); larval/immature nematodes—*Raphidascaris acus* (2), *Camallanus oxycephalus* (6), *Eustrongylides tubifex* (6), *Philometra cylindracea* (3); adult acanthocephalans—*Acanthocephalus dirus* (3), *Echinorhynchus salmonis* (4), *Leptorhynchoides thecatus* (7), *Neoechinorhynchus cylindratus* (2), *N. rutili* (3), *N. tenellus* (2), *Pomphorhynchus bulbocolli* (6); immature acanthocephalans—*L. thecatus* (6), *Pomphorhynchus bulbocolli* (3); leeches—*Myzobdella lugubris* (4), *Piscicola punctata* (6); and copepods—*Argulus appendiculatus* (2), *Achtheres pimelodi* (4), *Ergasilus caeruleus* (10), *E. centrarchidarum* (2), *Lernaea cyprinacea* (2).

Discussion

Lake Erie is the shallowest Great Lake and the second smallest in surface area, only Lake Ontario is smaller. Lake Erie has a mean depth (maximum) of 19 m (64 m), length of 388 km, width of 92 km, and a surface area of 25,700 km². Water flows from Lake Erie to Lake Ontario through the Niagara River and the Welland Canal. Cudmore-Vokey and Crossman (2000) listed 107 fish species that are established in Lake Erie. However, the number of fish species examined and not examined for parasites from this lake exceed 107 because several fish species examined for parasites were not listed as established species by Cudmore-Vokey and Crossman (*Anguilla rostrata*, *Cyprinella whipplei*, *Notropis anogenus*, *N. heterodon*, *Opsopoeodus emiliae*, *Moxostoma aureolum*, *Salvelinus fontinalis*, *Cottus cognatus*, *Sander canadensis*, and *S. glaucum*), plus the one remaining discrepancy may be due to the use of synonyms for the scientific name of a fish species.

The study by Dechtiar and Nepszy (1988), involving 10 fish species, reported the most parasite species (123, not including agnaths)—Protozoa (11), Digenetic Trematoda (31), Monogenea (25), Cestoda (17), Nematoda (14) Acanthocephala (11), Crustacea (10), Hirudinea (3), and Mollusca (1). Other prominent studies include Bangham (1972) and those by Crites and his co-workers in the Bass Island region of eastern Lake Erie. Only three studies (making up 5% of all studies) have been conducted since 1990.

Pathogenic Parasites

Protozoans

Ichthyophthirius multifiliis, *Trichodina domerguei*, *T. urinaria*, and *Capriniana piscium* occurred in heavy infections and are considered pathogenic to some fish species (Dogiel et al. 1958; Reichenbach-Klinke and Elkan 1965; Reichenbach-Klinke 1973). *Ichthyophthirius multifiliis* can cause weight loss and mortality in fish (Davis 1944; Elser 1955; and Allison and Kelly 1963). *Trichodina* spp. can cause severe hyperplasia of the gill lamellae and inflammation of the ureters (Richardson 1938; Davis 1947; Hoffman and Lom 1967). Dechtiar (1972a) reported mortality of young *Perca flavescens* mainly to *Ichthyophthirius multifiliis* and *Trichodina* spp.

Heneguya spp., *Myxobolus* spp., and *Thelohanellus notatus* are myxozoans that were found in the gills, kidney, muscle, mouth tissue, connective tissue, skin, cartilage, fins, heart, mesentery and bile ducts. These protozoans can cause weight loss and excessive damage to the gills, muscle, internal organs, and skin of fish (Dogiel et al. 1958; Reichenbach-Klinke and Elkan 1965; Reichenbach-Klinke 1973).

Of the microsporans found, the effect of *Glugea hertwigi* on *Osmerus mordax* was the most notable, especially in Lake Erie. Cysts of *G. hertwigi* were first found in *O. mordax* in Lake Erie in 1960 by Dechtiar (1965b). These cysts can be found in the intestinal wall, gonads, fins, viscera, and other organs. *Glugea hertwigi* is probably the most abundant and important parasite of *O.*

mordax in Lake Erie. Mass mortalities of young-of-the-year and adult *O. mordax* caused by *G. hertwigi* have been reported by Nepszy and Dechtiar (1972) and Nepszy et al. (1978) in Lake Erie, as well as a similar mortality of adult *O. mordax* in Lake Ontario (A. Dechtiar, unpublished data). Dechtiar and Nepszy (1988) stated “We believe that the major contributing factor to these mortalities was the high prevalence of *G. hertwigi*.” Nepszy (unpublished data) believed that infection of *O. mordax* by *G. hertwigi* was seasonal, with a peak of infection occurring in the fall, but fluctuations occurred monthly. Chen and Power (1972), however, did not report any mortalities of *O. mordax* infected with *G. hertwigi* in Lakes Erie and Ontario. *Glugea hertwigi* has not been reported from *O. mordax* in Lakes Michigan, Superior, and Huron. Of the other microsporans, *Glugea cepedianae* has been reported to produce large xenomas in the viscera and cause mortalities in *Dorosoma cepedianum* (see Putz et al. 1965; Dechtiar 1972a).

Digenetic Trematodes

Of the adult digenetic trematodes, *Crepidostomum* sp., *Acetodextra amiuri*, *Phyllodistomum* spp., *Sanguinicola occidentalis*, and *Sanguinicola* sp. can be pathogenic to fish if intensities are high (Davis 1937; Perkins 1951, 1956; Wales 1958b, Gleason et al. 1983). *Clinostomum complanatum*, *Crassiphiala bulboglossa*, *Diplostomum flexicaudum*, *D. spathaceum*, *Diplostomum* sp., *Tylodelphys scheuringi*, *Uvulifer ambloplitis*, *Apophallus brevis*, *Centrovarium lobotes*, *Sanguinicola* sp., *Ichthyocotylurus erraticus*, *I. pileatus*, *I. platycephalus*, *Ichthyocotylurus* sp., *Neascus rhinichthys*, *Neascus* sp., and *Posthodiplostomum minimum* are larval/immature digenetic trematodes that can be pathogenic to fish in several sites when their intensities are high (Meyer 1958; Kozicka 1958; Bychovskaya-Pavlovskaya and Petroshevski 1963; Dukes 1975). Smitherman (1968) reported that *Lepomis macrochirus* fingerlings had a significant reduction in growth when large numbers (>353) of metacercariae of *Posthodiplostomum minimum* were present. *Diplostomum* spp. can cause lens discoloration and blindness, and emaciation (Shariff et al. 1980). *Diplostomum spathaceum* was reported to be the causative agent of a mass mortality of *Perca fluviatilis* by Nümann (1972).

Monogeneans

Of the monogeneans, the ancyrocephalids, *Dactylogyrus* spp., *Tetracleidus banghami*, *Synclithrium fusiformis*, *Diclybothrium armatum*, *Gyrodactylus* spp., *Pseudomurraytrema copulatum*, and *Tetraonchus moneteron* are potentially dangerous parasites to freshwater fish. They can damage the epithelium of the gills, cause epithelial hyperplasia and excessive mucus production, and provide portals of entry for secondary fungal infections (Mizelle 1938; Tripathi 1959; Dogiel et al. 1958; Prost 1963; Lester and Adams 1974; Hoffman 1976).

Cestodes

Plerocercoids (larval stages) of the cestodes *Triaenophorus nodulosus* (in *Catostomus commersonii*, *Morone chrysops*, *Perca flavescens*), *Ligula intestinalis*, *Schistocephalus* sp., *Proteocephalus ambloplitis*, *Triaenophorus nodulosus*, and *T. stizostedionis* occurring in the body cavity, pericardial cavity, mesentery, liver, spleen, and gonads can cause serious problems to freshwater fish (Esch and Huffines 1973; McCormick and Stokes 1982; Mahon 1976; Sweeting

1976, 1977). Stromberg and Crites (1974a) reported that the plerocercoids of *Triaenophorus nodulosus* cause triaenophoriosis that may contribute to the mortality of *Morone chrysops* in Lake Erie. Mortality of *Perca flavescens* was caused by plerocercoids of *Triaenophorus nodulosus* (see Lawler 1969; Matthey 1963).

Nematodes

Of the nematodes, adults (*Hysterothylacium brachyurum*, *Raphidascaris acus*, *Philometra cylindracea*, *Philometra* sp., *Spinitectus carolini*) and larvae (*Hysterothylacium brachyurum*, *Raphidascaris acus*, *Camallanus oxycephalus*, *Eustrongylides tubifex*, *Eustrongylides* sp., *Spiroxys contortus*, *Spiroxys* sp., *Philometra cylindracea*) are considered pathogenic to fish when they occur in high intensities (Jilek and Crites 1982; Poole and Dick 1984). Poole and Dick (1984) demonstrated that migrating larvae of *Raphidascaris acus* caused distortion or destruction of blood vessels of *Perca flavescens* and found collagenous capsules around worms. Jilek and Crites (1982) reported that *Spinitectus carolini* caused simple infectious enteritis with inflammatory infiltration in the intestine of *Lepomis macrochirus*, with the most-intense tissue reaction occurring when the larvae completely penetrated the gut wall. Larvae of *Eustrongylides tubifex* and adults of *Philometra cylindracea* may play a role in reduced growth and high mortality of *Perca flavescens* in Lake Erie (Allison 1966; Crites 1982; and Salz 1989). Crites (1982) indicated that the higher the number of *Eustrongylides tubifex* within an age-class of *Perca flavescens*, the less the fish weighed. Salz (1989) noted that *Eustrongylides tubifex* may use some of the lipid reserve of infected *Perca flavescens*.

Acanthocephalans

Adult acanthocephalans that cause problems in fish when they occur in high intensities include *Acanthocephalus dirus*, *Echinorhynchus leidy*, *E. salmonis*, *Pomphorhynchus bulbocolli*, *Pomphorhynchus* sp., and *Leptorhynchoides thecatus*. They can cause inflammation and hemorrhaging of the intestinal wall that can reduce nutrient absorption (Bullock 1963; Schmidt et al. 1974). *Pomphorhynchus bulbocolli* and *Leptorhynchoides thecatus* can be harmful by damaging the mesentery and destroying visceral tissue leading to the formation of connective tissue and fibrosis.

Leeches

The most-recent report of a leech infecting a fish from Lake Erie was Dechtiar and Nepszy (1988). *Actinobdella inequiannulata* and *Myzobdella lugubris* can cause pathology to fish, with the former species damaging the gills and operculum of catostomids (Dechtiar and Lawrie 1988; Klemm et al. 2009). Appy and Cone (1982) reported that *Myzobdella lugubris* eroded the epithelium and caused hyperplasia of the surrounding epithelium when it was attached to the fins of *Percina caprodes* and *Ameiurus nebulosus*.

Copepods

Copepods (*Argulus catostomi*, *Ergasilus centrarchidarum*, *E. luciopercarum*), when they occur in high intensities, can be pathogenic to fish (Schumacher 1952; Allum and Huggins 1959; Kabata 1970; Rogers and Hawke 1978). Copepod movements on the gills of fish can cause destruction and hypertrophy of filaments. Roberts and Janovy (2009) reported that large numbers of *Ergasilus* can severely damage gill tissue, interfere with respiration, open the way to secondary infection, and lead to death.

Molluscs

Only Bangham and Hunter (1939), Bangham (1972), Dechtiar (1972a), and Dechtiar and Nepszy (1988) have reported glochidia on Lake Erie fish. When present in high intensities, glochidia can damage the skin, fins, and gills, impairing respiratory function (Karna and Milleman 1978; Treasure and Turnbull 2005).

Parasite Host Specificity—Jaccard Coefficients

Fifty-five parasite species or a specific genus reported for two or more fish families make up 24% of all the parasite species reported from fish in Lake Erie. These 55 parasite species have indirect life cycles, with fish becoming infected by eating infected intermediate hosts or paratenic hosts--the exceptions being *Ichthyophthirius multifiliis* and the leeches and copepods that have direct life cycles. Most of these species are digenetic trematodes (38%) and nematodes (18%). There are 171 parasite species that are host specific to one fish species or a fish family in Lake Erie.

Jaccard coefficients of similarity for the parasite communities between individuals in the five major fish families were low, indicating fish in these families share few parasite species. As was the case for Lake Huron, the highest coefficient involved the Percidae and Centrarchidae (0.3168), which are in the same order, Perciformes—these families shared 32 parasite species. The next highest coefficient involved the Cyprinidae (Cypriniformes) and Percidae (0.2375). These low coefficients involving fish species among these different fish families indicate: 1) many parasite species have phylogenetic host specificity, 2) fish species in different families do not occupy the same habitats or the habitats do not overlap much, and 3) the diets of the fish species do not typically overlap either by food items or spatially in foraging areas. There was no monogenean species or protozoan species (except for *Ichthyophthirius multifiliis*) shared between fish in these family pairings. Furthermore, the low Jaccard coefficients for parasite-community similarity among the centrarchids, catostomids, cyprinids, percids, and salmonids indicate that each fish family has its own characteristic parasite fauna.

Fish Families—Parasite Communities

Only five studies (Ward and Magath 1916; Vergeer 1928; Hunter and Bangham 1933; Bangham and Hunter 1939; Dechtiar 1972a) have reported on the parasites of salmonids in Lake Erie. These studies involved five salmonid species (*Coregonus artedi*, *C. clupeaformis*, *Coregonus* sp., *Salvelinus fontinalis*, *S. namaycush*) and reported only 14 parasite species. The fish examined by

Dechtiar (1972a) were collected in 1961-1969. Salmonids had the lowest percentage (64%) of autogenic helminth species found compared to salmonids in the other Great Lakes. Cestodes were the most-common parasites of salmonids followed by digenetic trematodes.

As for salmonids, digenetic trematodes, characteristic of warm-water lakes, made up the largest or second-largest percentage of parasites infecting fish in the other families. Dechtiar and Nepszy (1988) reported that digenetic trematodes was the most-abundant group of parasites found in fish they examined from Lake Erie. Most of the parasites found infecting cyprinids and percids were digenetic trematodes, most species in the centrarchids were digenetic trematodes and monogeneans, and monogeneans were most common in the catostomids.

Although salmonid habitat is available in the eastern and central basins, most of the lake is warm and cool water and warmwater and coolwater fishes predominate. Most Lake Erie fish species examined for parasites were cyprinids (23 species) followed by percids (13 species). Only 47 parasite species were reported from cyprinids—the lowest number except for the salmonids. Centrarchids and percids harbored 76 and 64 parasite species, respectively. The percent occurrence of autogenic helminth species was similar among the centrarchids (76%), cyprinids (71%), catostomids (76%), and percids (77%). Based on the fish species examined and from the parasites found in these species in each family, Lake Erie is characterized by having a mixture of centrarchids, percids, catostomids, and cyprinids and their autogenic helminth species.

Autogenic helminths dominated the parasite fauna of Lake Erie fishes. The autogenic helminth species found that mature in fish include larval/immature digenetic trematodes (*Allocreadium* sp., *Crepidostomum* sp., *Leuceruthrus* sp., *Proterometra* sp., *Bucephalus elegans*, *Bucephalus* sp., *Allacanthochasmus varius*, *Allacanthochasmus* sp., *Neochasmus umbellus*, *Sanguinicola* sp., *Centrovarium lobotes*, *Macroderoides* sp.), larval/immature cestodes (*Eubothrium crassum*, *Bothriocephalus cuspidatus*, *Bothriocephalus* sp., bothriocephalid plerocercoids, *Glaridacris* sp., *Proteocephalus ambloplitis*, *P. pearsei*, *P. pinguis*, *P. stizostethi*, *Proteocephalus* sp., *Triaenophorus nodulosus*, *T. stizostedionis*, *Triaenophorus* sp.), larval/immature nematodes (*Hysterothylacium brachyurum*, *Raphidascaris acus*, *Capillaria catenata*, *Philometra cylindracea*, *Philonema* sp., *Rhabdochona* sp.), immature acanthocephalans (*Acanthocephalus dirus*, *Echinorhynchus* sp., *Neoechinorhynchus cylindratus*, *Neoechinorhynchus* sp., *Pomphorhynchus bulbocolli*, *Leptorhynchoides thecatus*, *Leptorhynchoides* sp.). Of the allogenic helminth species found in fish, larvae of the digenetic trematodes (*Clinostomum complanatum*, *Crassiphiala bulboglossa*, *Diplostomum* spp., *Tylodelphys scheuringi*, *Uvulifer ambloplitis*, *Ichthyocotylurus* spp., *Neascus* spp., *Posthodiplostomum minimum*, *Apophallus brevis*), larvae of the cestodes (*Ligula intestinalis* and *Schistocephalus* sp.), and the larval nematode (*Eustrongylides* sp.) mature in piscivorous birds, larvae of *Diphyllobothrium laruei* and *Diocotophyma* sp. mature in mammals, and *Spiroxys* sp. matures in turtles.

Table 20. Parasites reported in fishes from Lake Erie, 1914-2010. Host documentation, in order, consists of references; when observed (cdnp = collection data not provided); prevalence defined as the percentage (%) of fish infected (pnp = prevalence not provided); mean intensity defined as the mean number of parasites per infected fish (minp = mean intensity not provided); for the Dechtiar et al. (1988) article, intensity of infection (L = light, 1-9 parasites per host; M = medium, 10-49 parasites per host; and H = heavy, ≥ 50 parasites per host); location (lns = location not specified or incomplete), latitude and longitude (llnk = latitude/longitude not known).

Mastigophora (Flagellates)

Trypanosomatidae Doflein, 1911

Trypanoplasma catostomi Bower and Woo, 1977

Synonym: ?*Trypanoplasma borreli* of Mavor, 1915, 1916

Site of Infection: Blood

Host: *Catostomus commersonii* (Bower and Woo 1977; 1975; pnp; minp; Hamilton, Ontario; 43°15'0"/-79°49'59")

Remarks: Bower and Woo (1977) suggested that the tentative record of *Trypanoplasma borreli* from *Catostomus commersonii* by Mavor (1915) is a misidentification.

Ciliophora (Ciliates)

Ichthyophthiriidae Kent, 1881

Ichthyophthirius multifiliis (Fouquet, 1876)

Synonym: None

Site of Infection: Fins, gills, external surface

Host:

Cyprinella spiloptera: Bangham 1972; cdnp; 6%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Cyprinus carpio: Bangham 1972; 2%; minp; South Bass Island, Ohio

Luxilus cornutus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Lythrurus umbratilis: Bangham 1972; 4%; minp; South Bass Island, Ohio

Pimephales notatus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Ameiurus natalis: Bangham 1972; 8%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 4%; minp; South Bass Island, Ohio

Ictalurus punctatus: Bangham 1972; 44%; minp; South Bass Island, Ohio

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 1%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 30%; M; lns; llnk

Morone chrysops: Dechtiar 1972a; 1961-1969; 8%; minp; lns; Ontario; llnk

Morone chrysops: Dechtiar and Nepszy 1988; 8%; H; lns

Lepomis gibbosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Micropterus dolomieu: Bangham 1972; 6%; minp; South Bass Island; Ohio

Micropterus dolomieu: Bangham and Hunter 1939; 1927-1929; 3%; M; western Lake Erie; llnk

Table 20, continued.

Perca flavescens: Dechtiar 1972a; 3%; minp; lns; Ontario

Perca flavescens: Dechtiar and Nepszy 1988; 7%; H; lns

Aplodinotus grunniens: Dechtiar 1972a; 10%; minp; lns; Ontario

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 11%; H; lns

Trichodinidae Raabe, 1959

Trichodina domerguei (Wallengren, 1897)

Synonym: *Cyclochaeta domerguei* (Wallengren, 1897)

Site of Infection: External surface

Host: *Micropterus salmoides*: Bangham and Hunter 1939; 1927-1929; 1%; M; western Lake Erie; llnk

Remarks: Bangham and Hunter (1939) record *Trichodina domerguei* from *Micropterus salmoides* but report this species from *Micropterus dolomieu* in their parasite-host list.

Trichodina urinaria Dogiel, 1940

Synonym: *Trichodina algonquinensis* Li and Desser, 1983

Site of Infection: Ureters

Host: *Perca flavescens*: Dechtiar and Nepszy 1988; 1970-1975; 7%; H; lns; llnk

Trichodina sp.

Site of Infection: [Gills]

Host:

Carpoides cyprinus: Dechtiar 1972a; 1961-1969; 6%; minp; lns; Ontario; llnk

Carpoides cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 6%; H; lns; llnk

Esox lucius: Dechtiar 1972a; 29%; minp; Wheatley, Ontario; 42°46'59"/-80°12'0"

Morone chrysops: Dechtiar 1972a; 8%; minp; lns; Ontario

Morone chrysops: Dechtiar and Nepszy 1988; 5%; H; lns

Perca flavescens: Dechtiar 1972a; 3%; minp; lns; Ontario

Perca flavescens: Dechtiar and Nepszy 1988; 7%; M; lns

Trichophryidae Fraipont, 1878

Capriniana piscium (Buetschli, 1889) Jankowski, 1973

Synonym: *Trichophrya piscium* Buetschli, 1889; *Trichophrya sinensis* Chen, 1955; *Trichophrya intermedia* Prost, 1952; *Trichophrya micropteri* Davis, 1947; *Trichophrya ictalurus* Davis, 1942; *Trichophrya salvelinus* Davis, 1942; *Capriniana aurantiaca* Strand, 1926

Site of Infection: Gills

Host: *Morone chrysops*: Dechtiar and Nepszy 1988; 1970-1975; 9%; H; lns; llnk

Table 20, continued.

Capriniana sp.

Site of Infection: [Gills]

Host: *Morone chrysops*: Dechtiar 1972a; 1961-1969; 2%; minp; lns; Ontario; llnk

Myxozoa (Myxosporans)

Ceratomyxidae Doflein, 1899

Ceratomyxa sp.

Site of Infection: [Viscera]

Host: *Notropis stramineus*: Dechtiar 1972a; 1961-1969; 100%; minp; lns; Ontario; llnk

Myxobolidae Thelohan, 1892

Henneguya brachyura Ward 1919

Synonym: None

Site of Infection: Cartilaginous fin ray

Host: *Notropis anogenus*: Ward 1919; August 1898; 14%; minp; Put-in-Bay, Ohio; 41°39'30"/-82°48'59"

Henneguya doori Guilford, 1963

Synonym: None

Site of Infection: Gills

Host:

Perca flavescens: Dechtiar 1972a; 1961-1969; 10%; minp; lns; Ontario; llnk

Perca flavescens: Dechtiar and Nepszy 1988; 1970-1975; 8%; M; lns; llnk

Henneguya exilis Kudo, 1929

Synonym: None

Site of Infection: Gills

Host:

Ameiurus nebulosus: Dechtiar 1972a; 1961-1969; 82%; minp; lns; Ontario; llnk

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 19%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Dechtiar 1972a; 23%; minp; lns; Ontario

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 13%; M; lns; llnk

Table 20, continued.

Henneguya ohioensis Herrick, 1941

Synonym: None

Site of Infection: Urinary bladder

Host: *Lepomis gibbosus*: Herrick 1941; 1933 and 1934; pnp; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Henneguya rupestris Herrick, 1941

Synonym: None

Site of Infection: Urinary bladder

Host: *Ambloplites rupestris*: Herrick 1941; 1933 and 1934; pnp; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Myxobolus algonquinensis Xiao and Desser, 1997

Synonym: None

Site of Infection: Connective tissue of ovary

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 26%; minp; western basin; 42°N, 82°W

Myxobolus aureatus Ward 1919

Synonym: None

Site of Infection: Between fin membranes

Host: *Notropis anogenus*: Ward 1919; August 1898; 23%; minp; Put-in-Bay, Ohio; 41°39'30"/-82°48'59"

Myxobolus bartai Salim and Desser, 2000

Synonym: None

Site of Infection: Intracellular in striated muscle

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 80%; minp; western basin; 42°N, 82°W

Myxobolus bibullatum (Kudo, 1934) Landsberg and Lom, 1991

Synonym: None

Site of Infection: Gills

Host: *Catostomus commersonii*: Dechtiar and Nepszy 1988; 1970-1975; 44%; M; lns; llnk

Myxobolus burti Cone and Marcogliese 2010

Synonym: *Myxobolus* sp. of Cone et al. 2004

Site of infection: Intracelleular in striated muscle

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 26%; minp; western basin; 42°N, 82°W; Cone and Marcogliese 2010, same infection data and information as in Cone et al. 2004

Table 20, continued.

Myxobolus conspicuous Kudo, 1929

Synonym: None

Site of Infection: Skin

Host: *Moxostoma anisurum*: Dechtiar 1972a; 1961-1969; 33%; minp; lns; Ontario; llnk

Myxobolus gibbosus Herrick, 1941

Synonym: None

Site of Infection: Connective tissue of gill arch

Host: *Lepomis gibbosus*: Herrick 1941; 1933 and 1934; pnp; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Myxobolus inornatus Fish, 1939

Synonym: None

Site of Infection: Muscle

Host: *Micropterus dolomieu*: Dechtiar and Nepszy 1988; 1970-1975; H; lns; llnk

Myxobolus kostiri Herrick 1936

Synonym: None

Site of Infection: Subcutaneous connective tissue in base of branchiostegal rays

Host: *Micropterus dolomieu*: Herrick 1936; 1934; 8%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Myxobolus osburni Herrick, 1936

Synonym: None

Site of Infection: Mesentery, peritoneum

Host:

Lepomis gibbosus: Herrick 1936; 1934; 31%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Micropterus dolomieu: Herrick 1936; 3%; minp; South Bass Island, Ohio

Myxobolus pendula Guilford, 1967

Synonym: *Myxosoma pendula* (Guilford, 1967)

Site of Infection: [Gills]

Host: *Semotilus atromaculatus*: Dechtiar 1972a; 1961-1969; 75%; minp; lns; Ontario; llnk

Myxobolus rotundum (Meglitsch, 1937) Lom and Noble, 1984

Synonym: *Myxosoma rotundum*

Site of Infection: Gills

Host:

Carpides cyprinus: Dechtiar 1972a; 1961-1969; 19%; minp; lns; Ontario; llnk

Carpides cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 35%; M; lns; llnk

Table 20, continued.

Myxobolus scleroperca (Guilford, 1963) Lom and Noble, 1984

Synonym: *Myxosoma scleroperca* (Guilford, 1963) Lom and Noble, 1984

Site of Infection: Sclerotic cartilage

Host:

Perca flavescens: Dechtiar 1965a; 1961-1963; pnp; minp; Canadian waters of Lake Erie; llnk

Perca flavescens: Dechtiar 1972a; 1961-1969; 10%; minp; lns; Ontario; llnk

Perca flavescens: Dechtiar and Nepszy 1988; 1970-1975; 10%; L; lns; llnk

Myxobolus sp.

Site of Infection: Gills

Host:

Anguilla rostrata: Dechtiar 1972a; 1961-1969; 40%; minp; lns; Ontario; llnk

Luxilus cornutus: Dechtiar 1972a; 40%; minp; lns; Ontario

Catostomus commersonii: Dechtiar 1972a; 10%; minp; lns; Ontario

Moxostoma anisurum: Dechtiar 1972a; 42%; minp; lns; Ontario

Moxostoma erythrurum: Dechtiar 1972a; 35%; minp; lns; Ontario

Micropterus dolomieu: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; llnk

Micropterus salmoides: Bangham and Hunter 1939; 4%; L; western Lake Erie

Pomoxis nigromaculatus: Dechtiar 1972a; 10%; minp; lns; Ontario

Remarks: Lom and Noble (1984) synonymized all species of *Myxosoma* with *Myxobolus*, which is followed here.

Thelohanellus notatus (Mavor, 1916) Kudo, 1929

Synonym: None

Site of Infection: Tissue

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 26%; minp; western basin; 42°N, 82°W

Thelohanellus sp.

Site of Infection: [Tissues]

Host: *Notropis hudsonius*: Dechtiar 1972a; cndp; <1%; minp; lns; Ontario; llnk

Zschokkella sp.

Site of Infection: Bile ducts of liver

Host: *Notropis hudsonius*: Cone et al. 2004; June 1993, July 1994, July 1998, September 1999, August 2001, October 2002; 13%; minp; western basin; 42°N, 82°W

Table 20, continued.

Sphaerosporidae Davis, 1917

Chloromyxum gibbosum Herrick, 1941

Synonym: None

Site of Infection: Gall bladder

Host: *Lepomis gibbosus*: Herrick 1941; 1933 and 1934; pnp; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14")

Unidentified Myxospora

Synonym: ?

Site of Infection: External surface, flesh, gills

Host:

Dorosoma cepedianum: Bangham 1972; 1957; 11%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Cyprinella spiloptera: Bangham 1972; 4%; minp; South Bass Island, Ohio

Cyprinus carpio: Bangham 1972; 2%; minp; South Bass Island, Ohio

Luxilus cornutus: Bangham 1972; 14%; minp; South Bass Island, Ohio

Lythrurus umbratilis: Bangham 1972; 4%; minp; South Bass Island, Ohio

Macrhybopsis storeriana: Bangham 1972; 11%; minp; South Bass Island, Ohio

Notemigonus crysoleucas: Bangham 1972; 44 %; minp; South Bass Island, Ohio

Notemigonus crysoleucas: Bangham and Hunter 1939; 1927-1929; 14%; M; western Lake Erie; lnk

Notropis atherinoides: Bangham and Hunter 1939; 1%; M; western Lake Erie

Notropis hudsonius: Bangham and Hunter 1939; 18%; H; eastern Lake Erie; lnk; 4%; L-M; western Lake Erie

Notropis stramineus: Bangham and Hunter 1939; 11%; L; western Lake Erie

Opsopoeodus emiliae: Bangham 1972; 2%; minp; South Bass Island, Ohio

Pimephales notatus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Pimephales notatus: Bangham and Hunter 1939; 10%; M; western Lake Erie; lnk

Pimephales promelas: Bangham and Hunter 1939; 22%; H; eastern Lake Erie

Rhinichthys obtusus: Bangham 1972; 100%; minp; South Bass Island, Ohio

Carpionodes cyprinus: Bangham 1972; 63%; minp; South Bass Island, Ohio

Catostomus commersonii: Bangham 1972; 7%; minp; South Bass Island, Ohio

Hypentelium nigricans: Bangham 1972; 33%; minp; South Bass Island, Ohio

Hypentelium nigricans: Bangham and Hunter 1939; 100%; L; western Lake Erie

Minytrema melanops: Bangham 1972; 50%; minp; South Bass Island, Ohio

Moxostoma aureolum: Bangham 1972; 33%; minp; South Bass Island, Ohio

Moxostoma macrolepidotum: Bangham and Hunter 1939; 50%; M; western Lake Erie

Ameiurus natalis: Bangham 1972; 15%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 15%; minp; South Bass Island, Ohio

Ictalurus punctatus: Bangham 1972; 15%; minp; South Bass Island, Ohio

Ictalurus punctatus: Bangham and Hunter 1939; 31%; L-H; western Lake Erie

Osmerus mordax: Bangham 1972; 2%; minp; South Bass Island, Ohio

Table 20, continued.

Percopsis omiscomaycus: Bangham 1972; 22%; minp; South Bass Island, Ohio
Percopsis omiscomaycus: Bangham and Hunter 1939; 13%; M; western Lake Erie
Fundulus diaphanus: Bangham and Hunter 1939; 6%; M; western Lake Erie
Cottus bairdii: Bangham 1972; 33%; minp; South Bass Island, Ohio
Morone chrysops: Bangham 1972; 11%; minp; South Bass Island, Ohio
Ambloplites rupestris: Bangham 1972; 3%; minp; South Bass Island, Ohio
Lepomis gibbosus: Bangham 1972; 2%; minp; South Bass Island, Ohio
Lepomis gibbosus: Bangham and Hunter 1939; 13%; H; western Lake Erie
Micropterus dolomieu: Bangham 1972; 2%; minp; South Bass Island, Ohio
Micropterus salmoides: Bangham 1972; 18%; minp; South Bass Island, Ohio
Micropterus salmoides (young): Bangham and Hunter 1939; 24%; L-H; western Lake Erie
Pomoxis annularis: Bangham 1972; 2%; minp; South Bass Island, Ohio
Pomoxis annularis: Bangham and Hunter 1939; 6%; M; western Lake Erie
Pomoxis nigromaculatus: Bangham 1972; 17%; minp; South Bass Island, Ohio
Perca flavescens: Bangham 1972; 1%; minp; South Bass Island, Ohio
Percina caprodes: Bangham 1972; 16%; minp; South Bass Island, Ohio
Percina caprodes: Bangham and Hunter 1939; 9%; L-M; western Lake Erie
Sander canadensis: Bangham and Hunter 1939; 3%; M; western Lake Erie
Aplodinotus grunniens: Bangham and Hunter 1939; 4%; M; western Lake Erie

Microspora (Microsporans)

Glugeidae Thelohan, 1892

Glugea cepedianae (Putz, Hoffman, and Dunbar, 1965) Canning, Lom, and Dykova 1986

Synonym: *Pleistophora cepedianae* Putz et al. 1965

Site of Infection: [Viscera]

Host: *Dorosoma cepedianum*: Dechtiar 1972a; 1961-1969; 10%; minp; lns; Ontario; llnk

Glugea hertwigi Weissenberg, 1911

Synonym: *Glugea hertwigi* var. *canadensis* Fantham, Porter, and Richardson, 1941

Site of Infection: Intestine, intestinal wall, gonads, fins, muscle, viscera

Table 20, continued.

Host:

Osmerus mordax: Chen and Power 1972; April 1968-May 1969; 63%; minp; lns; Ontario; llnk

Osmerus mordax: Dechtiar 1965b; 1960, 1961, 1963, 1964; pnp; minp; Port Dover; 42°46'59"/-80°12'0" and Wheatley; 42°6'0"/-82°27'0"

Osmerus mordax: Dechtiar 1972a; 1961-1969; 58%; minp; lns; Ontario; llnk

Osmerus mordax: Dechtiar and Nepszy 1988; 1970-1975; 55%; H; lns; llnk

Osmerus mordax: Nepszy and Dechtiar 1972; 1971; 88%; minp; western and west central Lake Erie; llnk

Osmerus mordax: Nepszy et al. 1978; 1969; 90%; minp; Port Glasgow in central Lake Erie; llnk; to Port Maitland in eastern basin; llnk

Osmerus mordax: Nsembukya-Katuramu et al. 1981; 1976-1977; 36-78%; minp; Long Point, Ontario; 42°75'5"/-84°46'1"

Remarks: *Glugea hertwigi* may be the most-prevalent protozoan parasite of *Osmerus mordax* in Lake Erie; mortalities of smelt in Lake Erie have been attributed to this parasite.

Adult Digenea (Digenetic Trematodes)

Allocreadiidae (Looss, 1899) Stossich, 1903

Allocreadium boleosomi Pearse, 1924

Synonym: *Allopodocotyle boleosomi*, *Homalomatron boleosomi*, *Podocotyle boleosomi*

Site of Infection: Digestive tract

Host:

Etheostoma blennioides: Bangham 1972; 1957; 60%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Etheostoma flabellare: Bangham 1972; 14%; minp; South Bass Island, Ohio

Etheostoma nigrum: Bangham 1972; 17%; minp; South Bass Island, Ohio

Percina caprodes: Bangham 1972; 5%; minp; South Bass Island, Ohio

Percina caprodes: Bangham and Hunter 1939; 1927-1929; 6%; L; western Lake Erie; llnk

Percina copelandi: Bangham 1972; 3%; minp; South Bass Island, Ohio

Remarks: Kuntz and Font (1984) redescribed this species as *Allopodocotyle boleosomi*.

Allocreadium corti (Lamont, 1921)

Synonym: None

Site of Infection: Intestine

Host: *Ictalurus punctatus*: Baker and Crites 1976; June-September, 1973 and 1974; 21%; 49; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Allocreadium lobatum Wallin, 1909

Synonym: *Allocreadium isoporum* (Looss, 1894) of Canadian authors

Site of Infection: Digestive tract

Host:

Luxilus cornutus: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Macrhybopsis storeriana: Bangham 1972; 11%; minp; South Bass Island, Ohio

Table 20, continued.

Allocreadium sp.

Site of Infection: Digestive tract

Host:

Acipenser fulvescens: Bangham and Hunter 1939; 1927-1929; 50%; L; western Lake Erie; llnk

Etheostoma blennioides: Bangham and Hunter 1939; 10%; L; western Lake Erie

Etheostoma exile: Bangham and Hunter 1939; 14%; L; western Lake Erie

Lepomis gibbosus: Bangham and Hunter 1939; 22%; L; eastern Lake Erie; llnk

Bunoderia luciopercae (Muller, 1776) Luhe, 1909

Synonym: *Bunoderia nodulosa* Froelich, 1791

Site of Infection: Digestive tract

Host: *Perca flavescens*: Bangham and Hunter 1939; 1927-1929; 13%; L; eastern Lake Erie; llnk

Bunoderia sacculata (Van Cleave and Mueller, 1932) Yamaguti, 1958

Synonym: ?*Bunoderina sacculata*

Site of Infection: Intestine

Host: *Perca flavescens*: Dechtiar and Nepszy 1988; 1970-1975; 10%; L; lns; llnk

Bunoderina eucaliae Miller, 1936

Synonym: *Bunoderia eucaliae* (Miller, 1936)

Site of Infection: Digestive tract

Host:

Culaea inconstans: Bangham 1972; 1957; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Culaea inconstans: Bangham and Hunter 1939; 1927-1929; 5%; L; eastern Lake Erie; llnk

Crepidostomum cooperi Hopkins, 1931

Synonym: *Crepidostomum ambloplitis* Hopkins, 1931; *Crepidostomum solidum* Van Cleave and Mueller, 1932; *Crepidostomum fausti* Hunninen and Hunter, 1933; *Crepidostomum laureatum* of Stafford (1904) and Cooper (1915) (partim); *Bunoderia nodulosa* of Stafford (1904) (partim); *Crepidostomum cornutum* (1915) (partim)

Site of Infection: Intestine

Host:

Ameiurus melas: Bangham 1972; 1957; 13%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ameiurus nebulosus: Bangham 1972; 6%; minp; South Bass Island, Ohio

Morone chrysops: Bangham 1972; 4%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham 1972; 7%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham 1972; 38%; minp; South Bass Island, Ohio

Lepomis macrochirus: Bangham 1972; 41%; minp; South Bass Island, Ohio

Pomoxis annularis: Bangham 1972; 6%; minp; South Bass Island, Ohio

Pomoxis nigromaculatus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Table 20, continued.

Perca flavescens: Bangham 1972; 66%; minp; South Bass Island, Ohio

Perca flavescens: Bangham and Hunter 1939; 1927-1929; 27%; L-M; western Lake Erie; llnk

Perca flavescens: Cooper et al. 1977; June-October; 1974; <1%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Perca flavescens: Dechtiar and Nepszy 1988; 1970-1975; 15%; L; lns; llnk

Aplodinotus grunniens: Bangham 1972; 15%; minp; South Bass Island, Ohio

Crepidostomum cornutum (Osborn, 1903) Stafford, 1904

Synonym: None

Site of Infection: Digestive tract

Host:

Amia calva: Bangham 1972; 1957; 25%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Amia calva: Bangham and Hunter 1939; 1927-1929; 33%; L; western Lake Erie; llnk

Anguilla rostrata: Dechtiar 1972a; 1961-1969; 40%; minp; lns; Ontario; llnk

Ambloplites rupestris: Bangham 1972; 19%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham and Hunter 1939; 17%; L; western Lake Erie

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham 1972; 41%; minp; South Bass Island, Ohio

Micropterus dolomieu: Bangham 1972; 25%; minp; South Bass Island, Ohio

Micropterus dolomieu: Bangham and Hunter 1939; 57%; L-H; eastern Lake Erie; llnk; 34%; L; western Lake Erie

Micropterus dolomieu (young): Bangham and Hunter 1939; 15%; L; eastern Lake Erie; 2%; L; western Lake Erie

Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 32%; L; lns; llnk

Micropterus salmoides: Bangham 1972; 3%; minp; South Bass Island, Ohio

Micropterus salmoides: Bangham and Hunter 1939; 33%; L; eastern Lake Erie

Crepidostomum illionoiense Faust, 1918

Synonym: *Crepidostomum hiodontos* Hunter and Bangham, 1932

Site of Infection: Intestine

Host:

Hiodon tergisus: Bangham 1972; 1957; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Hiodon tergisus: Bangham and Hunter 1939; 1927-1929; 58%; L-M; western Lake Erie; llnk

Hiodon tergisus: Hunter and Bangham 1932; cdnp; pnp; minp; lns; llnk

Crepidostomum isostomum Hopkins, 1931

Synonym: *Crepidostomum laureatum* of Cooper (1915) (partim); *Crepidostomum canadense* Hopkins, 1931

Site of Infection: Digestive tract

Table 20, continued.

Host:

Percopsis omiscomaycus: Bangham 1972; 1957; 32%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Percopsis omiscomaycus: Bangham and Hunter 1939; 1927-1929; 6%; L; eastern Lake Erie; llnk; 28%; L; western Lake Erie; llnk

Crepidostomum lintoni (Pratt and Linton, 1901) Hopkins, 1933

Synonym: *Crepidostomum petalosum* Lander

Site of Infection: Digestive tract

Host: *Acipenser fulvescens*: Bangham and Hunter 1939; 1927-1929; 100%; L; western Lake Erie; llnk

Crepidostomum sp.

Site of Infection: Digestive tract

Host:

Ameiurus melas: Bangham and Hunter 1939; 1927-1939; 5%; L; western Lake Erie; llnk

Aplodinotus grunniens: Bangham and Hunter 1939; 2%; L; western Lake Erie

Polylekithum ictaluri (Pearse, 1924) Arnold, 1934

Synonym: *Allocreadium ictaluri* Pearse, 1924; *Allocreadium halli* Mueller and Van Cleave, 1932

Site of Infection: Intestine

Host:

Ameiurus melas: Bangham 1972; 1957; 13%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ameiurus natalis: Bangham 1972; 8%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 6%; South Bass Island, Ohio, 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham 1972; 1957; 5%; minp; South Bass Island, Ohio

Azygiidae Luhe, 1909

Azygia angusticauda (Stafford, 1904) Manter, 1926

Synonym: *Mimodistomum angusticaudum* Stafford, 1904; *Azygia loossi* Marshall and Gilbert, 1905;

Ptychogonimus fontanus Lyster, 1939

Site of Infection: Digestive tract

Host:

Esox americanus: Bangham and Hunter 1939; 1927-1929; 20%; L; western Lake Erie; llnk

Esox lucius: Dechtiar 1972a; 1961-1969; 14%; minp; Wheatley, Ontario; 42°6'0"/-82°27'0"

Esox lucius: Dechtiar and Nepszy 1988; 1970-1975; 8%; L; lns; llnk

Micropterus dolomieu: Bangham and Hunter 1939; 2%; L; western Lake Erie

Micropterus dolomieu: Dechtiar and Nepszy 1988; 14%; L; lns

Sander vitreus: Bangham and Hunter 1939; 2%; L; western Lake Erie

Sander vitreus: Dechtiar and Nepszy 1988; 11%; L; lns

Table 20, continued.

Azygia longa (Leidy, 1851) Manter, 1926

Synonym: *Megadistomum longum* (Leidy, 1851); *Azygia acuminata* Goldberger, 1911; *Azygia lucii* of Cooper, 1915; *Azygia tereticolle* of Stafford, 1904

Site of Infection: [Stomach]

Host: *Anguilla rostrata*: Dechtiar 1972a; 1961-1969; 40%; minp; lns; Ontario; llnk

Leuceruthrus micropteri Marshall and Gilbert, 1905

Synonym: None

Site of Infection: Digestive tract

Host:

Amia calva: Bangham and Hunter 1939; 1927-1929; 33%; L; western Lake Erie; llnk

Ameiurus melas: Bangham and Hunter 1939; 5%; L; western Lake Erie

Morone chrysops: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Ambloplites rupestris: Bangham and Hunter 1939; 21%; L; eastern Lake Erie; llnk

Micropterus dolomieu: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Micropterus dolomieu: Bangham and Hunter 1939; 17%; L; western Lake Erie

Micropterus dolomieu: Dechtiar and Nepszy 1988; 7%; L; lns

Micropterus salmoides: Bangham 1972; 5%; minp; South Bass Island, Ohio

Micropterus salmoides: Bangham and Hunter 1939; 17%; L; western Lake Erie

Micropterus salmoides (young): Bangham and Hunter 1939; 17%; L; western Lake Erie

Percina caprodes: Bangham 1972; 2%; minp; South Bass Island, Ohio

Leuceruthrus sp.

Site of Infection: Digestive tract

Host:

Hiodon tergisus: Bangham and Hunter 1939; 1927-1929; 8%; L; western Lake Erie; llnk

Notropis atherinoides: Bangham and Hunter 1939; 1%; L; western Lake Erie

Morone chrysops: Bangham and Hunter 1939; 9%; L; western Lake Erie

Percina caprodes: Bangham and Hunter 1939; 8%; L; western Lake Erie

Proterometra macrostoma (Faust, 1918) Horsfall, 1933

Synonym: None

Site of Infection: [Esophagus]

Host:

Morone chrysops: Bangham 1972; 1957; 11%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Table 20, continued.

Bucephalidae Poche, 1907

Bucephalus elegans Woodhead, 1930

Synonym: None

Site of Infection: [Pyloric ceca]

Host:

Ictalurus punctatus: Bangham 1972; 1957; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Morone chrysops: Bangham 1972; 55%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham 1972; 5%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Lepomis macrochirus: Bangham 1972; 4%; minp; South Bass Island, Ohio

Bucephalus sp.

Site of Infection: Gills

Host: *Catostomus commersonii*: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Paurorhynchus hiodontis Dickerman, 1954

Synonym: None

Site of Infection: Digestive tract

Host: *Hiodon tergisus*: Bangham 1972; 1957; 34%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Hiodon tergisus: Dickerman 1954; 1944; pnp; minp; southern tributaries; Ohio; llnk

Prosorhynchoides pusilla (Stafford, 1904) Eckman, 1932

Synonym: *Bucephalopsis pusilla* (Stafford, 1904), *Bucephalus pusillus* Stafford, 1904; *Gasterostomum pusillum* Stafford, 1904

Site of Infection: Digestive tract

Host:

Sander canadensis: Bangham and Hunter 1939; 1927-1929; 18%; L-M; western Lake Erie; llnk

Sander glaucum: Bangham and Hunter 1939; 20%; L; western Lake Erie

Sander vitreus: Bangham 1972; 1957; 36%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Sander vitreus: Bangham and Hunter 1939; 17%; L-M; western Lake Erie

Sander vitreus (young): Bangham and Hunter 1939; 20%; L-M; western Lake Erie

Sander vitreus: Wolfert et al. 1967; 1962-1964; pnp; minp; western Lake Erie; llnk

Rhipidocotyle papillosa (Woodhead, 1929) Eckmann, 1932

Synonym: *Gasterostomum pusillum* of Cooper, 1915; *Bucephalus papillosus* Woodhead, 1929

Site of Infection: Digestive tract

Table 20, continued.

Host:

Micropterus dolomieu: Bangham 1972; 1957; 41%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Micropterus dolomieu: Bangham and Hunter 1939; 1927-1929; 2%; L; western Lake Erie; llnk

Micropterus salmoides: Bangham 1972; 18%; minp; South Bass Island, Ohio

Cryptogonimidae (Ward, 1917) Ciurea, 1933

Acetodextra amiuri (Stafford, 1900) Pearse, 1924

Synonym: *Monostomum amiuri* (Stafford, 1900) Pearse, 1924

Site of Infection: Reproductive organs, swim bladder

Host:

Noturus flavus: Dechtiar 1972a; 1961-1969; 26%; minp; lns; Ontario; llnk

Noturus gyrinus: Bangham and Hunter 1939; 1927-1929; 100%; L; western Lake Erie; llnk

Ameiurus melas: Bangham 1972; 1957; 50%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ameiurus natalis: Bangham 1972; 15%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 21%; minp; South Bass Island, Ohio

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 14%; 7; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham 1972; 13%; minp; South Bass Island, Ohio

Ictalurus punctatus: Bangham and Hunter 1939; 3%; L; western Lake Erie; llnk

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 21%; L; lns; llnk

Allacanthochoasmus artus Mueller and Van Cleave, 1932

Synonym: None

Site of Infection: Intestine

Host:

Morone chrysops: Bangham 1972; 1957; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Morone chrysops: Dechtiar and Nepszy 1988; 1970-1975; 47%; M; lns; llnk

Allacanthochoasmus varius Van Cleave, 1922

Synonym: None

Site of Infection: Digestive tract

Host:

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 2%; 2; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Morone chrysops: Bangham 1972; 1957; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Morone chrysops: Bangham and Hunter 1939; 1927-1929; 50%; M; eastern Lake Erie; llnk; 70%; L-M; western Lake Erie; llnk

Morone chrysops: Dechtiar and Nepszy 1988; 1970-1975; 50%; M; lns; llnk

Table 20, continued.

Caecicola parvulus Marshall and Gilbert, 1905

Synonym: None

Site of Infection: [Intestine]

Host: *Micropterus salmoides*: Bangham 1972; 1957; 13%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Cryptogonimus chili Osborn, 1903

Synonym: None

Site of Infection: Digestive tract

Host:

Ambloplites rupestris: Bangham 1972; 1957; 83%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ambloplites rupestris: Bangham and Hunter 1939; 1927-1929; 11%; L; eastern Lake Erie; llnk; 42%; L-M; western Lake Erie; llnk

Micropterus dolomieu: Bangham 1972; 27%; minp; South Bass Island, Ohio

Micropterus dolomieu: Bangham and Hunter 1939; 11%; M-H; eastern Lake Erie; 21%; M; western Lake Erie

Micropterus dolomieu (young): Bangham and Hunter 1939; 18%; L-M; western Lake Erie

Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 23%; M; lns

Micropterus salmoides: Bangham 1972; 5%; minp; South Bass Island, Ohio

Micropterus salmoides: Bangham and Hunter 1939; 17%; M; western Lake Erie

Micropterus salmoides (young): Bangham and Hunter 1939; 10%; L-M; western Lake Erie

Pomoxis annularis: Bangham 1972; 2%; minp; South Bass Island, Ohio

Perca flavescens: Bangham and Hunter 1939; 4%; L-M; western Lake Erie; llnk

Remarks: The species name, *chili*, is sometimes misspelled *chyl*.

Neochasmus umbellus Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Digestive tract

Host:

Morone chrysops: Dechtiar and Nepszy 1988; 1970-1975; 24%; L; lns; llnk

Morone chrysops: Kvach and Stepien 2008a; October-November 2006; 82%; 98; 80; Maumee Bay, Ohio; 41°41'42"/-83°23'95"

Micropterus dolomieu: Bangham and Hunter 1939; 1927-1929; 6%; L-M; western Lake Erie; llnk

Gorgoderidae Looss, 1901

Phyllodistomum fausti Pearse, 1924

Synonym: None

Site of Infection: Ureters, urinary bladder

Table 20, continued.

Host:

Aplodinotus grunniens: Bangham 1972; 1957; 9%; minp; South Bass Island, Ohio; llnk

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Aplodinotus grunniens: Vendeland 1968; 1967; 6%; minp; South Bass Island, western basin; 41°39'0"/-82°49'14"

Phyllodistomum lacustri (Loewen, 1929) Lewis, 1935

Synonym: None

Site of Infection: Ureters, urinary bladder

Host:

Ameiurus nebulosus: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio

Ictalurus punctatus: Baker and Crites 1976; June-September; 1973 and 1974; 46%; 3; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham 1972; 1957; 36%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Dechtiar 1972a; 1961-1969; 9%; minp; lns; Ontario; llnk

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 44%; L; lns; llnk

Phyllodistomum lohrenzi (Loewen, 1935)

Synonym: None

Site of Infection: [Urinary bladder]

Host: *Lepomis humilis*: Bangham 1972; 1957; 50%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Phyllodistomum lysteri Miller, 1940

Synonym: None

Site of Infection: Ureters

Host:

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 3%; L; lns; llnk

Catostomus commersonii: Dechtiar 1972a; 1961-1969; 26%; minp; lns; Ontario; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 7%; L; lns

Phyllodistomum staffordi Pearse 1924

Synonym: *Phyllodistomum folium* (Olfers, 1816) (partim) of Stafford (1902); *Phyllodistomum superbum* Stafford, 1904 (partim); ?*Phyllodistomum carolini* Holl, 1929; *Phyllodistomum hunteri* Arnold, 1934; ?*Phyllodistomum lacustri* of Dechtiar (1972a) and Dechtiar and Nepszy (1988)

Site of Infection: Urinary bladder

Host:

Ameiurus natalis: Bangham 1972; 1957; 8%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ameiurus nebulosus: Bangham 1972; 4%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Dechtiar 1972a; 1961-1969; 27%; minp; lns; Ontario; llnk

Table 20, continued.

Phyllodistomum superbum Stafford, 1904

Synonym: *Phyllodistomum fausti* Pearse 1924; *Phyllodistomum pearsei* Holl, 1929; *Phyllodistomum lohrenzi* (Loewen, 1935) Bhalerao, 1937

Site of Infection: Urinary bladder

Host: *Ameiurus nebulosus*: Bangham and Hunter 1939; 1927-1929; 100%; L; western Lake Erie; llnk

Phyllodistomum sp.

Site of Infection: Urinary bladder, digestive tract

Host:

Moxostoma erythrurum: Dechtiar 1972a; 1961-1969; 6%; minp; lns; Ontario; llnk

Moxostoma macrolepidotum: Dechtiar 1972a; 3%; minp; lns; Ontario

Ameiurus nebulosus: Dechtiar 1972a; 64%; minp; lns; Ontario

Ictalurus punctatus: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; llnk

Ambloplites rupestris: Dechtiar 1972a; 5%; minp; lns; Ontario

Aplodinotus grunniens: Dechtiar 1972a; 1%; minp; lns; Ontario

Homalometridae (Cable and Hunninen, 1942) Yamaguti, 1971

Synonym: Anallocreadiidae Hunter and Bangham, 1932

Homalometron armatum (MacCallum, 1895) Manter, 1947

Synonym: *Distomum isoporum* var. *armatum* MacCallum, 1895; *Anallocreadium armatum* (MacCallum, 1895) Simer, 1929; *Bunodera armatum* (MacCallum, 1895); *Anallocreadium pearsei* Hunter and Bangham, 1932

Site of Infection: Intestine

Host:

Aplodinotus grunniens: Bangham 1972; 1957; 51%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Aplodinotus grunniens: Bangham and Hunter 1939; 1927-1929; 33%; L; eastern Lake Erie; llnk; 22%; L-M; western Lake Erie; llnk

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 1970-1975; 19%; M; lns; llnk

Aplodinotus grunniens: Hunter and Bangham 1932; ncdp; pnp; minp; eastern basin; llnk

Homalometron pallidum Stafford, 1904

Synonym: *Anallocreadium pallidum* Hunter and Bangham, 1932

Site of Infection: Intestine

Host: *Aplodinotus grunniens*: Vendeland 1968; 1967; 36%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Table 20, continued.

Microcreadium parvum (Simer, 1929)

Synonym: None

Site of Infection: Pyloric ceca, anterior intestine

Host: *Aplodinotus grunniens*: Vendeland 1968; 1967; 9%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepocreadiidae (Odhner, 1905) Nicoll, 1935

Megalogonia ictaluri Surber, 1928

Synonym: *Crepidostomum ictaluri* Surber, 1928

Site of Infection: Digestive tract

Host:

Noturus flavus: Bangham and Hunter 1939; 1927-1929; 20%; L; western Lake Erie; llnk

Noturus miurus: Bangham and Hunter 1939; 67%; L-M; western Lake Erie

Ameiurus melas: Bangham and Hunter 1939; 5%; L; western Lake Erie

Ictalurus punctatus: Bangham 1972; 1957; 56%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham and Hunter 1939; 17%; L-M; western Lake Erie; llnk

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 45%; M; lns; llnk

Lepomis gibbosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Perca flavescens: Bangham 1972; 1%; minp; South Bass Island, Ohio

Sander canadensis: Bangham 1972; 33%; minp; South Bass Island, Ohio

Lissorchiidae (Poche, 1926) Yamaguti, 1971

Lissorchis attenuatus (Mueller and Van Cleave, 1932) Krygier and Macy, 1969

Synonym: *Triganodistomum attenuatum* Mueller and Van Cleave, 1932

Site of Infection: Intestine

Host:

Carpionodes cyprinus: Bangham 1972; 1957; 63%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Carpionodes cyprinus: Dechtiar 1972a; 1961-1969; 12%; minp; lns; Ontario; llnk

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 7%; L; lns; llnk

Catostomus commersonii: Bangham 1972; 40%; minp; South Bass Island, Ohio

Catostomus commersonii: Dechtiar and Nepszy 1988; 15%; L; lns

Moxostoma aureolum: Bangham 1972; 33%; minp; South Bass Island, Ohio

Macroderoidiidae McMullen, 1957

Alloglossidium corti (Lamont, 1921) Van Cleave and Mueller, 1934

Synonym: *Plagiorchis corti* Lamont; *Plagiorchis ameiuensis* McCoy, 1928

Site of Infection: Digestive tract, ureters

Table 20, continued.

Host:

Noturus flavus: Bangham 1972; 1957; 50%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Noturus gyrinus: Bangham and Hunter 1939; 1927-1929; 33%; L; western Lake Erie; llnk

Ameiurus melas: Bangham 1972; 13%; minp; South Bass Island, Ohio

Ictalurus punctatus: Bangham 1972; 44%; minp; South Bass Island, Ohio

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 45%; L; lns; llnk

Glossidium geminum (Mueller, 1930) Yamaguti, 1954

Synonym: *Alloglossidium geminus* (Mueller, 1930); *Plagiorchis geminum* Mueller, 1930

Site of Infection: Intestine

Host: *Ameiurus nebulosus*: Bangham 1972; 1957; 9%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Macroderoides spiniferus Pearse, 1924

Synonym: None

Site of Infection: Digestive tract

Host:

Lepisosteus osseus: Bangham 1972; 1957; 67%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepisosteus osseus: Bangham and Hunter 1939; 1927-1929; 56%; L-M; western Lake Erie; llnk

Macroderoides typicus (Winfield, 1929) Van Cleave and Mueller; 1932

Synonym: None

Site of Infection: Digestive tract

Host:

Amia calva: Bangham 1972; 1957; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Amia calva (young): Bangham and Hunter 1939; 1927-1929; 100%; M; western Lake Erie; llnk

Macroderoides sp.

Site of Infection: Digestive tract

Host: *Ictalurus punctatus*: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; llnk

Vietsoma parvum Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Digestive tract

Host: *Ictalurus punctatus*: Bangam and Hunter 1939; 1927-1929; 7%; L; western Lake Erie; llnk

Microphallidae (Ward, 1901) Travassos, 1920

Microphallus opacus (Ward, 1894) Ward, 1901

Synonym: *Distomum opacum* Ward, 1894; *Microphallus opacus ovatus* Strandine, 1943

Site of Infection: Digestive tract

Table 20, continued.

Host:

Amia calva: Bangham and Hunter 1939; 1927-1929; 33%; M; western Lake Erie; llnk

Anguilla rostrata: Dechtiar 1972a; 1961-1969; 20%; minp; lns; Ontario; llnk

Micropterus dolomieu (young): Bangham and Hunter 1939; 2%; L; western Lake Erie

Perca flavescens: Bangham and Hunter 1939; 2%; L; western Lake Erie

Opecoelidae Ozaki, 1925

Centrovarium lobotes (MacCallum, 1895)

Synonym: None

Site of Infection: Digestive tract

Host:

Esox americanus: Bangham and Hunter 1939; 1927-1929; 20%; L; western Lake Erie; llnk

Esox lucius: Dechtiar 1972a; 1961-1969; 29%; minp; Wheatley, Ontario; 42°6'0"/-82°27'0")

Esox lucius: Dechtiar and Nepszy 1988; 1970-1975; 21%; M; lns; llnk

Micropterus dolomieu: Bangham and Hunter 1939; 4%; L; eastern Lake Erie; llnk; 3%; L; western Lake Erie

Sander canadensis: Bangham and Hunter 1939; 20%; L-M; eastern Lake Erie; 15%; L; western Lake Erie

Sander glaucum: Bangham and Hunter 1939; 20%; L; western Lake Erie

Sander vitreus: Bangham 1972; 1957; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Sander vitreus: Bangham and Hunter 1939; 4%; L; western Lake Erie

Sander vitreus: Dechtiar and Nepszy 1988; 20%; L; lns

Plagioporus cooperi (Hunter and Bangham, 1932) Price 1934

Synonym: *Allocreadium commune* of Cooper, 1915 (partim); *Lebouria cooperi* Hunter and Bangham, 1932

Site of Infection: Intestine

Host:

Cyprinella spiloptera: Bangham 1972; 1957; 6%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Cyprinella whipplei: Bangham and Hunter 1939; 1927-1929; 56%; L; eastern Lake Erie; llnk; 12%; L; western Lake Erie; llnk

Cyprinella whipplei: Hunter and Bangham 1932; cdnp; pnp; minp; lns; llnk

Luxilus cornutus: Bangham 1972; 4%; minp; South Bass Island, Ohio

Lythrurus umbratilis: Bangham 1972; 2%; minp; South Bass Island, Ohio

Macrhybopsis storeriana: Bangham 1972; 16%; minp; South Bass Island, Ohio

Macrhybopsis storeriana: Bangham and Hunter 1939; 32%; L-M; western Lake Erie

Macrhybopsis storeriana: Hunter and Bangham 1932; pnp; minp; lns

Notropis atherinoides: Bangham 1972; 3%; minp; South Bass Island, Ohio

Notropis atherinoides: Bangham and Hunter 1939; 1%; L; western Lake Erie

Notropis atherinoides: Hunter and Bangham 1932; pnp; minp; lns

Notropis hudsonius: Bangham 1972; 1%; minp; South Bass Island, Ohio

Notropis hudsonius: Bangham and Hunter 1939; 18%; L; western Lake Erie

Notropis hudsonius: Hunter and Bangham 1932; pnp; minp; lns

Table 20, continued.

Notropis stramineus: Bangham and Hunter 1939; 44%; L; western Lake Erie

Notropis stramineus: Hunter and Bangham 1932; pnp; minp; lns

Notropis volucellus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Notropis volucellus: Bangham and Hunter 1939; 43%; L; western Lake Erie

Notropis volucellus: Hunter and Bangham 1932; pnp; minp; lns

Opsopoeodus emiliae: Bangham 1972; 2%; minp; South Bass Island, Ohio

Opsopoeodus emiliae: Bangham and Hunter 1939; 10%; L; western Lake Erie

Pimephales notatus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Pimephales notatus: Bangham and Hunter 1939; 10%; L; western Lake Erie

Rhinichthys cataractae: Bangham and Hunter 1939; 23%; L; western Lake Erie

Rhinichthys cataractae: Hunter and Bangham 1932; pnp; minp; lns

Ammocrypta pellucida: Bangham and Hunter 1939; 9%; L; western Lake Erie

Ammocrypta pellucida: Hunter and Bangham 1932; pnp; minp; lns

Percina copelandi: Bangham and Hunter 1939; 9%; L; western Lake Erie

Percina copelandi: Hunter and Bangham 1932; pnp; minp; lns

Sanguinicolidae Graaff, 1907

Sanguinicola occidentalis Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Circulatory system

Host:

Perca flavescens: Dechtiar 1972a; 1961-1969; 3%; minp; lns; Ontario; llnk

Perca flavescens: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Sander vitreus: Bangham 1972; 1957; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Sander vitreus: Dechtiar 1972a; 19%; minp; lns; Ontario

Sander vitreus: Dechtiar and Nepszy 1988; 13%; L; lns

Aplodinotus grunniens: Dechtiar 1972a; 13%; minp; lns; Ontario

Sanguinicola sp.

Site of Infection: Circulatory system

Host:

Notropis hudsonius: Dechtiar 1972a; 1961-1969; 13%; minp; lns; Ontario; llnk

Carpionodes cyprinus: Dechtiar 1972a; 11%; minp; lns; Ontario

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 10%; L; lns; llnk

Moxostoma erythrurum: Dechtiar 1972a; 6%; minp; lns; Ontario

Moxostoma macrolepidotum: Dechtiar 1972a; 27%; minp; lns; Ontario

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 11%; M; lns

Table 20, continued.

Unknown Family

Unidentified Trematode

Synonym: ?

Site of Infection: Digestive tract

Host:

Coregonus clupeaformis: Bangham and Hunter 1939; 1927-1929; 7%; L; western Lake Erie; llnk

Morone chrysops: Bangham and Hunter 1939; 4%; L; western Lake Erie

Lepomis gibbosus: Bangham and Hunter 1939; 9%; L; western Lake Erie

Perca flavescens: Bangham 1972; 1957; 1%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Larval/Immature Digenea (Digenetic Trematodes)

Allocreadiidae Looss, 1902

Allocreadium sp.

Site of Infection: Digestive tract

Host: *Labidesthes sicculus*: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; llnk

Crepidostomum sp.

Site of Infection: Digestive tract

Host:

Osmerus mordax: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Azygiidae Luhe, 1909

Leuceruthrus sp.

Site of Infection: Digestive tract

Host:

Etheostoma nigrum: Bangham and Hunter 1939; 1927-1929; 6%; L; western Lake Erie; llnk

Perca flavescens: Bangham and Hunter 1939; 2%; L; western Lake Erie

Proterometra sp.

Site of Infection: Digestive tract

Host: *Osmerus mordax*: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Table 20, continued.

Bucephalidae Poche, 1907

Bucephalus elegans Woodhead, 1930

Synonym: None

Site of Infection: Digestive tract

Host:

Ameiurus natalis: Bangham 1972; 1957; 15%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Pomoxis annularis: Bangham 1972; 2%; minp; South Bass Island, Ohio

Perca flavescens: Bangham 1972; 2%; minp; South Bass Island, Ohio

Bucephalus elegans Woodhead, 1930

Synonym: None

Site of Infection: Gills

Host:

Lepomis gibbosus: Bangham 1972; 1957; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Sander vitreus: Dechtiar and Nepszy 1988; 1970-1975; 11%; M; lns; llnk

Bucephalus sp.

Site of Infection: [Digestive tract?]

Host:

Percopsis omiscomaycus: Dechtiar 1972a; 1961-1969; 8%; minp; lns; Ontario; llnk

Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Clinostomidae Luhe, 1901

Clinostomum complanatum (Rudolphi, 1814) Braun, 1899

Synonym: *Clinostomum marginatum* (Rudolphi, 1819) Braun, 1899; ?*Clinostomum gracile* of Stafford (1904); ?*Distomum gracile* of Wright (1879)

Site of Infection: Flesh

Host:

Campostoma anomalum: Bangham 1972; 1957; 9%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Luxilus cornutus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Macrhybopsis storeriana: Bangham 1972; 5%; minp; South Bass Island, Ohio

Notropis stramineus: Bangham 1972; 50%; minp; South Bass Island, Ohio

Hypentelium nigricans: Bangham 1972; 33%; minp; South Bass Island, Ohio

Ameiurus melas: Bangham and Hunter 1939; 1927-1929; 5%; L; western Lake Erie; llnk

Ameiurus nebulosus: Bangham and Hunter 1939; 100%; L; western Lake Erie

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 8%; L; lns; llnk

Esox americanus: Bangham 1972; 50%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham and Hunter 1939; 8%; L; western Lake Erie

Table 20, continued.

Lepomis gibbosus: Bangham 1972; 3%; minp; South Bass Island, Ohio
Lepomis gibbosus: Bangham and Hunter 1939; 4%; L; western Lake Erie
Lepomis macrochirus: Bangham and Hunter 1939; 10%; L; western Lake Erie
Lepomis megalotis: Bangham 1972; 50%; minp; South Bass Island, Ohio
Micropterus dolomieu: Bangham 1972; 2%; minp; South Bass Island, Ohio
Micropterus dolomieu (young): Bangham and Hunter 1939; 2%; L; western Lake Erie
Etheostoma flabellare: Bangham and Hunter 1939; 6%; L; eastern Lake Erie; llnk
Etheostoma nigrum: Bangham 1972; 3%; minp; South Bass Island, Ohio
Etheostoma nigrum: Bangham and Hunter 1939; 14%; L; eastern Lake Erie
Perca flavescens: Bangham and Hunter 1939; 2%; L; western Lake Erie
Percina caprodes: Bangham and Hunter 1939; 3%; L; western Lake Erie
Remarks: Dzikowski et al. (2004) stated *Clinostomum complanatum* and *Clinostomum marginatum* are distinct species based on differences in ribosomal DNA.

Cryptogonomidae (Ward, 1917) Ciurea, 1933

Allacanthochoasmus varius Van Cleave, 1922

Synonym: None

Site of Infection: Mesentery

Host: *Labidesthes sicculus*: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; llnk

Allacanthochoasmus sp.

Site of Infection: Encysted

Host: *Perca flavescens*: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Centrovarium lobotes (MacCallum, 1895) Stafford, 1904

Synonym: None

Site of Infection: Flesh

Host:

Notropis hudsonius: Dechtiar 1972a; 1961-1969; 3%; minp; lns; Ontario; llnk

Percopsis omiscomaycus: Bangham and Hunter 1939; 1927-1929; 29%; M; eastern Lake Erie; llnk

Neochasmus umbellus Van Cleave and Mueller 1932

Synonym: None

Site of Infection: Brain, eyes, muscle

Host:

Notropis atherinoides: Kvach and Stepien 2008a; October-November 2006; 100%; 10; 10; Maumee Bay, Ohio; 41°43'17"/-83°24'16"

Apollonia melanostoma: Kvach and Stepien 2008a; 53%; 7; 4; Maumee Bay, Ohio

Apollonia melanostoma: Kvach and Stepien 2008b; October-November 2006; 25%; 7; 2; Maumee Bay, Ohio; 41°43'17"/-83°24'16"

Table 20, continued.

Neochasmus umbellus Van Cleave and Mueller 1932

Synonym: None

Site of Infection: Intestine

Host: *Morone americana*: Kvach and Stepien 2008a; October-November 2006; 13%; 1; 0.1; Maumee Bay, Ohio; 41°41.423'N, 83°23.953'W

Diplostomidae Poirier, 1886

Crassiphiala bulboglossa Van Haitsma, 1925

Synonym: *Neascus bulboglossa* (Van Haitsma, 1925)

Site of Infection: Flesh

Host:

Notropis buccatus: Bangham and Hunter 1939; 1927-1929; 33%; M; western Lake Erie; llnk

Semotilus atromaculatus: Bangham and Hunter 1939; 55%; L-M; eastern Lake Erie; llnk

Perca flavescens: Dechtiar 1972a; 1961-1969; 10%; minp; lns; Ontario; llnk

Diplostomum flexicaudum (Cort and Brooks, 1928)

Synonym: Considered a synonym of *Diplostomum spathaceum* by some authors

Site of Infection: [Eye]

Host:

Anguilla rostrata: Dechtiar 1972a; 1961-1969; 60%; minp; lns; Ontario; llnk

Cyprinus carpio: Dechtiar 1972a; 13%; minp; lns; Ontario

Luxilus cornutus: Dechtiar 1972a; 100%; minp; lns; Ontario

Notropis atherinoides: Dechtiar 1972a; 50%; minp; lns; Ontario

Catostomus commersonii: Dechtiar 1972a; 38%; minp; lns; Ontario

Moxostoma erythrurum: Dechtiar 1972a; 24%; minp; lns; Ontario

Moxostoma macrolepidotum: Dechtiar 1972a; 30%; minp; lns; Ontario

Esox masquinongy: Dechtiar 1972a; 100%; minp; lns; Ontario

Osmerus mordax: Dechtiar 1972a; 18%; minp; lns; Ontario; llnk

Coregonus clupeaformis: Dechtiar 1972a; 25%; minp; Port Dover, Ontario; 42°46'59"/-80°12'0"

Percopsis omiscomaycus: Dechtiar 1972a; 8%; minp; lns; Ontario

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Synonym: *Diplostomulum spathaceum* (Rudolphi, 1819); *Diplostomum volvens* Nordmann, 1832 or *Diplostomum volvens* Nordmann, 1833 of Cooper (1915); probably *Diplostomum emarginatae* Olivier, 1942; *Diplostomum flexicaudum* (Cort and Brooks, 1928); *Diplostomum indistinctum*; *Diplostomum gigas*

Site of Infection: Lens

Host:

Carpionides cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 10%; L; lns

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 28%; 2; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Table 20, continued.

Ictalurus punctatus: Dechtiar and Nepszy 1988; 17%; L; Ins
Osmerus mordax: Dechtiar and Nepszy 1988; 21%; L; Ins
Morone chrysops: Dechtiar and Nepszy 1988; 13%; L; Ins
Micropterus dolomieu: Dechtiar and Nepszy 1988; 32%; L; Ins
Perca flavescens: Dechtiar and Nepszy 1988; 20%; L; Ins
Sander vitreus: Dechtiar and Nepszy 1988; 20%; L; Ins
Aplodinotus grunniens: Dechtiar and Nepszy 1988; 10%; L; Ins
Aplodinotus grunniens: Vendeland 1968; 1967; 58%; minp; South Bass Island, Ohio 41°39'0"/-82°49'14"
Apollonia melanostoma: Kvach and Stepien 2008b; October-November 2006; 18%; 5; 1; Maumee Bay, Ohio; 41°43'17"/-83°24'16"

Diplostomum sp.

Site of Infection: Mesentery

Host:

Lepisosteus osseus: Bangham 1972; 1957; 1957; 33%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Amia calva: Bangham 1972; 25%; minp; South Bass Island, Ohio
Hiodon tergisus: Bangham 1972; 50%; minp; South Bass Island, Ohio
Alosa pseudoharengus: Bangham 1972; 14%; minp; South Bass Island, Ohio
Dorosoma cepedianum: Bangham 1972; 52%; minp; South Bass Island, Ohio
Campostoma anomalum: Bangham 1972; 9%; minp; South Bass Island, Ohio
Carassius auratus: Bangham 1972; 18%; minp; South Bass Island, Ohio
Cyprinella spiloptera: Bangham 1972; 10%; minp; South Bass Island, Ohio
Cyprinus carpio: Bangham 1972; 29%; minp; South Bass Island, Ohio
Luxilus cornutus: Bangham 1972; 4%; minp; South Bass Island, Ohio
Lythrurus umbratilis: Bangham 1972; 4%; minp; South Bass Island, Ohio
Macrhybopsis storeriana: Bangham 1972; 32%; minp; South Bass Island, Ohio
Notemigonus crysoleucas: Bangham 1972; 33%; minp; South Bass Island, Ohio
Notropis atherinoides: Bangham 1972; 31%; minp; South Bass Island, Ohio
Notropis bucatius: Bangham 1972; 10%; minp; South Bass Island, Ohio
Notropis heterodon: Bangham 1972; 50%; minp; South Bass Island, Ohio
Notropis hudsonius: Bangham 1972; 43%; minp; South Bass Island, Ohio
Notropis volucellus: Bangham 1972; 38%; minp; South Bass Island, Ohio
Opsopoeodus emilae: Bangham 1972; 18%; minp; South Bass Island, Ohio
Pimephales notatus: Bangham 1972; 19%; minp; South Bass Island, Ohio
Percina caprodes: Bangham and Hunter 1939; 1927-1929; 8%; L; eastern Lake Erie; llnk
Carpionodes cyprinus: Bangham 1972; 38%; minp; South Bass Island, Ohio
Catostomus commersonii: Bangham 1972; 47%; minp; South Bass Island, Ohio
Moxostoma aureolum: Bangham 1972; 33%; minp; South Bass Island, Ohio
Ameiurus melas: Bangham 1972; 63%; minp; South Bass Island, Ohio

Table 20, continued.

Ameiurus natalis: Bangham 1972; 62%; minp; South Bass Island, Ohio
Ameiurus nebulosus: Bangham 1972; 66%; minp; South Bass Island, Ohio
Ictalurus punctatus: Bangham 1972; 36%; minp; South Bass Island, Ohio
Noturus flavus: Bangham 1972; 100%; minp; South Bass Island, Ohio
Esox americanus: Bangham 1972; 50%; minp; South Bass Island, Ohio
Osmerus mordax: Bangham 1972; 67%; minp; South Bass Island, Ohio
Percopsis omiscomaycus: Bangham 1972; 59%; minp; South Bass Island, Ohio
Lota lota: Bangham 1972; 100%; minp; South Bass Island, Ohio
Fundulus diaphanus: Bangham 1972; 33%; minp; South Bass Island, Ohio
Labidesthes sicculus: Bangham 1972; 22%; minp; South Bass Island, Ohio
Cottus bairdii: Bangham 1972; 33%; minp; South Bass Island, Ohio
Morone chrysops: Bangham 1972; 47%; minp; South Bass Island, Ohio
Ambloplites rupestris: Bangham 1972; 13%; minp; South Bass Island, Ohio
Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio
Lepomis gibbosus: Bangham 1972; 5%; minp; South Bass Island, Ohio
Lepomis macrochirus: Bangham 1972; 14%; minp; South Bass Island, Ohio
Lepomis megalotis: Bangham 1972; 50%; minp; South Bass Island, Ohio
Micropterus dolomieu: Bangham 1972; 14%; minp; South Bass Island, Ohio
Micropterus salmoides: Bangham 1972; 18%; minp; South Bass Island, Ohio
Pomoxis annularis: Bangham 1972; 51%; minp; South Bass Island, Ohio
Pomoxis nigromaculatus: Bangham 1972; 10%; minp; South Bass Island, Ohio
Etheostoma blennioides: Bangham 1972; 10%; minp; South Bass Island, Ohio
Etheostoma flabellare: Bangham 1972; 14%; minp; South Bass Island, Ohio
Etheostoma nigrum: Bangham 1972; 3%; minp; South Bass Island, Ohio
Perca flavescens: Bangham 1972; 27%; minp; South Bass Island, Ohio
Percina caprodes: Bangham 1972; 7%; minp; South Bass Island, Ohio
Sander vitreus: Bangham 1972; 9%; minp; South Bass Island, Ohio
Aplodinotus grunniens: Bangham 1972; 33%; minp; South Bass Island, Ohio

Tylodelphys scheuringi (Hughes, 1929) Dubois, 1938

Synonym: *Diplostomulum scheuringi* Hughes, 1929

Site of Infection: [Brain or eye]

Host: *Perca flavescens*: Bangham and Hunter 1939; 1927-1929; 8%; L; eastern Lake Erie; lnk

Uvulifer ambloplitis (Hughes, 1927) Dubois, 1938

Synonym: *Neascus ambloplitis* Hughes, 1927; *Crassiphiala ambloplitis* (Hughes, 1927) Hunter and Hunter, 1931; *Neascus wardi* Hunter, 1928

Site of Infection: Flesh, skin

Table 20, continued.

Host:

Esox lucius: Dechtiar 1972a; 1961-1969; 29%; minp; Wheatley, Ontario; 42°6'0"/-82°27'0"

Esox lucius: Dechtiar and Nepszy 1988; 1970-1975; 13%; M; lns; llnk

Ambloplites rupestris: Bangham and Hunter 1939; 1927-1929; 25%; H; eastern Lake Erie; llnk; 17%; M; western Lake Erie; llnk

Lepomis gibbosus: Bangham and Hunter 1939; 17%; H; eastern Lake Erie

Lepomis macrochirus: Bangham and Hunter 1939; 10%; L; western Lake Erie; llnk

Micropterus dolomieu: Dechtiar and Nepszy 1988; 10%; M; lns

Perca flavescens: Dechtiar and Nepszy 1988; 4%; M; lns

Sander vitreus: Dechtiar and Nepszy 1988; 11%; L; lns

Heterophyidae Odhner, 1914

Apophallus brevis Ransom, 1920

Synonym: *Apophallus americanus* Van Cleave and Mueller, 1932; *Apophallus itascensis* Warren, 1953;

Distomum sp. larva of Cooper, 1915

Site of Infection: Fins, gills, muscle, skin

Host:

Perca flavescens: Dechtiar 1972a; 1961-1969; 10%; minp; lns; Ontario; llnk

Perca flavescens: Dechtiar and Nepszy 1988; 1970-1975; 32%; M; lns; llnk

Macroderoididae McMullen, 1957

Macroderoides sp.

Site of Infection: Digestive tract

Host: *Esox americanus*: Bangham 1972; 1957; 50%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Sanguinicolidae Graaff, 1907

Sanguinicola sp.

Site of Infection: Blood

Host: *Catostomus commersonii*: Dechtiar and Nepszy 1988; 1970-1975; 7%; L; lns; llnk

Strigeidae Railliet, 1919

Ichthyocotylurus erraticus (Rudolphi, 1809) Odening, 1969

Synonym: *Tetracotyle intermedia* Hughes, 1928; *Cotylurus erraticus* (Rudolphi, 1809) Szidat, 1928

Site of Infection: Heart, kidneys

Host: *Osmerus mordax*: Dechtiar and Nepszy 1988; 1970-1975; 8%; M; lns; llnk

Table 20, continued.

Ichthyocotylurus pileatus (Rudolphi, 1802) Odening, 1969

Synonym: *Tetracotyle diminuta* Hughes, 1928

Site of Infection: Kidney, mesentery

Host:

Percopsis omiscomaycus: Bangham and Hunter 1939; 1927-1929; 39%; L; western Lake Erie; llnk

Perca flavescens: Dechtiar and Nepszy 1988; 1970-1975; 36%; L; lns; llnk

Ichthyocotylurus platycephalus (Creplin, 1825) Odening, 1969

Synonym: *Tetracotyle communis* Hughes, 1928; *Cotylurus communis* (Hughes, 1928) La Rue, 1932

Site of Infection: Pericardial cavity

Host:

Etheostoma flabellare: Bangham and Hunter 1939; 1927-1929; 17%; L; eastern Lake Erie; llnk

Sander canadensis: Hughes 1928; March and April 1927; pnp; minp; lns; llnk

Aplodinotus grunniens: Vendeland 1968; 1967; 6%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ichthyocotylurus sp.

Site of Infection: Pericardial cavity, mesentery

Host:

Hiodon tergisus: Bangham and Hunter 1939; 1927-1929; 8%; L; western Lake Erie; llnk

Macrhybopsis storeriana: Bangham 1972; 1957; 63%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Notropis hudsonius: Bangham 1972; 51%; minp; South Bass Island, Ohio

Notropis hudsonius: Bangham and Hunter 1939; 5%; L; western Lake Erie

Notropis volucellus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Opsopoeodus emiliae: Bangham 1972; 7%; minp; South Bass Island, Ohio

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 6%; L; lns

Ameiurus nebulosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Osmerus mordax: Bangham 1972; 5%; minp; South Bass Island, Ohio

Osmerus mordax: Dechtiar 1972a; 1961-1969; 4%; minp; lns; Ontario; llnk

Coregonus artedi: Dechtiar 1972a; 50%; minp; lns; Ontario

Percopsis omiscomaycus: Bangham 1972; 79%; minp; South Bass Island, Ohio

Cottus bairdi: Dechtiar 1972a; 60%; minp; lns; Ontario

Morone chrysops: Bangham 1972; 2%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham 1972; 1%; minp; South Bass Island, Ohio

Lepomis macrochirus: Bangham 1972; 1%; minp; South Bass Island, Ohio

Lepomis macrochirus: Bangham and Hunter 1939; 10%; L; western Lake Erie

Pomoxis annularis: Dechtiar 1972a; 16%; minp; lns; Ontario

Ammocrypta pellucida: Bangham and Hunter 1939; 20%; L; western Lake Erie

Etheostoma blennioides: Bangham and Hunter 1939; 10%; L; western Lake Erie

Table 20, continued.

Etheostoma exile: Bangham and Hunter 1939; 14%; L; western Lake Erie
Etheostoma flabellare: Bangham 1972; 14%; minp; South Bass Island, Ohio
Etheostoma nigrum: Bangham 1972; 3%; minp; South Bass Island, Ohio
Perca flavescens: Bangham 1972; 1%; minp; South Bass Island, Ohio
Percina caprodes: Bangham 1972; 18%; minp; South Bass Island, Ohio
Percina caprodes: Bangham and Hunter 1939; 13%; L; western Lake Erie
Percina copelandi: Bangham 1972; 3%; minp; South Bass Island, Ohio
Sander canadensis: Dechtiar 1972a; 100%; minp; Ins; Ontario
Sander vitreus: Dechtiar and Nepszy 1988; 40%; M; Ins
Aplodinotus grunniens: Bangham 1972; 5%; minp; South Bass Island, Ohio
Aplodinotus grunniens: Bangham and Hunter 1939; 2%; L; western Lake Erie
Aplodinotus grunniens: Dechtiar and Nepszy 1988; 9%; M; Ins

Neascus rhinichthysi Hunter, 1933

Synonym: None

Site of Infection: Flesh

Host:

Rhinichthys obtusus: Bangham and Hunter 1939; 1927-1929; 50%; L-M; eastern Lake Erie; lnk

Rhinichthys cataractae: Bangham and Hunter 1939; 20%; L-M; eastern Lake Erie

Neascus sp.

Site of Infection: Flesh, liver, mesentery

Host:

Campostoma anomalum: Bangham 1972; 1957; 91%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Campostoma anomalum: Bangham and Hunter 1939; 1927-1929; 21%; M-H; eastern Lake Erie; lnk

Cyprinella spiloptera: Bangham 1972; 75%; minp; South Bass Island, Ohio

Cyprinella whipplei: Bangham and Hunter 1939; 2%; L-M; western Lake Erie; lnk

Luxilus cornutus: Bangham 1972; 100%; minp; South Bass Island, Ohio

Luxilus cornutus: Bangham and Hunter 1939; 26%; L-M; eastern Lake Erie

Lythrurus umbratilis: Bangham 1972; 2%; minp; South Bass Island, Ohio

Macrhybopsis storeriana: Bangham 1972; 11%; minp; South Bass Island, Ohio

Macrhybopsis storeriana: Bangham and Hunter 1939; 13%; L; western Lake Erie

Nocomis micropogon: Bangham and Hunter 1939; 22%; L-M; eastern Lake Erie

Notemigonus crysoleucas: Bangham 1972; 33%; minp; South Bass Island, Ohio

Notemigonus crysoleucas: Bangham and Hunter 1939; 40%; L; eastern Lake Erie

Notropis atherinoides: Bangham 1972; 3%; minp; South Bass Island, Ohio

Notropis heterodon: Bangham and Hunter 1939; 13%; L; western Lake Erie

Notropis hudsonius: Bangham 1972; 1%; minp; South Bass Island, Ohio

Table 20, continued.

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| <i>Notropis hudsonius</i> : Bangham and Hunter 1939; 10%; L; western Lake Erie |
| <i>Notropis stramineus</i> : Bangham 1972; 100%; minp; South Bass Island, Ohio |
| <i>Notropis stramineus</i> : Bangham and Hunter 1939; 11%; L; western Lake Erie |
| <i>Notropis volucellus</i> : Bangham and Hunter 1939; 7%; L; western Lake Erie |
| <i>Opsopoeodus emiliae</i> : Bangham 1972; 18%; minp; South Bass Island, Ohio |
| <i>Opsopoeodus emiliae</i> : Bangham and Hunter 1939; 10%; L; western Lake Erie |
| <i>Pimephales notatus</i> : Bangham 1972; 33%; minp; South Bass Island, Ohio |
| <i>Pimephales notatus</i> : Bangham and Hunter 1939; 67%; L; eastern Lake Erie |
| <i>Pimephales promelas</i> : Bangham and Hunter 1939; 100%; L; western Lake Erie |
| <i>Semotilus atromaculatus</i> : Bangham 1972; 100%; minp; South Bass Island, Ohio |
| <i>Carpiodes cyprinus</i> : Bangham 1972; 13%; minp; South Bass Island, Ohio |
| <i>Catostomus commersonii</i> : Bangham 1972; 33%; minp; South Bass Island, Ohio |
| <i>Erimyzon sucetta</i> : Bangham 1972; 100%; minp; South Bass Island, Ohio |
| <i>Hypentelium nigricans</i> : Bangham 1972; 67%; minp; South Bass Island, Ohio |
| <i>Minytrema melanops</i> : Bangham 1972; 50%; minp; South Bass Island, Ohio |
| <i>Moxostoma aureolum</i> : Bangham 1972; 33%; minp; South Bass Island, Ohio |
| <i>Moxostoma aureolum</i> : Bangham and Hunter 1939; 100%; L; western Lake Erie; lnk |
| <i>Noturus miurus</i> : Bangham and Hunter 1939; 33%; L; western Lake Erie |
| <i>Esox americanus</i> : Bangham 1972; 50%; minp; South Bass Island, Ohio |
| <i>Labidesthes sicculus</i> : Bangham and Hunter 1939; 7%; L; western Lake Erie |
| <i>Morone chrysops</i> : Bangham and Hunter 1939; 39%; L-M; western Lake Erie |
| <i>Morone chrysops</i> (young): Bangham and Hunter 1939; 22%; L; western Lake Erie |
| <i>Lepomis cyanellus</i> : Bangham 1972; 25%; minp; South Bass Island, Ohio |
| <i>Lepomis macrochirus</i> : Bangham 1972; 3%; minp; South Bass Island, Ohio |
| <i>Lepomis megalotis</i> : Bangham 1972; 50%; minp; South Bass Island, Ohio |
| <i>Micropterus salmoides</i> : Bangham 1972; 5%; minp; South Bass Island, Ohio |
| <i>Pomoxis annularis</i> : Bangham 1972; 2%; minp; South Bass Island, Ohio |
| <i>Ammocrypta pellucida</i> : Bangham and Hunter 1939; 7%; L; western Lake Erie |
| <i>Etheostoma blennioides</i> : Bangham 1972; 10%; minp; South Bass Island, Ohio |
| <i>Etheostoma caeruleum</i> : Bangham 1972; 33%; minp; South Bass Island, Ohio |
| <i>Etheostoma flabellare</i> : Bangham 1972; 14%; minp; South Bass Island, Ohio |
| <i>Etheostoma flabellare</i> : Bangham and Hunter 1939; 33%; L-M; eastern Lake Erie; 20%; L; western Lake Erie |
| <i>Etheostoma nigrum</i> : Bangham 1972; 28%; minp; South Bass Island, Ohio |
| <i>Etheostoma nigrum</i> : Bangham and Hunter 1939; 14%; M; eastern Lake Erie |
| <i>Perca flavescens</i> : Bangham 1972; 3%; minp; South Bass Island, Ohio |
| <i>Perca flavescens</i> : Bangham and Hunter 1939; 11%; L-M; western Lake Erie |
| <i>Perca flavescens</i> (young): Bangham and Hunter 1939; 7%; L; western Lake Erie |
| <i>Percina caprodes</i> : Bangham 1972; 21%; minp; South Bass Island, Ohio |
| <i>Percina caprodes</i> : Bangham and Hunter 1939; 8%; L; western Lake Erie |

Table 20, continued.

Percina copelandi: Bangham and Hunter 1939; 18%; L; western Lake Erie
Percina maculata: Bangham 1972; 80%; minp; South Bass Island, Ohio
Sander canadensis: Bangham and Hunter 1939; 3%; M; western Lake Erie
Sander vitreus: Bangham 1972; 3%; minp; South Bass Island, Ohio
Sander vitreus: Bangham and Hunter 1939; 2%; L; western Lake Erie
Sander vitreus (young): Bangham and Hunter 1939; 7%; L; western Lake Erie
Aplodinotus grunniens: Bangham and Hunter 1939; 31%; M; western Lake Erie

Posthodiplostomum minimum (MacCallum, 1921) Dubois, 1936

Synonym: *Neascus vanacleavi* (Agersborg, 1926); *Diplostomum cuticola* (Nordmann, 1832) Diesing, 1850 of Stafford (1904) and Cooper (1915); *Posthodiplostomum cuticola* (Nordmann, 1832) Dubois, 1936 of Margolis and Arthur (1979)

Site of Infection: Liver, mesentery, muscle

Host:

Hiodon tergisus: Bangham 1972; 1957; 13%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Dorosoma cepedianum: Bangham 1972; 4%; minp; South Bass Island, Ohio
Campostoma anomalum: Bangham 1972; 55%; minp; South Bass Island, Ohio
Campostoma anomalum: Bangham and Hunter 1939; 1927-1929; 29%; L; eastern Lake Erie; lnk; 50%; L; western Lake Erie; lnk
Cyprinella spiloptera: Bangham 1972; 51%; minp; South Bass Island, Ohio
Cyprinus carpio: Bangham and Hunter 1939; 17%; L; western Lake Erie
Luxilus cornutus: Bangham and Hunter 1939; 9%; L-M; eastern Lake Erie
Lythrurus umbratilis: Bangham 1972; 29%; minp; South Bass Island, Ohio
Nocomis micropogon: Bangham and Hunter 1939; 39%; L-M; eastern Lake Erie
Notropis atherinoides: Bangham 1972; 10%; minp; South Bass Island, Ohio
Notropis atherinoides: Bangham and Hunter 1939; 4%; L; western Lake Erie
Notropis atherinoides: Dechtiar 1972a; 1961-1969; 44%; minp; lns; Ontario; lnk
Notropis bucattus: Bangham 1972; 30%; minp; South Bass Island, Ohio
Notropis hudsonius: Bangham 1972; 4%; minp; South Bass Island, Ohio
Notropis hudsonius: Bangham and Hunter 1939; 9%; L; eastern Lake Erie
Notropis hudsonius: Dechtiar 1972a; 3%; minp; lns; Ontario
Notropis stramineus: Bangham 1972; 50%; minp; South Bass Island, Ohio
Notropis volucellus: Bangham 1972; 31%; minp; South Bass Island, Ohio
Opsopoeodus emiliae: Bangham 1972; 48%; minp; South Bass Island, Ohio
Pimephales notatus: Bangham 1972; 56%; minp; South Bass Island, Ohio
Pimephales notatus: Bangham and Hunter 1939; 10%; L; western Lake Erie
Rhinichthys obtusus: Bangham 1972; 100%; minp; South Bass Island, Ohio
Rhinichthys obtusus: Bangham and Hunter 1939; 2%; L; eastern Lake Michigan
Semotilus atromaculatus: Bangham 1972; 100%; minp; South Bass Island, Ohio
Semotilus atromaculatus: Bangham and Hunter 1939; 5%; L-M; eastern Lake Erie
Carpiodes cyprinus: Dechtiar 1972a; 6%; minp; lns; Ontario

Table 20, continued.

Carpiodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 6%; M; Ins; llnk
Catostomus commersonii: Dechtiar and Nepszy 1988; 3%; L; Ins
Ameiurus nebulosus: Dechtiar 1972a; 27%; minp; Ins; Ontario
Percopsis omiscomaycus: Bangham 1972; 3%; minp; South Bass Island, Ohio
Percopsis omiscomaycus: Bangham and Hunter 1939; 14%; L; eastern Lake Erie; 28%; L-M; western Lake Erie
Fundulus diaphanus: Bangham and Hunter 1939; 21%; L; eastern Lake Erie; 24%; L; western Lake Erie
Ambloplites rupestris: Bangham 1972; 5%; minp; South Bass Island, Ohio
Ambloplites rupestris: Bangham and Hunter 1939; 17%; L; western Lake Erie
Lepomis cyanellus: Bangham 1972; 83%; minp; South Bass Island, Ohio
Lepomis gibbosus: Bangham 1972; 21%; minp; South Bass Island, Ohio
Lepomis gibbosus: Bangham and Hunter 1939; 11%; L; eastern Lake Erie; 11%; L-M; western Lake Erie
Lepomis gibbosus: Dechtiar 1972a; 65%; minp; Ins; Ontario
Lepomis humilis: Bangham 1972; 100%; minp; South Bass Island, Ohio
Lepomis macrochirus: Bangham 1972; 34%; minp; South Bass Island, Ohio
Lepomis macrochirus: Bangham and Hunter 1939; 30%; L-M; western Lake Erie
Lepomis macrochirus: Dechtiar 1972a; 83%; minp; Ins; Ontario
Lepomis megalotis: Bangham 1972; 100%; minp; South Bass Island, Ohio
Lepomis megalotis: Bangham and Hunter 1939; 100%; L; western Lake Erie
Micropterus dolomieu: Bangham 1972; 8%; minp; South Bass Island, Ohio
Micropterus dolomieu: Dechtiar and Nepszy 1988; 19%; M; Ins
Micropterus salmoides: Bangham 1972; 30%; minp; South Bass Island, Ohio
Micropterus salmoides (young): Bangham and Hunter 1939; 4%; L; western Lake Erie
Pomoxis annularis: Bangham 1972; 2%; minp; South Bass Island, Ohio
Pomoxis nigromaculatus: Bangham 1972; 7%; minp; South Bass Island, Ohio
Pomoxis nigromaculatus: Bangham and Hunter 1939; 11%; L; western Lake Erie
Etheostoma blennioides: Bangham 1972; 10%; minp; South Bass Island, Ohio
Etheostoma nigrum: Bangham 1972; 3%; minp; South Bass Island, Ohio
Etheostoma nigrum: Bangham and Hunter 1939; 44%; L-M; western Lake Erie
Sander vitreus: Bangham and Hunter 1939; 10%; L; eastern Lake Erie
Aplodinotus grunniens: Bangham 1972; 2%; minp; South Bass Island, Ohio

Unknown Family

Unidentified metacercariae

Synonym: ?

Site of Infection: Mesentery

Host:

Macrhybopsis storeriana: Bangham and Hunter 1939; 1927-1929; 19%; L; western Lake Erie; llnk

Notropis atherinoides: Bangham and Hunter 1939; 1%; L; western Lake Erie

Table 20, continued.

Unknown Family

Unidentified metacercariae

Synonym: ?

Site of Infection: Gills

Host:

Alosa pseudoharengus: Bangham 1972; 1957; 14%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Campostoma anomalum: Bangham 1972; 73%; minp; South Bass Island, Ohio

Cyprinella spiloptera: Bangham 1972; 15%; minp; South Bass Island, Ohio

Luxilus cornutus: Bangham 1972; 24%; minp; South Bass Island, Ohio

Lythrurus umbratilis: Bangham 1972; 6%; minp; South Bass Island, Ohio

Macrhybopsis storeriana: Bangham 1972; 21%; minp; South Bass Island, Ohio

Notemigonus crysoleucas: Bangham 1972; 11%; minp; South Bass Island, Ohio

Notropis atherinoides: Bangham 1972; 59%; minp; South Bass Island, Ohio

Notropis bucattus: Bangham 1972; 40%; minp; South Bass Island, Ohio

Notropis heterodon: Bangham 1972; 50%; minp; South Bass Island, Ohio

Notropis hudsonius: Bangham 1972; 9%; minp; South Bass Island, Ohio

Notropis volucellus: Bangham 1972; 17%; minp; South Bass Island, Ohio

Opsopoeodus emiliae: Bangham 1972; 9%; minp; South Bass Island, Ohio

Pimephales notatus: Bangham 1972; 43%; minp; South Bass Island, Ohio

Ameiurus natalis: Bangham 1972; 15%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Ameiurus melas: Bangham 1972; 13%; minp; South Bass Island, Ohio

Noturus flavus: Bangham 1972; 50%; minp; South Bass Island, Ohio

Percopsis omiscomaycus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Fundulus diaphanus: Bangham 1972; 67%; minp; South Bass Island, Ohio

Labidesthes sicculus: Bangham 1972; 11%; minp; South Bass Island, Ohio

Lepomis humilis: Bangham 1972; 50%; minp; South Bass Island, Ohio

Lepomis megalotis: Bangham 1972; 50%; minp; South Bass Island, Ohio

Micropterus dolomieu: Bangham 1972; 4%; minp; South Bass Island, Ohio

Micropterus salmoides: Bangham 1972; 5%; minp; South Bass Island, Ohio

Pomoxis nigromaculatus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Etheostoma blennioides: Bangham 1972; 40%; minp; South Bass Island, Ohio

Etheostoma flabellare: Bangham 1972; 29%; minp; South Bass Island, Ohio

Etheostoma nigrum: Bangham 1972; 7%; minp; South Bass Island, Ohio

Percina caprodes semifaciata: Bangham 1972; 7%; minp; South Bass Island, Ohio

Percina copelandi: Bangham 1972; 18%; minp; South Bass Island, Ohio

Percina maculata: Bangham 1972; 40%; minp; South Bass Island, Ohio

Aplodinotus grunniens: Bangham 1972; 2%; minp; South Bass Island, Ohio

Table 20, continued.

Aspidobothrea (Aspidobothreans)

Aspidogastridae Poche, 1907

Cotylogaster occidentalis Nickerson, 1902

Synonym: *Cotylogasteroides occidentalis* Yamaguti, 1963

Site of Infection: Large intestine

Host:

Aplodinotus grunniens: Dechtiar 1972a; 1961-1969; 1%; minp; lns; Ontario; llnk

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 1970-1975; 3%; L; lns; llnk

Aplodinotus grunniens: Vendeland 1968; 1967; 9%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Monogenea (Monogeneans)

Ancyrocephalidae Bykhovski and Nagibina, 1978

Ligictaluridus floridanus (Mueller, 1936) Beverly-Burton, 1984

Synonym: *Cleidodiscus floridanus* Mueller, 1936; *Cleidodiscus mirabilis* Mueller 1937 (partim)

Site of Infection: Gills

Host:

Ameiurus nebulosus: Dechtiar 1972a; 1961-1969; 55%; minp; lns; Ontario; llnk

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 22%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Dechtiar 1972a; 100%; minp; lns; Ontario

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 54%; M; lns; llnk

Noturus gyrinus: Dechtiar 1972a; 40%; minp; lns; Ontario

Ligictaluridus pricei (Mueller, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus pricei* Mueller, 1936

Site of Infection: Gills

Host:

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 12%; minp; South Bass Island; Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Dechtiar 1972a; 1961-1969; 57%; minp; lns; Ontario; llnk

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 14%; L; lns; llnk

Noturus flavus: Dechtiar 1972a; 74%; minp; lns; Ontario

Noturus gyrinus: Dechtiar 1972a; 100%; minp; lns; Ontario

Table 20, continued.

Axinidae Unnithan, 1957

Lintaxine cokeri (Linton, 1940) Sproston, 1946

Synonym: *Heteraxine cokeri* (Linton, 1940)

Site of Infection: Gills

Host:

Aplodinotus grunniens: Dechtiar 1972a; 1961-1969; 13%; minp; lns; Ontario; llnk

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 1970-1975; 9%; L; lns; llnk

Aplodinotus grunniens: Vendeland 1968; 1967; 9%; minp; South Bass Island, western basin, Ohio; 41°39'0"/-82°49'14"

Dactylogyridae Bykhovski, 1933

Acolpenteron catostomi Fischthal and Allison, 1942

Synonym: None

Site of Infection: Ureters, urinary bladder

Host:

Carpionodes cyprinus: Dechtiar 1972a; 1961-1969; 6%; minp; lns; Ontario; llnk

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 5%; L; lns; llnk

Catostomus commersonii: Dechtiar 1972a; 13%; minp; lns; Ontario

Catostomus commersonii: Dechtiar and Nepszy 1988; 10%; L; lns

Actinocleidus bakeri Mizelle and Cronin, 1943

Synonym: None

Site of Infection: [Gills]

Host: *Lepomis macrochirus*: Dechtiar 1972a 1961-1969; 67%; minp; lns; Ontario; llnk

Actinocleidus oculatus (Mueller, 1934) Mueller, 1937

Synonym: *Cleidodiscus oculatus* Mueller, 1934

Site of Infection: [Gills]

Host: *Lepomis gibbosus*: Dechtiar 1972a; 1961-1969; 6%; minp; lns; Ontario; llnk

Actinocleidus recurvatus Mizelle and Donahue, 1944

Synonym: None

Site of Infection: [Gills]

Host: *Lepomis gibbosus*: Dechtiar 1972a; 1961-1969; 6%; minp; lns; Ontario; llnk

Aethycteron malleus (Mueller, 1938) Suriano and Beverley-Burton

Synonym: *Cleidodiscus malleus* Mueller, 1938

Site of Infection: [Gills]

Host: *Percina caprodes*: Dechtiar 1972a; 1961-1969; 17%; minp; lns; Ontario; llnk

Table 20, continued.

Clavunculus unguis (Mizelle, Stokely, Jaskoski, Seamster, and Monaco, 1956) Beverley-Burton, 1986

Synonym: *Actinocleidus unguis* Mizelle and Cronin, 1943

Site of Infection: [Gills?]

Host: *Lepomis macrochirus*: Dechtiar 1972a; 1961-1969; 67%; minp; lns; Ontario; llnk

Cleidodiscus alatus (Mueller, 1938) Price, 1968

Synonym: ?

Site of Infection: [Gills]

Host: *Ambloplites rupestris*: Dechtiar 1972a; 1961-1969; 36%; minp; lns; Ontario; llnk

Remarks: This species is an incertae sedis until further living material is studied.

Cleidodiscus brachus Mueller, 1938

Synonym: *Urocleidus brachus* (Mueller, 1938) Price, 1967

Site of infection: [Gills]

Host: *Semotilus atromaculatus*: Dechtiar 1972a; 1961-1969; 100%; minp; lns; Ontario; llnk

Cleidodiscus similis (Mueller, 1936) Mizelle and Hughes, 1938

Synonym: None

Site of Infection: [Gills]

Host: *Lepomis gibbosus*: Dechtiar 1972a; 1961-1969; 45%; minp; lns; Ontario; llnk

Cleidodiscus uniformis Mizelle, 1936

Synonym: None

Site of Infection: [Gills]

Host: *Pomoxis annularis*: Dechtiar 1972a; 1961-1969; 63%; minp; lns; Ontario; llnk

Cleidodiscus venardi Mizelle and Jaskoski, 1942

Synonym: None

Site of Infection: [Gills]

Host: *Lepomis macrochirus*: Dechtiar 1972a; 1961-1969; 50%; minp; lns; Ontario; llnk

Cleidodiscus sp.

Site of Infection: [Gills]

Host:

Percopsis omiscomaycus: Dechtiar 1972a; 1961-1969; 68%; minp; lns; Ontario; llnk

Ambloplites rupestris: Dechtiar 1972a; 26%; minp; lns; Ontario

Lepomis macrochirus: Dechtiar 1972a; 17%; minp; lns; Ontario

Micropterus dolomieu: Dechtiar 1972a; 30%; minp; lns; Ontario

Perca flavescens: Dechtiar 1972a; 17%; minp; lns; Ontario

Table 20, continued.

Dactylogyrus anchoratus (Dujardin, 1845) Wagener, 1857

Synonym: None

Site of Infection: [Gills]

Host:

Carassius auratus: Dechtiar 1972a; 1961-1969; 33%; minp; lns; Ontario; llnk

Cyprinus carpio: Dechtiar 1972a; 79%; minp; lns; Ontario

Dactylogyrus buddi Dechtiar, 1974

Synonym: None

Site of Infection: Gills

Host:

Cottus bairdii: Dechtiar 1974a; 1969; pnp; minp; lns; Ontario; llnk

Cottus cognatus: Dechtiar 1974a; pnp; minp; lns; Ontario

Dactylogyrus eucalius Mizelle and Regensberger, 1945

Synonym: None

Site of Infection: [Gills]

Host: *Culaea inconstans*: Dechtiar 1972a; 1961-1969; 50%; minp; lns; Ontario

Dactylogyrus extensus Mueller and Van Cleave, 1932

Synonym: *Dactylogyrus solidus* Akhmerov, 1948; *Dactylogyrus hovorkai* Kastak, 1957

Site of Infection: [Gills]

Host: *Cyprinus carpio*: Dechtiar 1972a; 1961-1969; 83%; minp; lns; Ontario; llnk

Dactylogyrus ursus Mueller, 1938

Synonym: *Neodactylogyrus ursus* Price, 1938

Site of Infection: [Gills]

Host: *Moxostoma anisurum*: Dechtiar 1972a; 1961-1969; 25%; minp; lns; Ontario; llnk

Dactylogyrus vastator Nybelin, 1924

Synonym: None

Site of Infection: [Gills]

Host: *Carassius auratus*: Dechtiar 1972a; 1961-1969; 7%; minp; lns; Ontario; llnk

Dactylogyrus sp.

Site of Infection: [Gills, skin]

Table 20, continued.

Host:

Luxilus cornutus: Dechtiar 1972a; 1961-1969; 80%; minp; lns; Ontario; llnk

Notropis atherinoides: Dechtiar 1972a; 100%; minp; lns; Ontario

Notropis hudsonius: Dechtiar 1972a; 43%; minp; lns; Ontario

Moxostoma erythrurum: Dechtiar 1972a; 59%; minp; lns; Ontario

Moxostoma macrolepidotum: Dechtiar 1972a; 61%; minp; lns; Ontario

Cottus bairdi: Dechtiar 1972a; 60%; minp; lns; Ontario

Icelanochondrion fyviei Dechtiar and Dillon, 1974

Synonym: None

Site of Infection: Fins, skin

Host:

Carpoides cyprinus: Dechtiar and Dillon 1974; 1968-1971; pnp; minp; lns; llnk

Carpoides cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 21%; L; lns; llnk

Icelanochondrion microcotyle Kritsky, Leiby, and Shelton, 1972

Synonym: None

Site of Infection: Fins, skin

Host: *Carpoides cyprinus*: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Lyrodiscus longibasis Rogers, 1967

Synonym: None

Site of Infection: Nasal cavity, skin

Host:

Lepomis macrochirus: Dechtiar 1972a; 1961-1969; 13%; minp; lns; Ontario; llnk

Pomoxis annularis: Dechtiar 1972a; 16%; minp; lns; Ontario

Pomoxis annularis: Dechtiar 1973; cdnp; pnp; minp; lns; llnk

Pomoxis nigromaculatus: Dechtiar 1972a; 48%; minp; lns; Ontario

Pomoxis nigromaculatus: Dechtiar 1973; pnp; minp; lns

Lyrodiscus rupestris Dechtiar, 1973

Synonym: None

Site of Infection: Fins, nasal cavity, skin

Host:

Ambloplites rupestris: Dechtiar 1972a; 1961-1969; 23%; minp; lns; Ontario; llnk

Ambloplites rupestris: Dechtiar 1973; cdnp; pnp; minp; lns; llnk

Table 20, continued.

Lyrodiscus seminolensis Rogers, 1967

Synonym: None

Site of Infection: Fins, skin

Host: *Lepomis macrochirus*: Dechtiar 1973; cdnp; pnp; minp; Trenton, Ontario; 44°6'0"/-77°34'59"

Lyrodiscus sp.

Site of Infection: [Fins, nasal cavity, skin]

Host:

Lepomis macrochirus: Dechtiar 1972a; 1961-1969; 3%; minp; lns; Ontario; llnk

Pomoxis nigromaculatus: Dechtiar 1972a; 5%; minp; lns; Ontario

Onchocleidus chautauquensis (Mueller, 1938) Murith and Beverley-Burton, 1984

Synonym: *Tetracleidus chautauquensis* (Mueller, 1938) Mizelle and Hughes, 1938; *Urocleidus chautauquensis* Mizelle and Hughes, 1938; *Cleidodiscus chautauquensis* Mueller, 1938

Site of Infection: [Gills]

Host: *Ambloplites rupestris*: Dechtiar 1972a; 1961-1969; 38%; minp; lns; Ontario; llnk

Onchocleidus ferox (Mueller, 1934) Mueller, 1936

Synonym: *Urocleidus ferox* Mueller, 1934; *Onchocleidus nucronatus* Mizelle, 1936; *Cleidodiscus ferox* (Mueller, 1934)

Site of Infection: [Gills]

Host: *Lepomis gibbosus*: Dechtiar 1972a; 1961-1969; 48%; minp; lns; Ontario; llnk

Onchocleidus helicus Mueller, 1936

Synonym: *Cleidodiscus helicus* (Mueller, 1936) Price and Mura, 1969; *Urocleidus helicus* (Mueller, 1936) Mizelle and Hughes, 1938

Site of Infection: [Gills]

Host: *Micropterus salmoides*: Dechtiar 1972a; 1961-1969; 100%; minp; lns; Ontario; llnk

Remarks: This species is an *incertae sedis* until further living material is studied.

Pellucidhaptor angularis Kritsky and Hathaway, 1969

Synonym: None

Site of Infection: Fins, skin

Host: *Carpionodes cyprinus*: Dechtiar and Nepszy 1988; 1970-1975; 8%; L; lns; llnk

Pellucidhaptor eremitus Rogers, 1967

Synonym: None

Site of Infection: Fins

Host: *Carpionodes cyprinus*: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Table 20, continued.

Pellucidhaptor microcanthus Kritsky, Leiby, and Shelton, 1972

Synonym: None

Site of Infection: Fins

Host: *Carpiodes cyprinus*: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Pellucidhaptor sp.

Site of Infection: [Gills]

Host:

Carpiodes cyprinus: Dechtiar 1972a; 1961-1969; 9%; minp; lns; Ontario; llnk

Moxostoma macrolepidotum: Dechtiar 1972a; 9%; minp; lns; Ontario

Pseudocolpenteron pavlovskii Bykhovskii and Gusev, 1955

Synonym: None

Site of Infection: [Skin]

Host:

Cyprinus carpio: Dechtiar 1971b; August-November 1969; pnp; minp; lns; llnk

Cyprinus carpio: Dechtiar 1972a; 1961-1969; 13%; minp; lns; Ontario; llnk

Synclathrium fusiformis (Mueller, 1934) Price, 1967

Synonym: *Actinocleidus fusiformis* (Mueller, 1934) Mueller, 1937; *Ancyrocephalus cruciatus* (Cooper, 1915) Mueller, 1936; *Cleidodiscus fusiformis* Mueller, 1934

Site of Infection: [Gills]

Host:

Micropterus dolomieu: Dechtiar 1972a; 1961-1969; 100%; minp; lns; Ontario; llnk

Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 19%; M; lns; llnk

Micropterus salmoides: Dechtiar 1972a; 100%; minp; lns; Ontario

Tetracleidus banghami Mueller, 1936

Synonym: *Cleidodiscus banghami* (Mueller, 1936) Mizelle, 1940

Site of Infection: Gills

Host:

Micropterus dolomieu: Dechtiar 1972a; 1961-1969; 100%; minp; lns; Ontario; llnk

Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970; 1975; 45%; M; lns; llnk

Table 20, continued.

Tetracleidus capax (Mizelle, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus capax* Mizelle, 1936

Site of Infection: [Gills]

Host:

Pomoxis annularis: Dechtiar 1972a; 1961-1969; 78%; minp; lns; Ontario; llnk

Pomoxis nigromaculatus: Dechtiar 1972a; 95%; minp; lns; Ontario

Tetracleidus longus (Mizelle, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus longus* Mizelle, 1936

Site of Infection: [Gills]

Host:

Pomoxis annularis: Dechtiar 1972a; 1961-1969; 78%; minp; lns; Ontario; llnk

Pomoxis nigromaculatus: Dechtiar 1972a; 48%; minp; lns; Ontario

Tetracleidus stentor (Mueller, 1937) Beverley-Burton, 1984

Synonym: *Cleidodiscus stentor* Mueller, 1937

Site of Infection: [Gills]

Host: *Ambloplites rupestris*: Dechtiar 1972a; 1961-1969; 26%; minp; lns; Ontario; llnk

Urocleidus aculeatus (Van Cleave and Mueller, 1932) Mueller, 1934

Synonym: *Ancyrocephalus aculeatus* Van Cleave and Mueller, 1932 *Cleidodiscus aculeatus* (Van Cleave and Mueller, 1932) Mizelle and Regensberger, 1945

Site of Infection: [Gills]

Host:

Sander canadensis: Dechtiar 1972a; 1961-1969; 100%; minp; lns; Ontario; llnk

Sander glaucum: Dechtiar 1972a; 100%; minp; lns; Ontario

Sander vitreus: Dechtiar 1972a; 100%; minp; lns; Ontario

Sander vitreus: Dechtiar and Nepszy 1988; 1970-1975; 57%; M; lns; llnk

Urocleidus adspectus (Mueller, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus adspectus* Mueller, 1936

Site of Infection: Gills

Host:

Perca flavescens: Dechtiar 1972a; 1961-1969; 33%; minp; lns; Ontario; llnk

Perca flavescens: Dechtiar and Nepszy 1988; 1970-1975; 56%; M; lns; llnk

Urocleidus baldwini (Dechtiar 1974) Beverley-Burton, 1984

Synonym: *Cleidodiscus baldwini* (Dechtiar 1974)

Site of Infection: Gills

Host: *Percopsis omiscomaycus*: Dechtiar 1974b; 1969; pnp; minp; lns; llnk

Table 20, continued.

Urocleidus chrysops Mizelle and Klucka, 1953

Synonym: *Cleidodiscus chrysops* (Mizelle and Klucka, 1953)

Site of Infection: [Gills]

Host:

Morone chrysops: Dechtiar 1972a; 1961-1969; 75%; minp; lns; Ontario; llnk

Morone chrysops: Dechtiar and Nepszy 1988; 1970-1975; 64%; M; lns; llnk

Diclybothriidae Bykhovskii and Gusev, 1950

Diclybothrium armatum Leuckart, 1835

Synonym: *Diplobothrium armatum* (Leuckart, 1835)

Site of Infection: [Gills]

Host: *Acipenser fulvescens*: Dechtiar 1972a; 1961-1969; 30%; minp; Port Dover, Ontario; 42°46'59"/-80°12'0"

Discocotylidae Price, 1936

Neodiscocotyle carpioditis Dechtiar, 1967

Synonym: None

Site of Infection: Gills

Host:

Carpiodes cyprinus: Dechtiar 1967b; 1962-1966; pnp; minp; west end and east end; llnk

Carpiodes cyprinus: Dechtiar 1972a; 1961-1969; 78%; minp; lns; Ontario; llnk

Carpiodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 38%; M; lns; llnk

Octomacrum lanceatum Mueller, 1934

Synonym: *Octobothrium sagittatum* Wright, 1879

Site of Infection: Gills

Host:

Carpiodes cyprinus: Bangham 1972; 1957; 25%; minp; South Bass Island, Ohio 41°39'0"/-82°49'14"

Catostomus commersonii: Dechtiar 1972a; 1961-1969; 51%; minp; lns; Ontario; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 20%; L; lns; llnk

Octomacrum sp.

Site of Infection: [Gills]

Host:

Alosa pseudoharengus: Bangham 1972; 1957; 14%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Dorosoma cepedianum: Bangham 1972; 48%; minp; South Bass Island, Ohio

Table 20, continued.

Gyrodactylidae Cobbold, 1864

Gyrodactylus bairdi Wood and Mizelle, 1957

Synonym: None

Site of Infection: [Gills]

Host: *Cottus bairdii*: Dechtiar 1972a; 1961-1969; 70%; minp; lns; Ontario; llnk

Gyrodactylus macrochiri Hoffman and Putz, 1964

Synonym: *Gyrodactylus elegans* of Hargis, 1953

Site of Infection: Fins

Host: *Micropterus dolomieu*: Dechtiar and Nepszy 1988; 1970-1975; 3%; M; lns; llnk

Gyrodactylus spathulatus Mueller, 1936

Synonym: None

Site of Infection: [Gills]

Host:

Catostomus commersonii: Dechtiar 1972a; 1961-1969; 26%; minp; lns; Ontario; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 27%; L; lns; llnk

Gyrodactylus sp.

Site of Infection: External surface, fins, gills

Host:

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 3%; L; lns

Moxostoma anisurum: Dechtiar 1972a; 1961-1969; 25%; minp; lns; Ontario; llnk

Moxostoma macrolepidotum: Dechtiar 1972a; 45%; minp; lns; Ontario

Notropis hudsonius: Dechtiar 1972a; 21%; minp; lns; Ontario

Culaea inconstans: Dechtiar 1972a; 30%; minp; lns; Ontario

Ambloplites rupestris: Dechtiar 1972a; 5%; minp; lns; Ontario

Unidentified Gyrodactyloidea

Synonym: None

Site of Infection: Gills

Host:

Carassius auratus: Bangham 1972; 1957; 91%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Cyprinella spiloptera: Bangham 1972; 43%; minp; South Bass Island, Ohio

Cyprinus carpio: Bangham 1972; 71%; minp; South Bass Island, Ohio

Macrhybopsis storeriana: Bangham 1972; 42%; minp; South Bass Island, Ohio

Luxilus cornutus: Bangham 1972; 47%; minp; South Bass Island, Ohio

Lythrurus umbratilis: Bangham 1972; 90%; minp; South Bass Island, Ohio

Notropis atherinoides: Bangham 1972; 31%; minp; South Bass Island, Ohio

Table 20, continued.

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| <i>Notropis bucattus</i> : Bangham 1972; 60%; minp; South Bass Island, Ohio |
| <i>Notropis heterodon</i> : Bangham 1972; 50%; minp; South Bass Island, Ohio |
| <i>Notropis hudsonius</i> : Bangham 1972; 13%; minp; South Bass Island, Ohio |
| <i>Notropis volucellus</i> : Bangham 1972; 41%; minp; South Bass Island, Ohio |
| <i>Opsopeodus emiliae</i> : Bangham 1972; 30%; minp; South Bass Island, Ohio |
| <i>Pimephales notatus</i> : Bangham 1972; 22%; minp; South Bass Island, Ohio |
| <i>Semotilus atromaculatus</i> : Bangham 1972; 50%; minp; South Bass Island, Ohio |
| <i>Ameiurus melas</i> : Bangham 1972; 38%; minp; South Bass Island, Ohio |
| <i>Ameiurus natalis</i> : Bangham 1972; 100%; minp; South Bass Island, Ohio |
| <i>Ameiurus nebulosus</i> : Bangham 1972; 55%; minp; South Bass Island, Ohio |
| <i>Ictalurus punctatus</i> : Bangham 1972; 77%; minp; South Bass Island, Ohio |
| <i>Ictalurus punctatus</i> : Bangham and Hunter 1939; 1927-1929; 10%; L; western Lake Erie; lnk |
| <i>Noturus flavus</i> : Bangham 1972; 50%; minp; South Bass Island, Ohio |
| <i>Percopsis omiscomaycus</i> : Bangham 1972; 10%; minp; South Bass Island, Ohio |
| <i>Cottus bairdii</i> : Bangham 1972; 33%; minp; South Bass Island, Ohio |
| <i>Morone chrysops</i> : Bangham 1972; 100%; minp; South Bass Island; Ohio |
| <i>Morone chrysops</i> : Bangham and Hunter 1939; 22%; L-M; western Lake Erie |
| <i>Morone chrysops</i> (young): Bangham and Hunter 1939; 44%; L-M; western Lake Erie |
| <i>Ambloplites rupestris</i> : Bangham 1972; 95%; minp; South Bass Island, Ohio |
| <i>Lepomis cyanellus</i> : Bangham 1972; 100%; minp; South Bass Island, Ohio |
| <i>Lepomis gibbosus</i> : Bangham 1972; 88%; minp; South Bass Island, Ohio |
| <i>Lepomis humilis</i> : Bangham 1972; 100%; minp; South Bass Island, Ohio |
| <i>Lepomis macrochirus</i> : Bangham 1972; 95%; minp; South Bass Island, Ohio |
| <i>Lepomis macrochirus</i> : Bangham and Hunter 1939; 30%; L-M; western Lake Erie |
| <i>Lepomis megalotis</i> : Bangham 1972; 50%; minp; South Bass Island, Ohio |
| <i>Micropterus dolomieu</i> : Bangham 1972; 69%; minp; South Bass Island, Ohio |
| <i>Micropterus dolomieu</i> : Bangham and Hunter 1939; 3%; M; western Lake Erie |
| <i>Micropterus dolomieu</i> (young): Bangham and Hunter 1939; 6%; L-M; western Lake Erie |
| <i>Micropterus salmoides</i> : Bangham 1972; 53%; minp; South Bass Island, Ohio |
| <i>Micropterus salmoides</i> : Bangham and Hunter 1939; 13%; L; western Lake Erie |
| <i>Micropterus salmoides</i> (young): Bangham and Hunter 1939; 10%; L-M; western Lake Erie |
| <i>Pomoxis annularis</i> : Bangham 1972; 89%; minp; South Bass Island, Ohio |
| <i>Pomoxis nigromaculatus</i> : Bangham 1972; 90%; minp; South Bass Island, Ohio |
| <i>Etheostoma blennioides</i> : Bangham 1972; 20%; minp; South Bass Island, Ohio |
| <i>Etheostoma flabellare</i> : Bangham 1972; 14%; minp; South Bass Island, Ohio |
| <i>Etheostoma nigrum</i> : Bangham 1972; ncdp; 34%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14" |
| <i>Perca flavescens</i> : Bangham 1972; 43%; minp; South Bass Island, Ohio |

Table 20, continued.

Percina caprodes: Bangham 1972; 16%; minp; South Bass Island, Ohio

Percina copelandi: Bangham 1972; 12%; minp; South Bass Island, Ohio

Percina maculata: Bangham 1972; 20%; minp; South Bass Island, Ohio

Sander vitreus: Bangham 1972; 18%; minp; South Bass Island, Ohio

Mazocraeoidae Price, 1936

Mazocraeoides olentangiensis Sroufe, 1958

Synonym: *Mazocraeoides similis* Price, 1959

Site of Infection: [Gills]

Host: *Dorosoma cepedianum*: Dechtiar 1972a; 1961-1969; 16%; minp; lns; Ontario; llnk

Mazacraeoides sp.

Site of Infection: [Gills]

Host: *Hiodon tergisus*: Dechtiar 1972a; 1961-1969; 23%; minp; lns; Ontario; llnk

Microcotylidae van Beneden and Hesse, 1863

Microcotyle eriensis Bangham and Hunter, 1936

Synonym: None

Site of Infection: Gills

Host:

Aplodinotus grunniens: Bangham 1972; 1957; 10%; minp; South Bass Island; Ohio; 41°39'0"/-82°49'14"

Aplodinotus grunniens: Bangham and Hunter 1936; cdnp; 11%; minp; lns; llnk

Aplodinotus grunniens: Bangham and Hunter 1939; 1927-1929; 11%; L; western Lake Erie; llnk

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 1970-1975; 6%; L; lns; llnk

Microcotyle spinicirrus (MacCallum, 1918)

Synonym: None

Site of Infection: Gills

Host:

Aplodinotus grunniens: Bangham 1972; 1957; 58%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Aplodinotus grunniens: Bangham and Hunter 1936; cdnp; 11%; minp; lns; llnk

Aplodinotus grunniens: Bangham and Hunter 1939; 1927-1929; 11%; L; western Lake Erie; llnk

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 1970-1975; 53%; M; lns; llnk

Aplodinotus grunniens: Vendeland 1968; 1967; 67%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Pseudomurraytreematidae (Kritsky, Mizelle, and Bilquees, 1978) Beverley-Burton, 1984

Anonchohaptor anomalus Mueller, 1938

Synonym: None

Site of Infection: Gills, fins, nasal cavity

Table 20, continued.

Host:

Carpiodes cyprinus: Dechtiar 1972a; 1961-1969; 10%; minp; lns; Ontario; llnk

Carpiodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 9%; L; lns; llnk

Catostomus commersonii: Dechtiar 1972a; 13%; minp; lns; Ontario

Catostomus commersonii: Dechtiar and Dillon 1974; 1968-1971; pnp; minp; lns; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 10%; L; lns

Moxostoma anisurum: Dechtiar 1972a; 25%; minp; lns; Ontario

Moxostoma erythrurum: Dechtiar 1972a; 24%; minp; lns; Ontario

Moxostoma macrolepidotum: Dechtiar 1972a; 58%; minp; lns; Ontario

Anonchohaptor muelleri Kritsky, Leiby and Shelton, 1972

Synonym: None

Site of Infection: Fins

Host: *Carpiodes cyprinus*: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Anonchohaptor sp.

Site of Infection: [Gills]

Host: *Carpiodes cyprinus*: Dechtiar 1972a; 1961-1969; 6%; minp; lns; Ontario; llnk

Pseudomurraytrema copulatum (Mueller, 1938) Bykhovski, 1957

Synonym: None

Site of Infection: Gills

Host:

Catostomus commersonii: Dechtiar 1972a; 1961-1969; 38%; minp; lns; Ontario; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 20%; L; lns; llnk

Moxostoma anisurum: Dechtiar 1972a; 42%; minp; lns; Ontario

Moxostoma erythrurum: Dechtiar 1972a; 29%; minp; lns; Ontario

Moxostoma macrolepidotum: Dechtiar 1972a; 15%; minp; lns; Ontario

Pseudomurraytrema moxostomi Dechtiar, 1972

Synonym: None

Site of Infection: [Gills]

Host: *Moxostoma macrolepidotum*: Dechtiar 1972a; 1961-1969; 21%; minp; lns; Ontario; llnk

Table 20, continued.

Tetraonchidae Bykhovski, 1937

Tetraonchus monenteron (Wagener, 1857) Diesing, 1858

Synonym: None

Site of Infection: Gills

Host:

Esox lucius: Dechtiar 1972a; 1961-1969; 100%; minp; Wheatley, Ontario; 42°6'0"/-82°27'0"

Esox lucius: Dechtiar and Nepszy 1988; 1970-1975; 58%; L; lns; llnk

Adult Cestoda (Cestodes)

Capingentidae Hunter, 1930

Spartoides wardi Hunter, 1929

Synonym: None

Site of Infection: Intestine

Host:

Carpionodes cyprinus: Dechtiar 1972a; 1961-1969; 37%; minp; lns; Ontario; llnk

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 45%; M; lns; llnk

Caryophyllaeidae Leuckhart, 1878

Biacetabulum sp.

Site of Infection: Intestine

Host:

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 21%; L; lns; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 23%; L, lns

Glaridacris catostomi (Cooper, 1920) Mackiewicz, 1965

Synonym: *Caryophyllaeus terebrans* of Bangham and Adams 1954 (partim), *Glaridacris laruei* of Bangham and Venard, 1946

Site of Infection: Digestive tract

Host:

Catostomus commersonii: Bangham and Hunter 1939; 1927-1929; 31%; L; eastern Lake Erie; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 48%; M; lns; llnk

Catostomus commersonii: Hunter 1927; cdnp; pnp; minp; Silver Creek area, New York; 42°32'46"/-79°10'9"

Hypentelium nigricans: Bangham 1972; 1957; 33%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Hypocaryophyllaeus paratarius Hunter, 1927

Synonym: None

Site of Infection: Digestive tract

Table 20, continued.

Host:

Carpoides cyprinus: Bangham 1972; 1957; 63%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Carpoides cyprinus: Bangham and Hunter 1939; 1927-1929; 8%; L; eastern Lake Erie; llnk

Lytocestidae Hunter, 1927

Khawia iowensis Calentine and Ulmer, 1961

Synonym: None

Site of Infection: [Intestine]

Host:

Cyprinus carpio: Bangham 1972; 1957; 13%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Cyprinus carpio: Dechtiar 1972a; 1961-1969; 13%; minp; lns; Ontario; llnk

Amphicotylidae Ariola, 1899

Eubothrium crassum (Bloch, 1779) Nybelin, 1922

Synonym: *Abothrium crassum* (Bloch, 1779), *Eubothrium oncorhynchi* Wardle, 1932

Site of Infection: Intestine

Host:

Coregonus clupeaformis: Bangham and Hunter 1939; 1927-1929; 11%; L; eastern Lake Erie; llnk; 13%; L; western Lake Erie; llnk

Lota lota: Bangham and Hunter 1939; 100%; L-H; eastern Lake Erie; 100%; L-M; western Lake Erie

Bothriocephalidae Blanchard, 1849

Bothriocephalus claviceps (Goeze, 1782) Rudolphi, 1810

Synonym: None

Site of Infection: Digestive tract

Host:

Percopsis omiscomaycus: Bangham and Hunter 1939; 1927-1929; 9%; L; western Lake Erie; llnk

Ambloplites rupestris: Bangham and Hunter 1939; 8%; L; western Lake Erie

Micropterus dolomieu: Bangham and Hunter 1939; 3%; L; western Lake Erie

Sander canadensis: Bangham and Hunter 1939; 10%; L; eastern Lake Erie; llnk

Aplodinotus grunniens: Bangham and Hunter 1939; 67%; L; eastern Lake Erie

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 1970-1975; 3%; L; lns; llnk

Table 20, continued.

Bothriocephalus cuspidatus Cooper, 1917

Synonym: *Bothriocephalus cuspidatus luciopercae* Wardle, 1932; *Bothriocephalus cuspidatus hiodontos* Wardle, 1932; *Bothriocephalus cuspidatus cuspidatus* Cooper, 1917

Site of Infection: Digestive tract

Host:

Hiodon tergisus: Bangham and Hunter 1939; 1927-1929; 8%; L; western Lake Erie; llnk

Percopsis omiscomaycus: Bangham and Hunter 1939; 14%; L; eastern Lake Erie; llnk

Morone chrysops: Bangham and Hunter 1939; 70%; L-M; western Lake Erie

Perca flavescens: Bangham and Hunter 1939; 4%; L; eastern Lake Erie; 16%; L-M; western Lake Erie

Perca flavescens: Bangham and Hunter 1939; 4%; L; eastern Lake Erie; 16%; L-M; western Lake Erie

Percina copelandi: Bangham and Hunter 1939; 3%; L; western Lake Erie

Sander canadensis: Bangham 1972; 1957; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Sander canadensis: Bangham and Hunter 1939; 100%; L-M; eastern Lake Erie; 88%; L-H; western Lake Erie

Sander glaucum: Bangham and Hunter 1939; 50%; L; eastern Lake Erie; prevalence could not be determined; M-H; western Lake Erie

Sander vitreus: Bangham 1972; 100%; minp; South Bass Island, Ohio

Sander vitreus: Bangham and Hunter 1939; 90%; L-H; eastern Lake Erie; 94%; L-H; western Lake Erie

Sander vitreus: Dechtiar and Nepszy 1988; 1970-1975; 53%; M; lns; llnk

Sander vitreus: Wolfert et al. 1967; 1962-1964; pnp; minp; western basin; llnk

Bothriocephalus formosus Mueller and Van Cleave, 1932

Synonym: None

Site of Infection: [Intestine]

Host:

Etheostoma nigrum: Bangham 1972; 1957; 17%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Percina caprodes: Bangham 1972; 2%; minp; South Bass Island, Ohio

Bothriocephalus sp.

Site of Infection: Digestive tract

Host: *Noturus miurus*: Bangham and Hunter 1939; 1927-1929; 33%; L; western Lake Erie; llnk

Haplobothriidae Meggitt, 1924

Haplobothrium globuliforme Cooper, 1914

Synonym: None

Site of Infection: Digestive tract

Host:

Amia calva: Bangham and Hunter 1939; 1927-1929; 33%; L; western Lake Erie; llnk

Ictalurus punctatus: Dechtiar 1972a; 1961-1969; 9%; minp; lns; Ontario; llnk

Table 20, continued.

Proteocephalidae La Rue, 1911

Corallobothrium fimbriatum Essex, 1927

Synonym: None

Site of Infection: Intestine

Host:

Ameiurus melas: Bangham 1972; 1957; 38%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ameiurus melas: Bangham and Hunter 1939; 1927-1929; 16%; L; western Lake Erie; llnk

Ameiurus natalis: Bangham 1972; 31%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 45%; minp; South Bass Island, Ohio

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 77%; 22; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham 1972; 5%; minp; South Bass Island, Ohio

Ictalurus punctatus: Bangham and Hunter 1939; 29%; L; eastern Lake Erie; llnk; 52%; L-M; western Lake Erie

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 41%; L; lns; llnk

Noturus flavus: Bangham 1972; 100%; minp; South Bass Island, Ohio

Noturus flavus: Bangham and Hunter 1939; 40%; L; western Lake Erie

Noturus miurus: Bangham and Hunter 1939; 33%; L; western Lake Erie

Corallobothrium sp.

Site of Infection: Digestive tract

Host:

Ameiurus melas: Bangham and Hunter 1939; 1927-1929; 5%; L; western Lake Erie; llnk

Ameiurus nebulosus: Bangham and Hunter 1939; 100%; L; western Lake Erie

Megathylacoides giganteum (Essex, 1928) Freze, 1965

Synonym: *Corallobothrium giganteum* Essex, 1928

Site of Infection: Intestine

Host:

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 4%; 1; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham 1972; 1957; 21%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; llnk

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 30%; L; lns; llnk

Table 20, continued.

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Digestive tract

Host:

Amia calva: Bangham and Hunter 1939; 1927-1929; 67%; M; western Lake Erie; llnk

Amia calva: La Rue 1914; cdnp; pnp; minp; lns; llnk

Ambloplites rupestris: Bangham and Hunter 1939; 17%; L; western Lake Erie

Micropterus dolomieu: Bangham 1972; 1957; 16%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Micropterus dolomieu: Bangham and Hunter 1939; 38%; L; eastern Lake Erie; llnk; 24%; L; western Lake Erie

Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 10%; L; lns; llnk

Micropterus salmoides: Bangham 1972; 5%; minp; South Bass Island, Ohio

Micropterus salmoides: Bangham and Hunter 1939; 33%; eastern Lake Erie

Micropterus salmoides (young): Bangham and Hunter 1939; 23%; L; western Lake Erie

Sander glaucum: Bangham and Hunter 1939; 67%; L, western Lake Erie

Proteocephalus exiguus La Rue, 1911

Synonym: *Ichthyotaenia laruei* (Faust, 1920)

Site of Infection: Digestive tract

Host:

Coregonus artedi: Bangham and Hunter 1939; 1927-1929; 67%; L-H; eastern Lake Erie; llnk; 20%; L-M; western Lake Erie; llnk

Coregonus clupeaformis: Bangham and Hunter 1939; 25%; L-M; eastern Lake Erie; 67%; L-M; western Lake Erie

Coregonus clupeaformis (young): Bangham and Hunter 1939; 100%; L-M; western Lake Erie

Coregonus clupeaformis: Hunter and Bangham 1933; 1927-1929; pnp; minp; Erie, Pennsylvania; 42°7'45"/-80°5'6"; and Port Dover, Ontario; 42°46'59"/-80°12'0"

Proteocephalus fluviatilis Bangham, 1925

Synonym: None

Site of Infection: Digestive tract

Host:

Micropterus dolomieu: Bangham 1972; 1957; 12%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Micropterus dolomieu: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; llnk

Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 5%; L; lns; llnk

Micropterus salmoides: Bangham 1972; 3%; minp; South Bass Island, Ohio

Proteocephalus macrocephalus (Creplin, 1825) Nufer, 1905

Synonym: None

Site of Infection: [Intestine]

Host: *Anguilla rostrata*: Dechtiar 1972a; 1961-1969; 40%; minp; lns; Ontario; llnk

Table 20, continued.

Proteocephalus pearsei La Rue, 1919

Synonym: None

Site of Infection: Digestive tract

Host:

Ameiurus nebulosus: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Percopsis omiscomaycus: Bangham and Hunter 1939; 1927-1929; 13%; L; western Lake Erie; llnk

Ambloplites rupestris: Bangham and Hunter 1939; 7%; L; eastern Lake Erie

Lepomis macrochirus: Bangham and Hunter 1939; 10%; L; western Lake Erie

Micropterus dolomieu: Bangham and Hunter 1939; 7%; L; western Lake Erie

Micropterus dolomieu (young): Bangham and Hunter 1939; 41%; L-M; western Lake Erie

Micropterus salmoides: Bangham and Hunter 1939; 13%; L; western Lake Erie

Micropterus salmoides (young): Bangham and Hunter 1939; 6%; L; western Lake Erie

Etheostoma nigrum: Bangham and Hunter 1939; 14%; L; eastern Lake Erie; llnk

Perca flavescens: Bangham and Hunter 1939; 13%; L; eastern Lake Erie; 24%; L; western Lake Erie

Perca flavescens (young): Bangham and Hunter 1939; 9%; L; eastern Lake Erie; 67%; L-M; western Lake Erie

Perca flavescens: Dechtiar and Nepszy 1988; 1970-1975; 9%; L; lns; llnk

Percina caprodes: Bangham and Hunter 1939; 3%; L; western Lake Erie

Proteocephalus perplexus La Rue, 1911

Synonym: None

Site of Infection: [Intestine]

Host:

Lepisosteus osseus: Dechtiar 1972a; 1961-1969; 100%; minp; lns; Ontario; llnk

Amia calva: Bangham 1972; 1957; 75%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Proteocephalus pinguis La Rue, 1911

Synonym: None

Site of Infection: Intestine

Host:

Esox americanus: Bangham 1972; 1957; 50%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Esox americanus: Bangham and Hunter 1939; 1927-1929; 20%; L; western Lake Erie; llnk

Esox lucius: Bangham and Hunter 1939; 100%; L-M; eastern Lake Erie; llnk; 50%; L; western Lake Erie

Esox lucius: Dechtiar and Nepszy 1988; 1970-1975; 54%; M; lns; llnk

Esox lucius: Hunter 1929; 1928; pnp; minp; Buffalo, New York; 42°53'11"/-78°52'42"

Table 20, continued.

Proteocephalus singularis La Rue, 1911

Synonym: None

Site of Infection: Digestive tract

Host:

Lepisosteus osseus: Bangham 1972; cdnp; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepisosteus osseus: Bangham and Hunter 1939; 1927-1929; 67%; L; western Lake Erie; llnk

Proteocephalus stizostethi Hunter and Bangham, 1932

Synonym: None

Site of Infection: Intestine

Host:

Sander canadensis: Bangham 1972; 1957; 33%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Sander canadensis: Bangham and Hunter 1939; 1927-1929; 6%; M; western Lake Erie; llnk

Sander canadensis: Hunter and Bangham 1933; 1927-1929; 6%; minp; western Lake Erie; llnk

Sander glaucum: Bangham and Hunter 1939; 10%; L-M; eastern Lake Erie; 10%; L-M; western Lake Erie

Sander glaucum: Hunter and Bangham 1933; 44%; minp; western Lake Erie; 58%; minp; eastern Lake Erie; llnk

Sander vitreus: Bangham 1972; 6%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Sander vitreus: Connor 1943; November 1949-June 1951; pnp; minp; lns; llnk

Sander vitreus: Dechtiar and Nepszy 1988; 1970-1975; 20%; L; lns; llnk

Sander vitreus: Hunter and Bangham 1933; 27%; minp; western Lake Erie

Proteocephalus wickliffi Hunter and Bangham, 1933

Synonym: None

Site of Infection: Intestine

Host:

Coregonus artedi: Bangham and Hunter 1939; 1927-1929; 5%; L; eastern Lake Erie; llnk; 40%; L; western Lake Erie; llnk

Coregonus artedi: Hunter and Bangham 1933; 1927-1929; pnp; minp; Erie, Pennsylvania; 42°7'45"/-80°5'6"; and Port Dover, Ontario; 42°46'59"/-80°12'0"

Proteocephalus sp.

Site of Infection: Digestive tract

Host:

Notropis atherinoides: Bangham and Hunter 1939; 1927-1929; 4%; L; western Lake Erie; llnk

Notropis hudsonius: Bangham and Hunter 1939; 1%; L; western Lake Erie

Semotilus atromaculatus: Bangham and Hunter 1939; 3%; L; eastern Lake Erie; llnk

Fundulus diaphanus: Bangham and Hunter 1939; 6%; minp; western Lake Erie

Culaea inconstans: Bangham and Hunter 1939; 50%; minp; western Lake Erie

Cottus bairdii: Bangham and Hunter 1939; 14%; minp; western Lake Erie

Table 20, continued.

Triaenophoridae Loennberg, 1889

Triaenophorus nodulosus (Pallas, 1760) Rudolphi, 1819

Synonym: *Triaenophorus* sp. type *nodulosus* of Cooper, 1919 (partim)

Site of Infection: [Intestine]

Host:

Esox lucius: Dechtiar 1972a; 1961-1969; 86%; minp; Wheatley, Ontario; 42°6'0"/-82°27'0"

Esox lucius: Dechtiar and Nepszy 1988; 1970-1975; 50%; M; lns; llnk

Triaenophorus stizostedionis Miller, 1945

Synonym: None

Site of Infection: Intestine

Host:

Sander vitreus: Bangham 1972; 1957; 6%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Sander vitreus: Dechtiar and Nepszy 1988; 1970-1975; 11%; L; lns; llnk

Triaenophorus sp.

Site of Infection: Digestive tract

Host:

Sander canadensis: Bangham and Hunter 1939; 1927-1929; 18%; L; western Lake Erie; llnk

Sander glaucum: Bangham and Hunter 1939; 10%; L; western Lake Erie

Unknown Family

Unidentified cestodes

Synonym: ?

Site of Infection: Intestine

Host: *Lota lota*: Ward 1937; December 1934; pnp; minp; lns; llnk

Larval/Immature Cestoda (Cestodes)

Caryophyllaeidae Leuckhart, 1878

Glaridacris sp.

Site of Infection: Intestine

Host: *Minytrema melanops*: Bangham 1972; 1957; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Table 20, continued.

Amphicotylidae Ariola, 1899

Eubothrium crassum (Bloch, 1779) Nybelin, 1922

Synonym: *Abothrium crassum*: Bloch, 1779); *Eubothrium oncorhynchi* Wardle, 1932

Site of Infection: Intestine, mesentery

Host: *Coregonus artedii*: Bangham and Hunter 1939; 1927-1929; 27%; L; western Lake Erie; llnk

Bothriocephalidae Blanchard, 1849

Bothriocephalus cuspidatus Cooper, 1917

Synonym: *Bothriocephalus cuspidatus luciopercae* Wardle, 1932; *Bothriocephalus cuspidatus hiodontos* Wardle, 1932; *Bothriocephalus cuspidatus cuspidatus* Cooper, 1917

Site of Infection: Digestive tract, mesentery

Host:

Notropis atherinoides: Bangham and Hunter 1939; 1927-1929; 5%; L; eastern Lake Erie; llnk; 4%; L-M; western Lake Erie; llnk

Percopsis omiscomaycus: Bangham and Hunter 1939; 29%; L; eastern Lake Erie

Morone chrysops: Dechtiar and Nepszy 1988; 1970-1975; 8%; M; lns; llnk

Etheostoma exile: Bangham and Hunter 1939; 14%; L; western Lake Erie

Perca flavescens: Bangham 1972; 1957; 16%; minp; South Bass Island, Ohio

Perca flavescens (young): Bangham and Hunter 1939; 2%; M; eastern Lake Erie; 13%; L; western Lake Erie

Percina caprodes: Bangham and Hunter 1939; 8%; L; eastern Lake Erie

Sander vitreus: Cooper 1919; cdnp; pnp; minp; Port Clinton, Ohio; 41°30'43"/-82°56'15"; pnp; minp; Put-in-Bay, Ohio; 41°39'30"/-82°48'59"

Sander vitreus (young): Bangham and Hunter 1939; 33%; L; western Lake Erie

Aplodinotus grunniens: Bangham and Hunter 1939; 11%; L; western Lake Erie

Aplodinotus grunniens: Vendeland 1968; 1967; 12%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Bothriocephalus sp.

Site of Infection: Intestine

Host:

Lepisosteus osseus: Bangham and Hunter 1939; 1927-1929; 11%; L; western Lake Erie; llnk

Ameiurus natalis: Bangham 1972; 1957; 8%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 6%; L; lns; llnk

Labidesthes sicculus: Bangham and Hunter 1939; 3%; L; western Lake Erie

Morone chrysops: Bangham 1972; 40%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham 1972; 1%; minp; South Bass Island, Ohio

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham and Hunter 1939; 6%; M; eastern Lake Erie; llnk

Lepomis macrochirus: Bangham 1972; 1%; minp; South Bass Island, Ohio

Table 20, continued.

Micropterus dolomieu: Bangham 1972; 14%; minp; South Bass Island, Ohio
Micropterus salmoides: Bangham 1972; 5%; minp; South Bass Island, Ohio
Pomoxis annularis: Bangham 1972; 2%; minp; South Bass Island, Ohio
Perca flavescens: Cooper et al. 1977; June-October 1974; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Aplodinotus grunniens: Bangham 1972; 13%; minp; South Bass Island, Ohio
Aplodinotus grunniens: Dechtiar and Nepszy 1988; 9%; L; lns

Bothriocephalid plerocercoids

Synonym: ?

Site of Infection: Under peritoneum of stomach

Host: *Coregonus artedii*: Vergeer 1928; 1926 and 1927; pnp; minp; Sandusky, Ohio; 41°26'56"/-82°42'28"; and possibly other locations

Diphyllobothriidae Luhe, 1910

Diphyllobothrium laruei Vergeer, 1942

Synonym: None

Site of Infection: Outside of stomach, inside stomach wall

Host: *Coregonus* sp.: Vergeer 1942; cdnp; pnp; minp; lns; llnk

Ligula intestinalis (Linnaeus, 1758) Gmelin, 1790

Synonym: None

Site of Infection: Coelom

Host:

Catostomus commersonii: Bangham and Hunter 1939; 1927-1929; 15%; L; eastern Lake Erie; llnk; 13%; L; western Lake Erie; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 9%; L; lns; llnk

Cyprinella whipplei: Bangham and Hunter 1939; 44%; L; western Lake Erie

Cyprinus carpio: Dechtiar 1972a; 1961-1969; 4%; minp; lns; Ontario; llnk

Luxilus cornutus: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Luxilus cornutus: Bangham and Hunter 1939; 6%; L; eastern Lake Erie

Macrhybopsis storeriana: Bangham and Hunter 1939; 6%; L; western Lake Erie

Notropis hudsonius: Bangham and Hunter 1939; 18%; L; eastern Lake Erie; 45%; L; western Lake Erie

Notropis hudsonius: Mahon 1976; June; 1975; 33%; minp; south shore of Long Point; 42°32' N; 80°07' W

Notropis stramineus: Bangham and Hunter 1939; 33%; L; eastern Lake Erie

Opsopoeodus emiliae: Bangham and Hunter 1939; 20%; L; western Lake Erie

Pimephales notatus: Bangham and Hunter 1939; 10%; L; western Lake Erie

Table 20, continued.

Schistocephalus sp.

Site of Infection: Pericardial cavity

Host: *Coregonus clupeaformis*: Bangham and Hunter 1939; 1927-1929; 7%; L; western Lake Erie; lnk

Sparganum pseudosegmentatum

Synonym: ?

Site of Infection: In stomach wall, among intestinal ceca

Host: *Lota lota*: Vergeer 1942; cdnp; pnp; minp; Toledo, Ohio; 41°39'50"/-83°33'18"

Remarks: It is suggested this was a species of *Diphyllobothrium*.

Proteocephalidae La Rue, 1911

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Digestive tract

Host: *Lepomis macrochirus*: Bangham and Hunter 1939; 1927-1929; 20%; minp; western Lake Erie; lnk

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Mesentery, viscera, liver, spleen, reproductive organs

Host:

Lepisosteus osseus: Bangham 1972; 1957; 33%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepisosteus osseus: Bangham and Hunter 1939; 1927-1929; 78%; L-M; western Lake Erie; lnk

Notropis atherinoides: Bangham and Hunter 1939; 4%; L; western Lake Erie

Notropis hudsonius: Bangham and Hunter 1939; 1%; L; western Lake Erie

Ameiurus melas: Bangham and Hunter 1939; 11%; L; western Lake Erie

Ameiurus natalis: Bangham 1972; 8%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 11%; minp; South Bass Island, Ohio

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 7%; L; lns; lnk

Noturus flavus: Bangham 1972; 50%; minp; South Bass Island, Ohio

Noturus flavus: Bangham and Hunter 1939; 20%; L; western Lake Erie

Labidesthes sicculus: Bangham and Hunter 1939; 3%; L; western Lake Erie

Cottus bairdii: Bangham and Hunter 1939; 14%; L; western Lake Erie

Morone chrysops: Bangham 1972; 4%; minp; South Bass Island, Ohio

Morone chrysops: Bangham and Hunter 1939; 13%; L; western Lake Erie

Ambloplites rupestris: Bangham 1972; 13%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham and Hunter 1939; 7%; L; eastern Lake Erie; lnk

Lepomis cyanellus: Bangham 1972; 42%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham 1972; 7%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham and Hunter 1939; 22%; L; eastern Lake Erie; 26%; L; western Lake Erie

Table 20, continued.

Lepomis macrochirus: Bangham 1972; 9%; minp; South Bass Island, Ohio
Lepomis macrochirus: Bangham and Hunter 1939; 20%; L; western Lake Erie
Micropterus dolomieu: Bangham 1972; 31%; minp; South Bass Island, Ohio
Micropterus dolomieu: Bangham and Hunter 1939; 7%; M; eastern Lake Erie; 48%; M; western Lake Erie
Micropterus dolomieu: Dechtiar and Nepszy 1988; 18%; L; Ins
Micropterus salmoides: Bangham 1972; 33%; minp; South Bass Island, Ohio
Micropterus salmoides: Bangham and Hunter 1939; 33%; M; eastern Lake Erie; 42%; L-M; western Lake Erie
Micropterus salmoides (young): Bangham and Hunter 1939; 12%; M-H; western Lake Erie
Micropterus sp.: Bangham 1927; 1923?; pnp; minp; Ins; lnk
Pomoxis annularis: Bangham 1972; 4%; minp; South Bass Island, Ohio
Pomoxis nigromaculatus: Bangham 1972; 3%; minp; South Bass Island, Ohio
Etheostoma blennioides: Bangham 1972; 10%; minp; South Bass Island, Ohio
Etheostoma flabellare: Bangham 1972; 14%; minp; South Bass Island, Ohio
Etheostoma nigrum: Bangham 1972; 17%; minp; South Bass Island, Ohio
Perca flavescens: Bangham 1972; 6%; minp; South Bass Island, Ohio
Perca flavescens: Bangham and Hunter 1939; 4%; L; eastern Lake Erie; 22%; L-M; western Lake Erie
Perca flavescens (young): Bangham and Hunter 1939; 7%; L; eastern Lake Erie; 4%; L-M; western Lake Erie
Perca flavescens: Dechtiar and Nepszy 1988; 5%; L; Ins
Percina caprodes: Bangham 1972; 18%; minp; South Bass Island, Ohio
Percina copelandi: Bangham 1972; 12%; minp; South Bass Island, Ohio
Sander canadensis: Bangham 1972; 67%; minp; South Bass Island, Ohio
Sander glaucum: Bangham and Hunter 1939; 10%; L; western Lake Erie
Sander vitreus: Bangham 1972; 3%; minp; South Bass Island, Ohio
Sander vitreus (young): Bangham and Hunter 1939; 20%; L; western Lake Erie
Aplodinotus grunniens: Bangham 1972; 1%; minp; South Bass Island, Ohio
Aplodinotus grunniens: Vendeland 1968; 1967; 9%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Proteocephalus pearsei La Rue, 1919
Synonym: None
Site of Infection: Digestive tract
Host:
Morone chrysops: Bangham and Hunter 1939; 1927-1929; 39%; L-M; western Lake Erie; lnk
Morone chrysops (young): Bangham and Hunter 1939; 22%; M; western Lake Erie
Morone chrysops: Dechtiar and Nepszy 1988; 1970-1975; 8%; M; Ins; lnk
Ambloplites rupestris: Bangham 1972; 1957; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Micropterus dolomieu: Bangham 1972; 29%; minp; South Bass Island, Ohio
Micropterus salmoides: Bangham 1972; 10%; minp; South Bass Island, Ohio
Pomoxis annularis: Bangham 1972; 8%; minp; South Bass Island, Ohio

Pomoxis nigromaculatus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Table 20, continued.

Aplodinotus grunniens: Bangham 1972; 8%; minp; South Bass Island, Ohio

Aplodinotus grunniens: Bangham and Hunter 1939; 4%; L; western Lake Erie

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 6%; L; lns

Perca flavescens: Bangham 1972; 4%; minp; South Bass Island, Ohio

Proteocephalus pinguis La Rue, 1911

Synonym: None

Site of Infection: Digestive tract

Host:

Notropis atherinoides: Bangham and Hunter 1939; 1927-1929; 11%; L; eastern Lake Erie; llnk

Perca flavescens (young): Bangham and Hunter 1939; 41%; L; eastern Lake Erie

Proteocephalus stizostethi Hunter and Bangham, 1933

Synonym: None

Site of Infection: Liver, digestive tract

Host:

Percina caprodes: Bangham and Hunter 1939; 1927-1929; 6%; L; western Lake Erie; llnk

Sander vitreus: Bangham and Hunter 1939; 27%; L-M; western Lake Erie; llnk

Proteocephalus sp.

Site of Infection: Intestine

Host:

Hiodon tergisus: Bangham and Hunter 1939; 1927-1929; 8%; L; western Lake Erie; llnk

Cyprinella spiloptera: Bangham 1972; 1957; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lythrurus umbratilis: Bangham 1972; 24%; minp; South Bass Island, Ohio

Pimephales promelas: Bangham 1972; 100%; minp; South Bass Island, Ohio

Osmerus mordax: Bangham and Hunter 1939; 6%; L; western Lake Erie

Osmerus mordax: Dechtiar 1972a; 1961-1969; 2%; minp; Wheatley, Ontario; 42°6'0"/-82°27'0"

Osmerus mordax: Dechtiar and Nepszy 1988; 1970-1975; 3%; L; lns; llnk

Fundulus diaphanus: Bangham and Hunter 1939; 6%; L; western Lake Erie

Culaea inconstans: Bangham and Hunter 1939; 50%; L; western Lake Erie

Cottus bairdi: Bangham and Hunter 1939; 14%; L; western Lake Erie

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Perca flavescens: Cooper et al. 1977, June-October 1974, <1%; minp, South Bass Island, Ohio, 41°39'0"/-82°49'14"

Percina caprodes: Bangham 1972; 9%; minp; South Bass Island, Ohio

Table 20, continued.

Triaenophoridae Loennberg, 1889

Triaenophorus nodulosus (Pallas, 1760) Rudolphi, 1819

Synonym: *Triaenophorus* sp. type *nodulosus* of Cooper, 1919 (partim)

Site of Infection: Liver, mesentery

Host:

Carassius auratus: Dechtiar 1972a; 1961-1969; 13%; minp; lns; Ontario; llnk

Luxilus cornutus: Dechtiar 1972a; 40%; minp; lns; Ontario

Carpiodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 10%; L; lns; llnk

Catostomus commersonii: Bangham and Hunter 1939; 1927-1929; 8%; L; eastern Lake Erie; llnk; 13%; L; western Lake Erie; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 7%; L; lns

Moxostoma anisurum: Dechtiar 1972a; 25%; minp; lns; Ontario

Moxostoma erythrurum: Dechtiar 1972a; 24%; minp; lns; Ontario

Morone chrysops: Bangham 1972; 1957; 49%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Morone chrysops: Crites 1975; 1974; data separated by a variety of fish variables; South Bass Island, Ohio, 41°39'0"/-82°49'14"

Morone chrysops: Dechtiar 1972a; 24%; minp; lns; Ontario

Morone chrysops: Dechtiar and Nepszy 1988; 53%; L; lns

Morone chrysops: Stromberg and Crites 1974a; May-September 1973; 51%; minp; western Lake Erie; Ohio; llnk

Ambloplites rupestris: Bangham 1972; 1%; minp; South Bass Island, Ohio

Lepomis gibbosus: Crites 1975; 1%; 1; South Bass Island, Ohio

Micropterus dolomieu: Dechtiar and Nepszy 1988; 4%; L; lns

Micropterus salmoides: Bangham 1972; 3%; minp; South Bass Island, Ohio

Pomoxis nigromaculatus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Perca flavescens: Bangham 1972; 3%; minp; South Bass Island, Ohio

Perca flavescens: Cooper et al. 1977; June-October 1974; 12%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Perca flavescens: Crites 1975; 12%; 1; South Bass Island, Ohio

Perca flavescens: Crites 1982; 1978-1981; prevalence varied from 47% to 86% among 1978-1981; various mean intensities provided; Green Island; 41°38'45"/-82°50'59"; Rattlesnake Island; 41°40'45"/-82°50'59"

Perca flavescens: Dechtiar and Nepszy 1988; 5%; L; lns

Sander canadensis: Bangham 1972; 67%; minp; South Bass Island, Ohio

Sander vitreus: Bangham 1972; 6%; minp; South Bass Island, Ohio

Triaenophorus stizostedionis Miller, 1945

Synonym: *Triaenophorus* sp. of Miller, 1943

Site of Infection: [Liver]

Host: *Percopsis omiscomaycus*: Dechtiar 1972a; 1961-1969; 8%; minp; lns; Ontario; llnk

Table 20, continued.

Triaenophorus sp.

Site of Infection: Digestive tract

Host:

Perca flavescens: Bangham and Hunter 1939; 1927-1929; 4%; L; western Lake Erie; llnk

Sander canadensis: Bangham and Hunter 1939; 18%; L; western Lake Erie

Triaenophorus sp.

Site of Infection: Liver, mesentery

Host:

Percopsis omiscomaycus: Bangham and Hunter 1939; 1927-1929; 29%; L; eastern Lake Erie; llnk; 39%; L; western Lake Erie; llnk

Micropterus dolomieu: Bangham and Hunter 1939; 3%; L; western Lake Erie

Perca flavescens: Bangham and Hunter 1939; 4%; L; western Lake Erie

Sander canadensis: Bangham and Hunter 1939; 18%; L; western Lake Erie

Sander vitreus: Bangham and Hunter 1939; 2%; L; western Lake Erie

Sander vitreus (young): Bangham and Hunter 1939; 7%; L; western Lake Erie

Unknown Family

Unidentified cestode

Synonym: ?

Site of Infection: Encysted in outer wall of digestive tract

Host: *Cyprinus carpio*: Bangham and Hunter 1939; 1927-1929; pnp; minp; eastern Lake Erie; llnk

Adult Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Hysterothylacium brachyurum Ward and Magath, 1916

Synonym: *Contracaecum brachyurum* Van Cleave and Mueller 1934, *Thynnascaris brachyurum* Margolis and Arthur 1979

Site of Infection: Digestive tract

Host:

Esox lucius: Dechtiar and Nepszy 1988; 1970-1975; 21%; M; lns; llnk

Lepomis cyanellus: Bangham 1972; 1957; 42%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Micropterus dolomieu: Dechtiar and Nepszy 1988; 13%; M; lns

Micropterus salmoides: Bangham and Hunter 1939; 1927-1929; 4%; L; western Lake Erie; llnk

Table 20, continued.

Hysterothylacium sp.

Site of Infection: Digestive tract

Host: *Ambloplites rupestris*: Bangham and Hunter 1939; 1927-1929; 8%; L; western Lake Erie; llnk

Raphidascaris acus (Bloch, 1779) Railliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790; *Ascaris anguillae* Schrank, 1790; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata* (Zeder, 1800) Rudolphi, 1809; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris mucronata* Schrank, 1790 nec Froel., 1791; *Fusaria acus* (Bloch, 1779) Zeder, 1800; *Fusaria dentata* Zeder, 1800; Rudolphi, 1809; *Ascaris labiata* Rudolphi, 1809; *Agamonema leucisci rutili* Diesing, 1851; *Trichina cyprinorum* Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris gracillima* Linstow, 1890; *Ascaris lucii* Pearse, 1924; *Hysterothylacium cayugensis* Wigdor, 1918; *Raphidascaris canadense* Smedley, 1933; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928; *Raphidascaris cayugensis* (Wigdor, 1918); Yorke and Maplestone, 1926; *Raphidascaris gracillima* (Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937; *Raphidascaris laurentianus* Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Intestine

Host: *Esox lucius*: Smith 1984; cdnp; 85%; 1-87; lns; Ontario; llnk

Camallanidae Railliet and Henry, 1915

Camallanus ancyloDIRUS Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host: *Carpiodes cyprinus*: Dechtiar and Nepszy 1988; 1970-1975; 21%; L; lns; llnk

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine, rectum

Host:

Hiodon tergisus: Bangham 1972; 1957; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Hiodon tergisus: Bangham and Hunter 1939; 1927-1929; 38%; L-M; eastern Lake Erie; llnk

Alosa pseudoharengus: Stromberg and Crites 1975b; 12%; minp; yoy; western basin; llnk

Alosa pseudoharengus: Stromberg et al. 1973; cdnp; pnp; minp; Buckeye Point; 41°39'54"/-82°47'26"; South Bass Island; 41°39'0"/-82°49'14"

Dorosoma cepedianum: Stromberg and Crites 1975b; 53%; minp; yoy; western basin; llnk

Dorosoma cepedianum: Stromberg et al. 1973; pnp; minp; Buckeye Point, South Bass Island

Cyprinella spiloptera: Bangham 1972; 1%; minp; South Bass Island, Ohio

Cyprinella spiloptera: Crites 1975; 1971 and 1972; 10% (1927); 2% (1957); 17% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio, 41°26'56"/-82°42'28"

Cyprinella spiloptera: Stromberg and Crites 1975b; 17%; minp; western basin

Cyprinella spiloptera: Stromberg et al. 1973; pnp; minp; Buckeye Point, South Bass Island

Table 20, continued.

Cyprinella whipplei: Bangham and Hunter 1939; 10%; L; western Lake Erie; llnk
Notropis atherinoides: Bangham and Hunter 1939; 1%; L; western Lake Erie
Notropis atherinoides: Crites 1975; 1971 and 1972; 1% (1927); 1% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio
Notropis atherinoides: Stromberg and Crites 1975b; 1%; minp; western basin
Notropis buccatus: Bangham and Hunter 1939; 33%; L; western Lake Erie
Notropis heterodon: Bangham and Hunter 1939; 13%; L; western Lake Erie
Notropis hudsonius: Bangham and Hunter 1939; 4%; L; western Lake Erie
Notropis hudsonius: Crites 1975; 1971 and 1972; 4% (1927); 1% (1957); data separated by a variety of fish variables; Sandusky Bay, Ohio
Opsopoeodus emiliae: Bangham 1972; 2%; minp; South Bass Island, Ohio
Rhinichthys cataractae: Bangham and Hunter 1939; 5%; L; western Lake Erie; llnk
Carpionodes cyprinus: Dechtiar 1972a; 1961-1969; 15%; minp; lns; Ontario; llnk
Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 21%; M; lns; llnk
Ameiurus nebulosus: Dechtiar 1972a; 82%; minp; lns; Ontario
Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 17%; 2; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Ictalurus punctatus: Bangham 1972; 3%; minp; South Bass Island, Ohio
Ictalurus punctatus: Crites 1975; 1971 and 1972; 3% (1927); 3% (1957); 16% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio
Ictalurus punctatus: Stromberg and Crites 1975b; 1972; 16%; minp; western basin
Noturus flavus: Bangham and Hunter 1939; 40%; L; western Lake Erie
Osmerus mordax: Stromberg and Crites 1975b; 4%; minp; yoy; western basin
Osmerus mordax: Stromberg et al. 1973; pnp; minp; Buckeye Point, South Bass Island
Percopsis omiscomaycus: Bangham 1972; 3%; minp; South Bass Island, Ohio
Percopsis omiscomaycus: Bangham and Hunter 1939; 37%; L-M; western Lake Erie
Percopsis omiscomaycus: Crites 1975; 1971 and 1972; 37% (1927); 3% (1957); 8% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio
Percopsis omiscomaycus: Stromberg and Crites 1975b; 8%; minp; western basin
Lota lota: Bangham 1972; 100%; minp; South Bass Island, Ohio
Labidesthes sicculus: Bangham and Hunter 1939; 2%; L; western Lake Erie
Morone chrysops: Bangham 1972; 47%; minp; South Bass Island, Ohio
Morone chrysops (adults): Crites 1975; 1971 and 1972; 47% (1927); 47% (1957); 95% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio
Morone chrysops (yoy): Crites 1975; 22% (1927); 64% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio
Morone chrysops: Dechtiar and Nepszy 1988; 47%; M; lns
Morone chrysops: Stromberg and Crites 1975a; August 1979-November 1973; pnp; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Morone chrysops: Stromberg and Crites 1975b; 1972; 64%; minp; yoy; 95%; minp; adult; western basin, llnk

Table 20, continued.

Morone chrysops: Stromberg and Crites 1974b, 1975a; 1975b, August 1970-November 1973; 1972; pnp; minp; western basin; lnk

Morone chrysops: Stromberg et al. 1973; pnp; minp; Buckeye Point, South Bass Island

Ambloplites rupestris: Bangham 1972; 11%; minp, South Bass Island; Ohio

Ambloplites rupestris: Bangham and Hunter 1939; 17%; L; western Lake Erie

Ambloplites rupestris: Crites 1975; 1971 and 1972; 12% (1927); 11% (1957); 27% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio

Ambloplites rupestris: Stromberg and Crites 1975b; 27%; minp; western basin

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham and Hunter 1939; 4%; L; western Lake Erie

Lepomis gibbosus: Crites 1975; 1971 and 1972; 4% (1927); 7% (1957); 11% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio

Lepomis gibbosus: Stromberg and Crites 1975b; 11%; minp; western basin

Lepomis macrochirus: Bangham 1972; 31%; minp; South Bass Island, Ohio

Lepomis macrochirus: Bangham and Hunter 1939; 10%; L; western Lake Erie

Lepomis macrochirus: Crites 1975; 1971 and 1972; 10% (1927); 31% (1957); data separated by a variety of fish variables; Sandusky Bay, Ohio

Lepomis megalotis: Bangham 1972; 7%; minp; South Bass Island, Ohio

Micropterus dolomieu: Bangham 1972; 8%; minp; South Bass Island, Ohio

Micropterus dolomieu: Bangham and Hunter 1939; 7%; L; western Lake Erie

Micropterus dolomieu (young): Bangham and Hunter 1939; 16%; L; western Lake Erie

Micropterus dolomieu: Crites 1975; 1971 and 1972; 13% (1927); 8% (1957); 38% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio

Micropterus dolomieu: Dechtiar and Nepszy 1988; 10%; L; ln

Micropterus dolomieu: Stromberg and Crites 1975b; 38%; minp; western basin

Micropterus salmoides: Bangham 1972; 30%; minp; South Bass Island, Ohio

Micropterus salmoides: Bangham and Hunter 1939; 4%; L; western Lake Erie

Micropterus salmoides (young): Bangham and Hunter 1939; 2%; L; western Lake Erie

Micropterus salmoides: Crites 1975; 1971 and 1972; 4% (1927); 18% (1957); data separated by a variety of fish variables; Sandusky Bay, Ohio

Pomoxis annularis: Bangham 1972; 40%; minp; South Bass Island, Ohio

Pomoxis annularis: Bangham and Hunter 1939; 24%; L; western Lake Erie

Pomoxis annularis: Crites 1975; 1971 and 1972; 23% (1927); 40% (1957); 71% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio

Pomoxis annularis: Stromberg and Crites 1975b; 71%; minp; western basin

Pomoxis nigromaculatus: Bangham 1972; 31%; minp; South Bass Island, Ohio

Pomoxis nigromaculatus: Bangham and Hunter 1939; 11%; L; western Lake Erie

Pomoxis nigromaculatus: Crites 1975; 1971 and 1972; 11% (1927); 31% (1957); 73% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio

Pomoxis nigromaculatus: Stromberg and Crites 1975b; 73%; minp; western basin

Ammocrypta pellucida: Bangham and Hunter 1939; 20%; L; western Lake Erie

Table 20, continued.

Etheostoma blennioides: Bangham and Hunter 1939; 10%; L; western Lake Erie
Etheostoma nigrum: Bangham 1972; 3%; minp; South Bass Island, Ohio
Etheostoma/Percina: Crites 1975; 1971 and 1972; 16% (1927); 10% (1957); data separated by a variety of fish variables; Sandusky Bay, Ohio
Perca flavescens: Bangham 1972; 5%; minp; South Bass Island, Ohio
Perca flavescens: Bangham and Hunter 1939; 2%; L; western Lake Erie
Perca flavescens: Cooper et al. 1977; June-October 1974; 6%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Perca flavescens: Crites 1975; 1971 and 1972; 2% (1927); 5% (1957); 48% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio
Perca flavescens (yoy): Crites 1975; 1971 and 1972; 2% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio
Perca flavescens: Dechtiar and Nepszy 1988; 7%; L; Ins
Perca flavescens: Smedley 1934; 1933; pnp; minp; Port Stanley 42°40'0"/-81°13'0"
Perca flavescens: Stromberg and Crites 1975b; 2%; minp; yoy; 48%; minp; adult; western basin
Percina caprodes: Bangham 1972; 14%; minp; South Bass Island, Ohio
Percina caprodes: Bangham and Hunter 1939; 28%; L-M; western Lake Erie
Percina copelandi: Bangham 1972; 9%; minp; South Bass Island, Ohio
Percina copelandi: Bangham and Hunter 1939; 3%; L; western Lake Erie
Percina maculata: Bangham and Hunter 1939; 50%; L; western Lake Erie
Sander canadensis: Bangham and Hunter 1939; 36%; L; western Lake Erie
Sander vitreus: Bangham 1972; 21%; minp; South Bass Island, Ohio
Sander vitreus: Bangham and Hunter 1939; 10%; L-M; western Lake Erie
Sander vitreus (young): Bangham and Hunter 1939; 40%; L; western Lake Erie
Sander vitreus: Crites 1975; 1971 and 1972; 10% (1927); 21% (1957); 69% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio
Sander vitreus: Dechtiar and Nepszy 1988; 16%; L; Ins
Sander vitreus: Stromberg and Crites 1975b; 69%; minp; western basin
Aplodinotus grunniens: Bangham 1972; 15%; minp; South Bass Island, Ohio
Aplodinotus grunniens: Bangham and Hunter 1939; 45%; L; western Lake Erie
Aplodinotus grunniens (adult): Crites 1975; 40% (1927); 14% (1957); 51% (1972); data separated by a variety of fish variables; Sandusky Bay, Ohio
Aplodinotus grunniens (yoy): Crites 1975; 1972; 50%; data separated by a variety of fish variables; Sandusky Bay, Ohio
Aplodinotus grunniens: Dechtiar and Nepszy 1988; 14%; L; Ins
Aplodinotus grunniens: Stromberg and Crites 1975b; 50%; minp; yoy; 51%; minp; adult; western basin
Unknown fish species: Kelly et al. 1989; cdnp; pnp; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Table 20, continued.

Capillariidae Neuve-Lemaire, 1936

Capillaria catenata Van Cleave and Mueller, 1932

Synonym: *Echinocoleus catenata* (Van Cleave and Mueller, 1932) Lopez-Neyra, 1947; *Thominx catenata* (Van Cleave and Mueller, 1932) Skrjabin and Schikhobalova, 1954

Site of Infection: [Intestine]

Host: *Ambloplites rupestris*: Bangham 1972; 1957; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Capillaria sp.

Site of Infection: [Intestine]

Host:

Alosa pseudoharengus: Bangham 1972; 1957; 21%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Aplodinotus grunniens: Bangham 1972; 2%; minp; South Bass Island, Ohio

Skrjabinocapillaria bakeri (Mueller and Van Cleave, 1932) Skrjabin and Schikhobalova, 1954

Synonym: *Capillaria bakeri* (Mueller and Van Cleave, 1932); *Hepaticola bakeri* Mueller and Van Cleave, 1932; ?*Capillaria catostomi* Pearse, 1924

Site of Infection: Digestive tract

Host:

Cyprinella spiloptera: Bangham 1972; 1957; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Notropis heterodon: Bangham 1972; 50%; minp; South Bass Island, Ohio

Opsopoeodus emiliae: Bangham 1972; 11%; minp; South Bass Island, Ohio

Cucullanidae Cobbold, 1864

Dichelyne cotylophora Ward and Magath 1916

Synonym: *Dacnitoides cotylophora* Ward and Magath, 1916; *Cucullanellus cotylophora* (Ward and Magath, 1916) Petter, 1974

Site of Infection: Intestine

Host:

Ameiurus melas: Bangham and Hunter 1939; 1927-1929; 5%; L; western Lake Erie; llnk

Morone chrysops: Bangham and Hunter 1939; 4%; L; western Lake Erie

Ambloplites rupestris: Bangham 1972; 1957; 1%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepomis macrochirus: Bangham and Hunter 1939; 10%; L; western Lake Erie

Micropterus dolomieu: Bangham and Hunter 1939; 11%; L; eastern Lake Erie; llnk

Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 28%; L; lns; llnk

Micropterus salmoides: Bangham and Hunter 1939; 4%; L; western Lake Erie

Perca flavescens: Baker 1984a; May-October 1982; pnp; minp; Port Dover, Ontario; 42°46'59"/-80°12'0"

Perca flavescens: Baker 1984b; 1982; pnp; minp; Port Dover, Ontario; 42°46'59"/-80°12'0"

Perca flavescens: Bangham 1972; 31%; minp; South Bass Island, Ohio

Perca flavescens: Bangham and Hunter 1939; 54%; L-M; eastern Lake Erie; 49%; L-M; western Lake Erie

Table 20, continued.

Perca flavescens (young): Bangham and Hunter 1939; 7%; L; western Lake Erie
Perca flavescens: Cooper et al. 1977; June-October, 1974; 10%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Perca flavescens: Dechtiar and Nepszy 1988; 6%; L; lns; llnk
Perca flavescens: Smedley 1934; 1933; pnp; minp; Port Stanley; 42°40'0"/-81°13'0"
Sander vitreus: Bangham and Hunter 1939; 4%; L; western Lake Erie
Aplodinotus grunniens: Bangham 1972; 1%; minp; South Bass Island, Ohio
Aplodinotus grunniens: Bangham and Hunter 1939; 33%; L; eastern Lake Erie; 4%; L; western Lake Erie
Aplodinotus grunniens: Vendeland 1968; 1967; 27%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Dichelyne robusta (Van Cleave and Mueller, 1932) Petter, 1974

Synonym: None

Site of Infection: Intestine

Host:

Ameiurus melas: Bangham 1972; 1957; 38%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ameiurus natalis: Bangham 1972; 38%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 21%; minp; South Bass Island, Ohio

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 2%; 1; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham 1972; 10%; minp; South Bass Island, Ohio

Truttaedacnitis clitellarius (Ward and Magath, 1916) Petter, 1974

Synonym: *Cucullanus clitellarius* Ward and Magath, 1916

Site of Infection: Digestive tract

Host: *Acipenser fulvescens*: Bangham and Hunter 1939; 1927-1929; 100%; L; western Lake Erie; llnk

Cystidicolidae (as in Anderson et al. 1975)

Cystidicola lepisostei Hunter and Bangham, 1933

Synonym: ?

Site of Infection: Stomach, intestine

Host:

Lepisosteus osseus: Bangham and Hunter 1939; 1927-1929; 22%; L; western Lake Erie; llnk

Lepisosteus osseus: Hunter and Bangham 1933; 1927-1929; pnp; minp; west shore between mouths of Raisin and Detroit rivers; llnk

Remarks: This species is a species inquirenda; the above record by Hunter and Bangham (1933) may be due to ingestion of infected salmonid fish by *Lepisosteus osseus*.

Cystidicola stigmatura (Leidy, 1886) Ward and Magath, 1916

Synonym: *Filaria stigmatura* Leidy, 1886; *Ancyracanthus cystidicola* of Wright 1879 *not* (Lamarck, 1801);

Cystidicola sp. of White 1940; *Cystidicola farionis* of Ward and Magath 1916 *not* (Fischer, 1798);

Cystidicola cristivomeri White, 1941

Table 20, continued.

Site of Infection: Swim bladder

Host:

Coregonus artedi: Bangham and Hunter 1939; 1927-1929; 7%; L; western Lake Erie; llnk

Coregonus artedi: Hunter and Bangham 1933; 1927-1929; pnp; minp; lns; llnk

Coregonus artedi: Ward and Magath 1916; cdnp; pnp; minp; lns; llnk

Coregonus clupeaformis: Bangham and Hunter 1939; 20%; L; western Lake Erie

Coregonus clupeaformis: Hunter and Bangham 1933; 1927-1929; pnp; minp; lns; llnk

Coregonus clupeaformis: Ward and Magath 1916; pnp; minp; lns

Salvelinus namaycush: Ward and Magath 1916; pnp; minp; lns

Remarks: Black (1983) reported that *Cystidicola stigmatura* is apparently absent in the Great Lakes since 1925; the above record of *Cystidicola stigmatura* in *Salvelinus namaycush* is probably valid; the above records of *Cystidicola stigmatura* in *Coregonus* spp. may be erroneous since *Salvelinus* spp. are the only hosts for this nematode species in North America (Black 1983).

Cystidicoloides ephemeridarum (Linstow, 1872) Moravec, 1981

Synonym: *Filaria ephemeridarum* Leidy, 1872; *Cystidicoloides tenuissima* (Zeder, 1800) Rasheed, 1965; *Sterliadochona tenuissima* (Zeder, 1800); *Metabronema salvelini* (Fujita, 1920) *Metabronema canadense* Skinner, 1931; *Cystidicoloides harwoodi* (Chandler, 1931)

Site of Infection: Digestive tract

Host: *Salvelinus fontinalis*: Bangham and Hunter 1939; 1927-1929; 63%; L; eastern Lake Erie; llnk

Spinitectus carolini Holl, 1928

Synonym: None

Site of Infection: Gastrointestinal tract

Host:

Ameiurus nebulosus: Jilek and Crites 1981; June-October 1978, May-September 1979; 7%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Jilek and Crites 1981; 8%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Morone chrysops: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ambloplites rupestris: Bangham 1972; 100%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham and Hunter 1939; 1927-1929; 18%; L; eastern Lake Erie; llnk; 33%; L; western Lake Erie; llnk

Ambloplites rupestris: Jilek and Crites 1981; 81%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepomis cyanellus: Bangham 1972; 25%; minp; South Bass Island, Ohio

Lepomis humilis: Bangham 1972; 50%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham 1972; 66%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham and Hunter 1939; 22%; L; eastern Lake Erie; 4%; L; western Lake Erie

Lepomis gibbosus: Jilek and Crites 1981; 32%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepomis macrochirus: Bangham 1972; 93%; minp; South Bass Island, Ohio

Lepomis macrochirus: Jilek and Crites 1981; 41%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepomis megalotis: Bangham 1972; 100%; minp; South Bass Island, Ohio

Table 20, continued.

Micropterus dolomieu: Bangham 1972; 55%; minp; South Bass Island, Ohio
Micropterus dolomieu: Bangham and Hunter 1939; 32%; L; eastern Lake Erie; 10%; L; western Lake Erie
Micropterus dolomieu (young): Bangham and Hunter 1939; 15%; L; eastern Lake Erie; 2%; L; western Lake Erie
Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 8%; L; lns; llnk
Micropterus dolomieu: Jilek and Crites 1981; 22%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Micropterus salmoides: Bangham 1972; 18%; minp; South Bass Island, Ohio
Micropterus salmoides: Bangham and Hunter 1939; 33%; L; eastern Lake Erie
Micropterus salmoides: Jilek and Crites 1981; 8%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Perca flavescens: Jilek and Crites 1981; 9%; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Spinitectus gracilis Ward and Magath, 1916

Synonym: None

Site of Infection: Gastrointestinal tract

Host:

Ameiurus melas: Bangham 1972; 1957; 25%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Ameiurus nebulosus: Bangham 1972; 11%; minp; South Bass Island, Ohio
Ameiurus nebulosus: Jilek and Crites 1981; June-October 1978, May-September 1979; 10%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 1%; 1; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Ictalurus punctatus: Bangham 1972; 36%; minp; South Bass Island, Ohio
Ictalurus punctatus: Bangham and Hunter 1939; 1927-1929; 14%; L; western Lake Erie; llnk
Ictalurus punctatus: Jilek and Crites 1981; 16%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Noturus flavus: Bangham and Hunter 1939; 20%; L; western Lake Erie
Esox americanus: Bangham and Hunter 1939; 20%; L; western Lake Erie
Percopsis omiscomaycus: Bangham 1972; 2%; minp; South Bass Island, Ohio
Morone chrysops: Bangham 1972; 13%; minp; South Bass Island, Ohio
Morone chrysops: Jilek and Crites 1981; 6%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Ambloplites rupestris: Bangham and Hunter 1939; 13%; L; eastern Lake Erie; llnk
Ambloplites rupestris: Jilek and Crites 1981; 31%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Lepomis gibbosus: Jilek and Crites 1981; 33%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Lepomis macrochirus: Jilek and Crites 1981; 25%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Micropterus dolomieu: Jilek and Crites 1981; 39%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Micropterus salmoides: Jilek and Crites 1981; 11%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Pomoxis annularis: Bangham 1972; 19%; minp; South Bass Island, Ohio
Pomoxis nigromaculatus: Bangham 1972; 38%; minp; South Bass Island, Ohio
Percina caprodes: Bangham 1972; 7%; minp; South Bass Island, Ohio
Sander vitreus (young): Bangham and Hunter 1939; 7%; L; western Lake Erie
Sander vitreus: Dechtiar and Nepszy 1988; 1970-1975; 20%; L; lns; llnk
Aplodinotus grunniens: Bangham and Hunter 1939; 2%; L; western Lake Erie

Table 20, continued.

Spinitectus sp.

Site of Infection: [Intestine]

Host:

Perca flavescens: Bangham 1972; 1957; 5%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Aplodinotus grunniens: Bangham 1972; 1%; minp; South Bass Island, Ohio

Philometridae Baylis and Daubney, 1926

Philometra cylindracea (Ward and Magath, 1916) Van Cleave and Mueller, 1934

Synonym: *Ichthyonema cylindraceum* Ward and Magath 1916

Site of Infection: Body cavity

Host:

Perca flavescens: Ashmead and Crites 1975; cdnp; pnp; minp; between Rattlesnake Island 41°40'45"/-82°50'59" and South Bass Islands; 41°39'0"/-82°49'14"

Perca flavescens: Bangham and Hunter 1939; 1927-1929; 2%; L; western Lake Erie; llnk

Perca flavescens: Cooper et al. 1977; June-October 1974; 8%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Perca flavescens: Crites 1982; 1978-1981; prevalence varied from 35%-60% among 1978-1981; various mean intensities provided; Green Island; 41°38'45"/-82°51'59"; Rattlesnake Island; 41°40'45"/-82°50'59"; western basin; llnk

Perca flavescens: Dechtiar and Nepszy 1988; 1970-1975; 10%; L; lns; llnk

Sander glaucum: Bangham and Hunter 1939; 1927-1929; 10%; L; western Lake Erie; llnk

Aplodinotus grunniens: Bangham and Hunter 1939; 13%; L; western Lake Erie

Aplodinotus grunniens: Crites 1975; pnp; minp; between Green 41°38'45"/-82°51'59" and Rattlesnake Islands, 41°40'45"/-82°50'59"; Sandusky Bay, Ohio; 41°28'44"/-82°50'28"

Unknown fish species: Kelly et al. 1989; cdnp; pnp; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Remarks: The specimen found by Bangham and Hunter (1939) occurred in the digestive tract of *Aplodinotus grunniens*.

Philometra sp.

Site of Infection: Eye

Host:

Aplodinotus grunniens: Crites 1975; June-October 1972, March-October 1973, April-October 1974; data separated by a variety of fish variables; between Green Island; llnk; and Rattlesnake Island; 41°40'45"/-82°50'59"; Sandusky Bay, Ohio

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 1970-1975; 6%; L; lns; llnk

Table 20, continued.

Philometra sp.

Site of Infection: [Body cavity, ?eye]

Host:

Aplodinotus grunniens: Dechtiar 1972a; 1961-1969; 10%; minp; lns; Ontario; llnk

Unkown fish species: Kelly et al. 1989; cdnp; pnp; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Philometroides nodulosa (Thomas, 1929) Dailey, 1967

Synonym: *Philometra nodulosus* (Thomas, 1929)

Site of Infection: Cheek galleries, fins

Host:

Carpionodes cyprinus: Dechtiar 1972a 1961-1969; 7%; minp; lns; Ontario; llnk

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 7%; L; lns; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 7%; L; lns

Quimperidae Baylis, 1930

Synonym: Haplonematidae Sudarikov and Ryzhikov, 1952

Haplonema hamulatum Moulton, 1931

Synonym: None

Site of Infection: Digestive tract

Host: *Lota lota*: Bangham and Hunter 1939; 1927-1929; 67%; L-M; eastern Lake Erie; llnk

Haplonema immutatum Ward and Magath, 1916

Synonym: None

Site of Infection: Digestive tract

Host:

Amia calva: Bangham 1972; 1957; 75%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Amia calva: Bangham and Hunter 1939; 1927-1929; 33%; L; western Lake Erie; llnk

Rhabdochonidae Skrjabin, 1946

Rhabdochona cascadilla Wigdor, 1918

Synonym: *Rhabdochona* sp. of Bangham, 1941 (partim) and of Bangham and Venard, 1946 (partim)

Site of Infection: Digestive tract

Host:

Acipenser fulvescens: Dechtiar 1972a 1961-1969; 70%; minp; Port Dover, Ontario; 42°46'59"/-80°12'0"

Hiodon tergisus: Bangham 1972; 1957; 13%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Hiodon tergisus: Bangham and Hunter 1939; 1927-1929; 25%; L; eastern Lake Erie; llnk; 50%; L; western Lake Erie; llnk

Cyprinella whipplei: Bangham and Hunter 1939; 22%; L; western Lake Erie

Cyprinella whipplei: Gustafson 1949; cdnp; pnp; minp; lns; llnk

Table 20, continued.

Luxilus cornutus: Bangham 1972; 22%; minp; South Bass Island, Ohio
Macrhybopsis storeriana: Bangham 1972; 11%; minp; South Bass Island, Ohio
Notropis atherinoides: Bangham 1972; 5%; minp; South Bass Island, Ohio
Notropis hudsonius: Bangham 1972; 3%; minp; South Bass Island, Ohio
Notropis hudsonius: Bangham and Hunter 1939; 2%; L; western Lake Erie
Notropis volucellus: Bangham and Hunter 1939; 7%; L; western Lake Erie
Rhinichthys obtusus: Bangham 1972; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Carpiodes cyprinus: Bangham and Hunter 1939; 38%; L; eastern Lake Erie; llnk
Moxostoma macrolepidotum: Bangham and Hunter 1939; 50%; L; western Lake Erie

Rhabdochona milleri Choquette, 1951

Synonym: None

Site of Infection: [Intestine]

Host:

Carpiodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Moxostoma erythrurum: Dechtiar 1972a; 1961-1969; 6%, minp, lns, Ontario, llnk

Moxostoma erythrurum: A. Dechtiar (unpublished data), pnp; minp; lns; Ontario; llnk; Moravec and Arai 1971

Moxostoma macrolepidotum: A. Dechtiar (unpublished data), pnp; minp; lns; Ontario; llnk; Moravec and Arai 1971; Dechtiar 1972; 12%; minp; lns; Ontario

Rhabdochona ovifilamenta Weller, 1938

Synonym: *Rhabdochona laurentiana* Lyster, 1940; *Rhabdochona fortunatowi* of Kussat, 1969;

Rhabdochona sp. of Arai and Kussat, 1967

Site of Infection: Intestine

Host: *Catostomus commersonii*: Dechtiar and Nepszy 1988; 1970-1975; 3%; L; lns; llnk

Rhabdochona sp.

Site of Infection: Digestive tract

Host:

Fundulus diaphanus: Bangham and Hunter 1939; 1927-1929; 7%; L; eastern Lake Erie; llnk

Morone chrysops: Bangham and Hunter 1939; 4%; L; western Lake Erie

Ambloplites rupestris: Bangham and Hunter 1939; 8%; L; western Lake Erie

Lepomis macrochirus: Bangham and Hunter 1939; 10%; L; western Lake Erie

Pomoxis annularis: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Percina caprodes: Bangham 1972; 5%; minp; South Bass Island, Ohio

Apollonia melanostoma: Kvach and Stepien 2008b; October-November 2006; 2%; 1; 0.01; Maumee Bay, Ohio; 41°43'17"/-83°24'16"

Table 20, continued.

Unknown Family

Unidentified nematode

Synonym: ?

Site of Infection: Digestive tract

Host:

Dorosoma cepedianum: Bangham 1972; 1957; 7%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Moxostoma aureolum: Bangham and Hunter 1939; 1927-1929; 50%; L; eastern Lake Erie; llnk

Sander vitreus: Wolfert et al. 1967; 1962-1964; pnp; minp; western Lake Erie; llnk

Larval/Immature Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Heterocheilidae Railliet and Henry, 1905 (partim)

Hysterothylacium brachyurum Ward and Magath, 1916

Synonym: *Contracecum brachyurum* Van Cleave and Mueller 1934, *Thynnascaris brachyurum* Margolis and Arthur 1979

Site of Infection: Liver

Host: *Perca flavescens*: Dechtiar and Nepszy 1988; 1970-1975; 4%; M; lns; llnk

Raphidascaris acus (Bloch, 1779) Railliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790; *Ascaris anguillae* Schrank, 1790; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris mucronata* Schrank, 1790 nec Froel, 1791; *Fusaria acus* (Bloch, 1779) Zeder, 1800; *Fusaria dentata* (Zeder, 1800) Rudolphi, 1809; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata* (Zeder, 1800) Rudolphi, 1809; *Ascaris labiata* Rudolphi, 1809; *Agamonema leucisci rutili* Diesing, 1851; *Trichina cyprinorum* Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris gracillima* Linstow, 1890; *Ascaris lucii* Pearse, 1924; *Hysterothylacium cayugensis* Wigdor, 1918; *Raphidascaris canadense* Smedley, 1933; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928; *Raphidascaris cayugensis* (Wigdor, 1918) Yorke and Maplestone, 1926; *Raphidascaris gracillima* (Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937; *Raphidascaris laurentianus* Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Liver

Host:

Morone chrysops: Dechtiar and Nepszy 1988; 1970-1975; 11%; M; lns; llnk

Perca flavescens: Dechtiar and Nepszy 1988; 8%; M; lns

Anisakidae gen. sp.

Synonym: ?

Site of Infection: Mesentery

Host: *Apollonia melanostoma*: Kvach and Stepien 2008b; October-November 2006; 2%; 1; 0.01; Maumee Bay, Ohio; 41°43'17"/-83°24'16"

Table 20, continued.

Camallanidae Railliet and Henry, 1913

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host:

Cyprinus carpio: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Luxilus cornutus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Lythrurus umbratilis: Bangham 1972; 2%; minp; South Bass Island, Ohio

Notropis hudsonius: Bangham 1972; 1%; minp; South Bass Island, Ohio

Cottus bairdii: Bangham 1972; 33%; minp; South Bass Island, Ohio

Etheostoma flabellare: Bangham 1972; 14%; minp; South Bass Island, Ohio

Aplodinotus grunniens: Vendeland 1968; 1967; 36%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Coelom, mesentery of posterior intestine near urinary bladder

Host:

Dorosoma cepedianum: Stromberg and Crites 1974b; cdnp; 71%; minp; western basin; llnk

Dorosoma cepedianum: Stromberg and Crites 1975a; August 1970-November 1973; 71%; minp; western basin; llnk

Dorosoma cepedianum: Stromberg and Crites 1975b; 1972; 71%; minp; western basin; llnk

Ictalurus punctatus: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; llnk

Aplodinotus grunniens: Bangham and Hunter 1939; 2%; L; western Lake Erie

Aplodinotus grunniens: Crites 1976; July 1975; 4%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Unknown fish species: Kelly et al. 1989; cdnp; pnp; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Capillariidae Neuve-Lemaire, 1936

Capillaria catenata Van Cleave and Mueller, 1932

Synonym: *Echinocoleus catenata* (Van Cleave and Mueller, 1932) Lopez-Neyra, 1947; *Thomnix catenata* (Van Cleave and Mueller, 1932) Skrjabin and Schikhobalova, 1954

Site of Infection: Posterior intestine

Host: *Aplodinotus grunniens*: Vendeland 1968; 1967; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Table 20, continued.

Dioctophymatidae Railliet, 1915/Dioctophymidae Railliet, 1915

Dioctophyma sp.

Site of Infection: Body cavity

Host:

Micropterus salmoides: Bangham and Hunter 1939; 1927-1929; 4%; L; western Lake Erie; llnk

Micropterus salmoides (young): Bangham and Hunter 1939; 1%; L; western Lake Erie

Remarks: This may be the only report of *Dioctophyma* in a fish from the Great Lakes.

Dioctophymidae Railliet, 1915

Eustrongylides tubifex (Nitzsch, 1819) Jagerskiold, 1909

Synonym: None

Site of Infection: Larvae encapsulated in mesentery; surface of ovaries, testes, liver, spleen and gastrointestinal tract; free in body cavity, viscera, and muscle

Host:

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 6%; L; lns; llnk

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 15%; 3; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Crites 1975; 1973 and 1974; data separated by a variety of fish variables; western basin, Ohio; llnk

Ictalurus punctatus: Dechtiar and Nepszy 1988; 8%; L; lns

Ictalurus punctatus: Cooper et al. 1978b; 1973 and 1974; 15%; minp presented by size class; western basin; llnk

Morone chrysops: Dechtiar and Nepszy 1988; 4%; L; lns

Micropterus dolomieu: Cooper et al. 1978b; pnp and minp presented by size class; western basin

Micropterus dolomieu: Crites 1975; 1974; data separated by a variety of fish variables; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Micropterus dolomieu: Dechtiar and Nepszy 1988; 5%; L; lns

Perca flavescens: Cooper et al. 1977; June-October; 1974; 41%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Perca flavescens: Cooper et al. 1978b; pnp and minp presented by size class; western basin

Perca flavescens: Crites 1975; 1972; data separated by a variety of fish variables; between Green Island, 41°38'45"/-82°51'59", and Rattlesnake Island, 41°40'45"/-82°50'59"; Sandusky Bay, Ohio; 41°26'36"/-82°42'28"

Perca flavescens: Crites 1982; 1978-1981; prevalence varied from 34%-46% among 1978-1981; various mean intensities provided; Green, 41°38'45"/-82°50'59", and Rattlesnake, 41°40'45"/-82°50'59", Islands; western basin; llnk

Perca flavescens: Dechtiar and Nepszy 1988; 50%; L; lns

Perca flavescens: Measures 1988a; 1984; 42%; 2; western basin; llnk; Wheatley, Ontario; 42°6'0"/-82°27'0"

Perca flavescens: Sprinkle Fastzkie and Crites 1977; 1971 and 1972; pnp; minp; western basin; llnk

Table 20, continued.

Aplodinotus grunniens: Cooper et al. 1978b; pnp and minp presented by size class; western basin
Aplodinotus grunniens: Crites 1975; 1973; data separated by a variety of fish variables; western basin, Ohio; llnk

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 6%; L; lns
Unknown fish species: Measures 1988b; 1984; pnp; minp; lns; llnk

Eustrongylides sp.

Site of Infection: Body cavity, intestine, intestinal wall, musculature, viscera

Host:

Ictalurus punctatus: Bangham 1972; 1957; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Perca flavescens: Bangham 1972; 9%; minp; South Bass Island, Ohio

Perca flavescens: Cooper et al. 1978a; 1972-1975; pnp; minp; western Lake Erie, Ohio; llnk

Perca flavescens: Dechtiar 1972a; 1961-1969; 2%; minp; lns; Ontario; llnk

Percina caprodes: Bangham 1972; 2%; minp; South Bass Island, Ohio

Sander canadensis: Dechtiar 1972a; 100%; minp; lns; Ontario

Aplodinotus grunniens: Bangham 1972; 2%; minp; South Bass Island, Ohio

Aplodinotus grunniens: Vendeland 1968; 1967; 55%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Gnathostomatidae Lane, 1923

Spiroxys contortus (Rudolphi, 1819)

Synonym: None

Site of Infection: Mesentery

Host: *Aplodinotus grunniens*: Vendeland 1968; 1967; 18%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Spiroxys sp.

Site of Infection: Mesentery, viscera

Host:

Umbra limi: Bangham and Hunter 1939; 1927-1929; 67%; L; western Lake Erie; llnk

Morone chrysops: Dechtiar and Nepszy 1988; 1970-1975; 4%; M; lns; llnk

Micropterus dolomieu: Dechtiar and Nepszy 1988; 13%; L, lns

Table 20, continued.

Philometridae Baylis and Daubney, 1926

Philometra cylindracea (Ward and Magath, 1916) Van Cleave and Mueller, 1934

Synonym: *Ichthyonema cylindraceum* Ward and Magath 1916

Site of Infection: [Body cavity, peritoneum]

Host:

Ambloplites rupestris: Bangham 1972; 1957; 1%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepomis macrochirus: Bangham 1972; 1%; minp; South Bass Island, Ohio

Percina caprodes: Bangham 1972; 2%; minp; South Bass Island, Ohio

Aplodinotus grunniens: Bangham 1972; 27%; minp; South Bass Island, Ohio

Aplodinotus grunniens: Vendeland 1968; 1967; 9%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Philonema sp.

Site of Infection: Digestive tract

Host: *Minytrema melanops*: Bangham 1972; 1957; 50%; minp; South Bass Island, Ohio

Remarks: This is the only report of *Philonema* in a fish from a Great Lake.

Rhabdochonidae Skrjabin 1946

Rhabdochona sp.

Site of Infection: Digestive tract

Host:

Cyprinella spiloptera: Bangham 1972; 1957; 12%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Notropis volucellus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Unknown Family

Agamonema sp.

Synonym: ?

Site of Infection: Digestive tract

Host:

Dorosoma cepedianum (young): Bangham and Hunter 1939; 1927-1929; 100%; L; western Lake Erie; Inlk

Carassius auratus: Bangham and Hunter 1939; 27%; L; western Lake Erie

Cyprinella whipplei: Bangham and Hunter 1939; 11%; L; eastern Lake Erie; Inlk

Cyprinus carpio: Bangham and Hunter 1939; 33%; L; western Lake Erie

Macrhybopsis storeriana: Bangham and Hunter 1939; 6%; L; western Lake Erie

Nocomis micropogon: Bangham and Hunter 1939; 6%; L; eastern Lake Erie; Inlk

Notemigonus crysoleucas: Bangham and Hunter 1939; 14%; L; western Lake Erie

Notropis heterodon: Bangham and Hunter 1939; 13%; L; western Lake Erie

Notropis hudsonius: Bangham and Hunter 1939; 1%; L; western Lake Erie

Semotilus atromaculatus: Bangham and Hunter 1939; 3%; L; eastern Lake Erie; 2%; L; western Lake Erie

Table 20, continued.

Catostomus commersonii: Bangham and Hunter 1939; 13%; L; western Lake Erie
Ameiurus nebulosus: Bangham and Hunter 1939; 100%; L; western Lake Erie
Ictalurus punctatus: Bangham and Hunter 1939; 14%; L; western Lake Erie
Percopsis omiscomaycus: Bangham and Hunter 1939; 2%; L; western Lake Erie
Labidesthes sicculus: Bangham and Hunter 1939; 13%; L; western Lake Erie
Culaea inconstans: Bangham and Hunter 1939; 10%; L; eastern Lake Erie
Morone chrysops: Bangham and Hunter 1939; 4%; L; western Lake Erie
Ambloplites rupestris: Bangham and Hunter 1939; 8%; L; western Lake Erie
Lepomis gibbosus: Bangham and Hunter 1939; 17%; L; eastern Lake Erie; 4%; L; western Lake Erie
Micropterus dolomieu: Bangham and Hunter 1939; 21%; L-M; eastern Lake Erie
Micropterus dolomieu (young): Bangham and Hunter 1939; 6%; L; eastern Lake Erie
Pomoxis annularis: Bangham and Hunter 1939; 12%; L; western Lake Erie
Ammocrypta pellucida: Bangham and Hunter 1939; 40%; L; western Lake Erie
Etheostoma exile: Bangham and Hunter 1939; 40%; L; western Lake Erie
Etheostoma nigrum: Bangham and Hunter 1939; 38%; L-M; western Lake Erie
Perca flavescens (young): Bangham and Hunter 1939; 13%; L; western Lake Erie
Percina caprodes: Bangham and Hunter 1939; 8%; L; western Lake Erie
Sander vitreus: Bangham and Hunter 1939; 2%; L; western Lake Erie
Aplodinotus grunniens: Bangham and Hunter 1939; 4%; L; western Lake Erie
Remarks: Yorke and Maplestone (1926) define *Agamonema* as a collective group for immature nematodes in fishes.

Agamonema sp.

Synonym: ?

Site of Infection: Liver, mesentery, spleen

Host:

Fundulus diaphanus: Bangham and Hunter 1939; 1927-1929; 12%; L; western Lake Erie; llnk

Morone chrysops: Bangham and Hunter 1939; 4%; L; western Lake Erie

Morone chrysops (young): Bangham and Hunter 1939; 11% L; western Lake Erie

Micropterus dolomieu (young): Bangham and Hunter 1939; 6%; L; western Lake Erie

Micropterus dolomieu: Bangham and Hunter 1939; 40%; L; western Lake Erie

Micropterus salmoides (young): Bangham and Hunter 1939; 1%; L; western Lake Erie

Micropterus salmoides: Bangham and Hunter 1939; 4%; L; western Lake Erie

Etheostoma exile: Bangham and Hunter 1939; 71%; L; western Lake Erie

Percina caprodes: Bangham and Hunter 1939; 15%; L; western Lake Erie

Aplodinotus grunniens: Bangham and Hunter 1939; 7%; L; western Lake Erie

Remarks: Yorke and Maplestone (1926) defined *Agamonema* as a collective group for immature nematodes in fishes.

Table 20, continued.

Superfamily Spiruroidea

Synonym: ?

Site of Infection: Liver, large intestine

Host: *Aplodinotus grunniens*: Vendeland 1968; 1967; 12%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14")

Superfamily Spiruroidea

Synonym: ?

Site of Infection: Swim bladder wall

Host: *Aplodinotus grunniens*: Vendeland 1968; 1967; 3%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14")

Unknown Family

Unidentified nematode

Synonym: ?

Site of Infection: Digestive tract

Host:

Notropis hudsonius: Bangham 1972; 1957; 1%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Catostomus commersonii: Bangham 1972; 7%; minp; South Bass Island, Ohio

Lepomis megalotis: Bangham 1972; 2%; minp; South Bass Island, Ohio

Unidentified nematode

Synonym: ?

Site of Infection: Encysted in gills

Host:

Dorosoma cepedianum: Bangham 1972; 1957; 4%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Osmerus mordax: Bangham 1972; 2%; minp; South Bass Island, Ohio

Adult Acanthocephala (Acanthocephalans)

Echinorhynchidae Cobbold, 1876

Acanthocephalus dirus (Van Cleave, 1931) Van Cleave and Townsend, 1936

Synonym: *Echinorhynchus dirus* Van Cleave, 1931; *Acanthocephalus jacksoni* Bullock, 1962;

Acanthocephalus parksidei Amin 1975, 1977

Site of Infection: Digestive tract

Host:

Amia calva: Bangham 1972; 1957; 25%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 9%; L; lns; llnk

Osmerus mordax: Dechtiar and Nepszy 1988; 27%; M; lns

Morone chrysops: Dechtiar and Nepszy 1988; 7%; L; lns

Table 20, continued.

Echinorhynchus leidy (Van Cleave, 1924) Golvan, 1969

Synonym: *Echinorhynchus salvelini* Linkins in Ward and Whipple, 1918; *Metechinorhynchus leidy* (Van Cleave, 1924) Golvan, 1969

Site of Infection: [Intestine]

Host: *Lota lota*: Ward 1937; December 1934; pnp; minp; lns; llnk

Echinorhynchus salmonis (Muller, 1784) Petrochenko, 1956

Synonym: *Echinorhynchus coregoni* Linkins in Van Cleave, 1919; *Echinorhynchus pachysomus*, *Echinorhynchus phoenix*, *Echinorhynchus inflatus*, *Echinorhynchus maraenae*, *Echinorhynchus murenae*, *Metechinorhynchus alpinus*, *Metechinorhynchus salmonis* (Muller, 1784) Petrochenko, 1956

Site of Infection: Digestive tract

Host:

Esox lucius: Dechtiar 1972a; 1961-1969; 57%; minp; Wheatley, Ontario; 42°6'0"/-82°48'59"

Esox lucius: Dechtiar and Nepszy 1988; 1970-1975; 17%; L; lns; llnk

Osmerus mordax: Bangham 1972; cdnp; 5%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Osmerus mordax: Dechtiar 1972a; 31%; minp; lns; Ontario; llnk

Osmerus mordax: Dechtiar and Nepszy 1988; 29%; M; lns

Coregonus artedi: Dechtiar 1972a; 83%; minp; lns; Ontario

Coregonus clupeaformis: Bangham and Hunter 1939; 1927-1929; 33%; L-M; eastern Lake Erie; llnk; 100%; L-M; western Lake Erie; llnk

Coregonus clupeaformis: Dechtiar 1972a; 100%; minp; Port Dover, Ontario; 42°46'59"/-80°12'0"

Lota lota: Bangham and Hunter 1939; 100%; L; eastern Lake Erie

Lota lota: Ward 1937; December 1934; pnp; minp; lns; llnk

Neoechinorhynchidae Ward, 1917

Synonym: Hebesomidae Van Cleave, 1928; Hebesomatidae Yamaguti, 1963

Neoechinorhynchus carpiodi Dechtiar, 1968

Synonym: None

Site of Infection: [Intestine]

Host:

Carpiodes cyprinus: Dechtiar 1968; summers of 1964 and 1965; 25%; minp; west end; Wheatley area; 42°6'0"/-82°27'0"; east end, Port Dover; 42°46'59"/-80°12'0"

Carpiodes cyprinus: Dechtiar 1972a; 1961-1969; 31%; minp; lns; Ontario; llnk

Carpiodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 6%; M; lns; llnk

Table 20, continued.

Neoechinorhynchus crassus Van Cleave, 1919

Synonym: None

Site of Infection: Digestive tract

Host:

Carpionides cyprinus: Dechtiar 1972a; 1961-1969; 6%; minp; lns; Ontario; llnk

Catostomus commersonii: Bagham and Hunter 1939; 1927-1929; 50%; L-M; western Lake Erie; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 13%; L; lns; llnk

Catostomus commersonii: Van Cleave 1949; cdnp; pnp; minp; lns; llnk

Neoechinorhynchus cristatus Lynch, 1936

Synonym: None

Site of Infection: [Intestine]

Host:

Catostomus commersonii: Dechtiar 1972a; 1961-1969; 26%; minp; lns; Ontario; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 3%; L; lns; llnk

Neoechinorhynchus cylindratus (Van Cleave, 1913) Van Cleave, 1919

Synonym: *Neorhynchus cylindratus* Van Cleave, 1913; *Eorhynchus cylindratus* (Van Cleave, 1913) Van Cleave, 1914

Site of Infection: Intestine

Host:

Ambloplites rupestris: Bangham 1972; 1957; 1%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lepomis gibbosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Lepomis macrochirus: Bangham 1972; 1%; minp; South Bass Island, Ohio

Micropterus dolomieu: Bangham 1972; 10%; minp; South Bass Island, Ohio

Micropterus dolomieu (young): Bangham and Hunter 1939; 1927-1929; 2%; L; western Lake Erie; llnk

Micropterus dolomieu: Bangham and Hunter 1939; 4%; L; eastern Lake Erie; llnk

Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 36%; M; lns; llnk

Micropterus salmoides: Bangham 1972; 20%; minp; South Bass Island, Ohio

Micropterus salmoides (young): Bangham and Hunter 1939; 7%; L; western Lake Erie; llnk

Micropterus salmoides: Bangham and Hunter 1939; 33%; L; eastern Lake Erie; 54%; L-M; western Lake Erie

Pomoxis annularis: Bangham 1972; 2%; minp; South Bass Island, Ohio

Perca flavescens: Cooper et al. 1977; June-October 1974; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Perca flavescens: Dechtiar and Nepszy 1988; 20%; M; lns

Sander vitreus: Bangham and Hunter 1939; 10%; L; eastern Lake Erie

Table 20, continued.

Neoechinorhynchus rutili (Mueller, 1780) Hamann, 1892

Synonym: *Echinorhynchus tuberosus* Zider, 1803

Site of Infection: Intestine

Host:

Notropis hudsonius: Dechtiar 1972a; 1961-1969; 17%; minp; lns; Ontario; llnk

Ictalurus punctatus: Baker and Crites 1976; June-September 1973-1974; 3%; 6; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Osmerus mordax: Dechtiar and Nepszy 1988; 1970-1975; 5%; L; lns; llnk

Perca flavescens: Dechtiar 1972a; 2%; minp; lns; Ontario

Perca flavescens: Dechtiar and Nepszy 1988; 2%; L; lns

Neoechinorhynchus tenellus (Van Cleave, 1913) Van Cleave, 1919

Synonym: *Neorhynchus tenellus* Van Cleave, 1913

Site of Infection: Intestine

Host:

Esox lucius: Bangham and Hunter 1939; 1927-1929; 33%; L; eastern Lake Erie; llnk

Esox lucius: Dechtiar and Nepszy 1988; 1970-1975; 33%; M; lns; llnk

Sander vitreus: Dechtiar 1972a; 1961-1969; 7%; minp; lns; Ontario; llnk

Sander vitreus: Dechtiar and Nepszy 1988; 33%; M; lns

Neoechinorhynchus tumidus Van Cleave and Bangham, 1949

Synonym: None

Site of Infection: [Intestine]

Host: *Coregonus clupeaformis*: Dechtiar 1972a; 1961-1969; 25%; minp; Port Dover, Ontario; 42°46'59"/-80°12'0"

Neoechinorhynchus sp.

Site of Infection: Digestive tract

Host:

Perca flavescens: Dechtiar 1972a; 1961-1969; 2%; minp; lns; Ontario; llnk

Sander canadensis: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; llnk

Table 20, continued.

Octospinifer macilentus Van Cleave, 1919

Synonym: *Octospinifer* of Mudry and Arai, 1973; *Octospinifer* of Mudry and Anderson, 1976

Site of Infection: Digestive tract

Host:

Catostomus commersonii: Bangham 1972; 1957; 33%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Catostomus commersonii: Bangham and Hunter 1939; 1927-1929; 23%; L; eastern Lake Erie; llnk; 13%; L; western Lake Erie; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 43%; L; lns; llnk

Catostomus commersonii: Van Cleave 1949; cdnp; pnp; minp; lns; llnk

Moxostoma aureolum: Bangham 1972; 33%; minp; South Bass Island, Ohio

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Digestive tract

Host:

Hiodon tergisus: Dechtiar 1972a; 1961-1969; 8%; minp; lns; Ontario; llnk

Cyprinus carpio: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Cyprinus carpio: Dechtiar 1972a; 42%; minp; lns; Ontario

Notropis hudsonius: Bangham 1972; 4%; minp; South Bass Island, Ohio

Notropis volucellus: Bangham 1972; 7%; minp; South Bass Island, Ohio

Carpionodes cyprinus: Bangham 1972; 13%; minp; South Bass Island, Ohio

Carpionodes cyprinus: Dechtiar 1972a; 6%; minp; lns; Ontario

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 7%; L; lns; llnk

Catostomus commersonii: Bangham and Hunter 1939; 1927-1929; 25%; L; western Lake Erie; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 13%; L; lns

Hypentelium nigrican: Bangham 1972; 33%; minp; South Bass Island, Ohio

Minytrema melanops: Bangham 1972; 50%; minp; South Bass Island, Ohio

Moxostoma anisurum: Dechtiar 1972a; 25%; minp; lns; Ontario

Moxostoma erythrurum: Dechtiar 1972a; 29%; minp; lns; Ontario

Moxostoma macrolepidotum: Dechtiar 1972a; 64%; minp; lns; Ontario

Ameiurus nebulosus: Dechtiar 1972a; 27%; minp; lns; Ontario

Ambloplites rupestris: Bangham 1972; 1%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Lepomis gibbosus: Dechtiar 1972a; 10%; minp; lns; Ontario

Lepomis macrochirus: Bangham 1972; 14%; minp; South Bass Island, Ohio

Micropterus dolomieu: Dechtiar 1972a; 30%; minp; lns; Ontario

Perca flavescens: Bangham 1972; 1%; minp; South Bass Island, Ohio

Aplodinotus grunniens: Dechtiar 1972a; 4%; minp; lns; Ontario

Aplodinotus grunniens: Vendeland 1968; 1967; 24%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Table 20, continued.

Pomphorhynchus rocci Cordonnier and Ward, 1967

Synonym: None

Site of Infection: [Intestine]

Host: *Ambloplites rupestris*: Dechtiar 1972a; 1961-1969; 5%; minp; Ins; Ontario; llnk

Remarks: This is the only report of *Pomphorhynchus rocci* in a fish from a Great Lake; this species usually occurs in estuarine and marine fishes.

Pomphorhynchus sp.

Site of Infection: Digestive tract

Host: *Ictalurus punctatus*: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; llnk

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Digestive tract

Host:

Lepisosteus osseus: Bangham and Hunter 1939; 1927-1929; 11%; L; western Lake Erie; llnk

Amia calva: Bangham 1972; 1957; 25%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Amia calva: Bangham and Hunter 1939; 33%; L; western Lake Erie

Cyprinus carpio: Bangham and Hunter 1939; 14%; L; eastern Lake Erie; llnk

Macrhybopsis storeriana: Bangham and Hunter 1939; 3%; L; western Lake Erie

Ameiurus melas: Bangham 1972; 13%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 6%; minp; South Bass Island, Ohio

Ictalurus punctatus: Bangham 1972; 5%; minp; South Bass Island, Ohio

Noturus flavus: Bangham and Hunter 1939; 40%; L; western Lake Erie

Ambloplites rupestris: Bangham 1972; 25%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham and Hunter 1939; 11%; L; eastern Lake Erie; 17%; L; western Lake Erie

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham 1972; 22%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham and Hunter 1939; 6%; L; eastern Lake Erie; 4%; L; western Lake Erie

Lepomis macrochirus: Bangham 1972; 27%; minp; South Bass Island, Ohio

Lepomis macrochirus: Bangham and Hunter 1939; 10%; L; western Lake Erie

Micropterus dolomieu: Bangham 1972; 41%; minp; South Bass Island, Ohio

Micropterus dolomieu (young): Bangham and Hunter 1939; 8%; L; eastern and western Lake Erie

Micropterus dolomieu: Bangham and Hunter 1939; 61%; L-H; eastern Lake Erie; 69%; L-M; western Lake Erie

Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 44%; M; Ins; llnk

Micropterus salmoides: Bangham 1972; 13%; minp; South Bass Island, Ohio

Micropterus salmoides (young): Bangham and Hunter 1939; 10%; L; western Lake Erie

Micropterus salmoides: Bangham and Hunter 1939; 17%; L-M; western Lake Erie

Table 20, continued.

Pomoxis annularis: Bangham 1972; 2%; minp; South Bass Island, Ohio
Pomoxis annularis: Bangham and Hunter 1939; 29%; L; western Lake Erie
Etheostoma exile: Bangham and Hunter 1939; 14%; L; western Lake Erie
Perca flavescens: Bangham 1972; 3%; minp; South Bass Island, Ohio
Perca flavescens: Dechtiar and Nepszy 1988; 3%; L; Ins
Percina caprodes: Bangham and Hunter 1939; 54%; L; eastern Lake Erie; 3%; L; western Lake Erie
Sander vitreus: Bangham and Hunter 1939; 2%; L; western Lake Erie
Sander vitreus: Dechtiar and Nepszy 1988; 16%; L; Ins
Aplodinotus grunniens: Bangham 1972; 5%; minp; South Bass Island, Ohio
Aplodinotus grunniens: Bangham and Hunter 1939; 2%; L; western Lake Erie
Aplodinotus grunniens: Dechtiar and Nepszy 1988; 5%; L; Ins

Immature Acanthocephala (Acanthocephalans)

Echinorhynchidae Cobbold, 1876

Acanthocephalus dirus (Van Cleave, 1931) Van Cleave and Townsend, 1936
Synonym: *Echinorhynchus dirus* Van Cleave, 1931; *Acanthocephalus jacksoni* Bullock, 1962;
Acanthocephalus parksidei Amin 1975, 1977
Site of Infection: Digestive tract
Host: *Esox lucius*: Dechtiar and Nepszy 1988; 1970-1975; 21%; L; Ins; llnk

Echinorhynchus sp.
Site of Infection: [Intestine]
Host: *Coregonus clupeaformis*: Bangham and Hunter 1939; 1927-1929; 7%; L; western Lake Erie; llnk

Neoechinorhynchidae Ward, 1917

Synonym: Hebesomidae Van Cleave, 1928; Hebesomatidae Yamaguti, 1963
Neoechinorhynchus cylindratus (Van Cleave, 1913) Van Cleave, 1919
Synonym: *Neorhynchus cylindratus* Van Cleave, 1913; *Eorhynchus cylindratus* (Van Cleave, 1913)
Site of Infection: Intestine
Host: *Lota lota*: Ward 1937; December 1934; pnp; minp; lns; llnk

Neoechinorhynchus sp.
Site of Infection: Liver, mesentery
Host: *Fundulus diaphanus*: Bangham and Hunter 1939; 1927-1929; 41%; L; western Lake Erie; llnk

Table 20, continued.

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Mesentery

Host: *Aplodinotus grunniens*: Vendeland 1968; 1967; 24%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host:

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 10%; L; lns; llnk

Micropterus dolomieu: Dechtiar and Nepszy 1988; 5%; L; lns

Aplodinotus grunniens: Dechtiar and Nepszy 1988; 10%; L; lns

Pomphorhynchus sp.

Site of Infection: Digestive tract

Host: *Carassius auratus*: Bangham and Hunter 1939; 1927-1929; 9%; L; western Lake Erie; llnk

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Intestine

Host:

Lota lota: Ward 1937; December 1934; pnp; minp; lns; llnk

Aplodinotus grunniens: Vendeland 1968; 1967; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Mesentery

Host:

Ameiurus melas: Bangham and Hunter 1939; 1927-1929; 5%; L; western Lake Erie; llnk

Ictalurus punctatus: Bangham and Hunter 1939; 14%; L; western Lake Erie

Noturus flavus: Bangham and Hunter 1939; 40%; L; western Lake Erie

Percopsis omiscomaycus: Bangham and Hunter 1939; 2%; L; western Lake Erie

Fundulus diaphanus: Bangham 1972; 1957; 33%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ambloplites rupestris: Bangham and Hunter 1939; 27%; L; eastern Lake Erie; llnk; 17%; L; western Lake Erie

Table 20, continued.

Lepomis gibbosus: Bangham and Hunter 1939; 9%; L; eastern Lake Erie
Lepomis macrochirus: Bangham and Hunter 1939; 30%; L; western Lake Erie
Micropterus dolomieu (young): Bangham and Hunter 1939; 10%; L; western Lake Erie
Micropterus dolomieu: Bangham and Hunter 1939; 3%; L; western Lake Erie
Micropterus salmoides (young): Bangham and Hunter 1939; 1%; L; western Lake Erie
Pomoxis nigromaculatus: Bangham and Hunter 1939; 11%; L; western Lake Erie
Etheostoma flabellare: Bangham 1972; 14%; minp; South Bass Island, Ohio
Etheostoma nigrum: Bangham 1972; 3%; minp; South Bass Island, Ohio
Perca flavescens: Bangham and Hunter 1939; 2%; L; western Lake Erie
Percina caprodes: Bangham 1972; 21%; minp; South Bass Island, Ohio
Percina caprodes: Bangham and Hunter 1939; 54%; L; eastern Lake Erie; 19%; L; western Lake Erie
Aplodinotus grunniens: Vendeland 1968; 1967; 100%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Leptorhynchoides sp.

Site of Infection: Mesentery

Host: *Sander glaucum*: Bangham and Hunter 1939; 1927-1929; 10%; L; western Lake Erie; lnk

Hirudinea (Leeches)

Glossiphoniidae Vaillant, 1890

Actinobdella inequiannulata Moore, 1901

Synonym: *Actinobdella triannulata* Moore, 1924; *Actinobdella triannulata* Daniels and Freeman, 1976

Site of Infection: [Gill cavity]

Host: *Carpoides cyprinus*: Bangham 1972; 1957; 13%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Actinobdella pediculata (Hemmingway, 1908)

Synonym: ?*Placobdella pediculata* Hemmingway, 1912; ?*Haementaria pediculata* Autrum, 1936

Site of Infection: Inner wall of operculum

Host: *Aplodinotus grunniens*: Bur 1994; 1991-1993; 9%; 2; western Lake Erie; Ins

Actinobdella sp.

Site of Infection: Anal fin

Host: *Catostomus commersonii*: Bower and Woo 1977; 1975; 1%; 1; Hamilton, Ontario; 43°15'0"/-79°49'59"

Table 20, continued.

Hirudinidae Whitman, 1886

Macrobodella decora (Say, 1824) Verrill, 1872)

Synonym: None

Site of Infection: Operculum

Host: *Aplodinotus grunniens*: Dechtiar and Nepszy 1988; 1970-1975; 3%; L; Ins; llnk

Piscicolidae Johnston, 1865

Myzobdella lugubris Leidy, 1851

Synonym: *Cystobranchus virginicus* Paperna and Zwerner, 1974; *Ichthyobdella funduli* Verrill, 1872; *Ichthyobdella rapax* Wass, 1972; *Ichthyobdella richardsoni* Meyer, 1940; *Illinobdella alba* Meyer, 1940; *Myzobdella alba* Meyer, 1940; *Illinobdella elongata* Meyer, 1940; *Illinobdella moorei* Meyer, 1940; *Myzobdella lugubris* Pearse, 1948; *Myzobdella moorei* (Meyer, 1940) Meyer and Moore, 1954

Site of Infection: Pectoral, anal, caudal fins, skin

Host:

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 3%; 2; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham 1972; 1957; 5%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Dechtiar 1972a; 1961-1969; 9%; minp; Ins; Ontario; llnk

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 10%; M; Ins; llnk

Micropterus dolomieu: Dechtiar and Nepszy 1988; 5%; L; Ins

Sander vitreus: Dechtiar and Nepszy 1988; 20%; L; Ins

Perca flavescens: Bangham 1972; 2%; minp; South Bass Island, Ohio

Sander vitreus: Dechtiar 1972a; 19%; minp; Ins; Ontario

Aplodinotus grunniens: Bangham 1972; 2%; minp; South Bass Island, Ohio

Aplodinotus grunniens: Vendeland 1968; 1967; 58% for all leeches; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Myzobdella sp.

Site of Infection: [Fins]

Host:

Campostoma anomalum: Bangham 1972; 1957; 9%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Cyprinella spiloptera: Bangham 1972; 1%; minp; South Bass Island, Ohio

Catostomus commersonii: Dechtiar and Nepszy 1988; 1970-1975; 3%; L; Ins; llnk

Ameiurus natalis: Bangham 1972; 15%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Percopsis omiscomaycus: Dechtiar 1972a; 1961-1969; 8%; minp; Ins; Ontario; llnk

Ambloplites rupestris: Bangham 1972; 3%; minp; South Bass Island, Ohio

Table 20, continued.

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Percina caprodes: Bangham 1972; 19%; minp; South Bass Island, Ohio

Percina copelandi: Bangham 1972; 3%; minp; South Bass Island, Ohio

Aplodinotus grunniens: Vendeland 1968; 1967; 58% for all leeches; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Piscicola punctata (Verrill, 1871) Moore, 1912

Synonym: *Ichthyobdella punctata* (Verrill, 1871)

Site of Infection: External surface

Host:

Cyprinella whipplei: Bangham and Hunter 1939; 1927-1929; 2%; L; western Lake Erie; llnk

Ameiurus melas: Bangham and Hunter 1939; 16%; L; western Lake Erie

Lota lota: Bangham and Hunter 1939; 43%; L; western Lake Erie

Lepomis gibbosus: Bangham and Hunter 1939; 4%; L; western Lake Erie

Lepomis macrochirus: Bangham and Hunter 1939; 20%; L; western Lake Erie

Micropterus dolomieu (young): Bangham and Hunter 1939; 2%; L; western Lake Erie

Perca flavescens: Bangham and Hunter 1939; 8%; eastern Lake Erie

Percina caprodes: Bangham and Hunter 1939; 6%; L; western Lake Erie

Sander vitreus: Bangham and Hunter 1939; 2%; L; western Lake Erie

Aplodinotus grunniens: Bangham and Hunter 1939; 4%; L; western Lake Erie

Placobdella montifera Moore, 1906

Synonym: *Placobdella parasitica* Amin 1977

Site of Infection: External surface

Host: *Micropterus salmoides*: Bangham and Hunter 1939; 1927-1929; 1%; L; western Lake Erie; llnk

Copepoda (Copepods)

Argulidae Yamaguti, 1963

Argulus appendiculosus Wilson, 1907

Synonym: *Argulus biramosus*

Site of Infection: Fins

Host:

?*Ameiurus nebulosus*: Tidd 1931; 1927-1929; pnp; minp; lns; llnk

Cyprinus carpio: Dechtiar 1972a; 1961-1969; 13%; minp; lns; Ontario; llnk

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 7%; L; lns; llnk

Argulus catostomi Dana and Herrick, 1837

Synonym: None

Site of Infection: Skin

Table 20, continued.

Host:

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; Ins; lnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 6%; L; Ins

Argulus sp.

Site of Infection: [External surface]

Host: *Aplodinotus grunniens*: Bangham 1972; 1957; 1%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ergasilidae Nordmann, 1832

Ergasilus caeruleus Wilson, 1911

Synonym: *Ergasilus confusus* Bere, 1931; *Ergasilus skrjabini* Mueller, 1937

Site of Infection: Gills

Host:

Anguilla rostrata: Dechtiar 1972a; 1961-1969; 100%; minp; Ins; Ontario; lnk

Cyprinus carpio: Dechtiar 1972a; 13%; minp; Ins; Ontario

Lythrurus umbratilis: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Notropis bucattus: Bangham 1972; 10%; minp; South Bass Island, Ohio

Carpionodes cyprinus: Dechtiar 1972a; 2%; minp; Ins; Ontario

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 5%; L; Ins; lnk

Catostomus commersonii: Bangham 1972; 7%; minp; South Bass Island, Ohio

Catostomus commersonii: Dechtiar and Nepszy 1988; 13%; L; Ins

Esox masquinongy: Dechtiar 1972a; 100%; minp; Ins; Ontario

Percopsis omiscomaycus: Tidd 1931; 1927-1929; pnp; minp; lnk; lnk

Percopsis omiscomaycus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Percopsis omiscomaycus: Dechtiar 1972a; 14%; minp; Ins; Ontario

Morone chrysops: Bangham 1972; 2%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham 1972; 11%; minp; South Bass Island, Ohio

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham 1972; 7%; minp; South Bass Island, Ohio

Lepomis macrochirus: Tidd 1931; 1927-1929; pnp; minp; lnk; lnk

Lepomis macrochirus: Bangham 1972; 38%; minp; South Bass Island, Ohio

Micropterus salmoides: Bangham 1972; 3%; minp; South Bass Island, Ohio

Pomoxis nigromaculatus: Dechtiar 1972a; 19%; minp; Ins; Ontario

Perca flavescens: Tidd 1931; pnp; minp; lnk; lnk

Perca flavescens: Bangham 1972; 29%; minp; South Bass Island, Ohio

Percina caprodes: Bangham 1972; 2%; minp; South Bass Island; Ohio

Sander canadensis: Tidd 1931; 1927-1929; pnp; minp; lnk; lnk

Sander canadensis: Bangham and Hunter 1939; 1927-1929; 9%; L; western Lake Erie; lnk

Table 20, continued.

Sander glaucum: Tidd 1931; 1927-1929; pnp; minp; lnk; llnk
Sander glaucum: Bangham and Hunter 1939; 30%; L-M; western Lake Erie
Sander vitreus: Tidd 1931; 1927-1929; pnp; minp; lnk; llnk
Sander vitreus: Bangham 1972; 73%; minp; South Bass Island, Ohio
Sander vitreus (young): Bangham and Hunter 1939; 7%; L; western Lake Erie
Sander vitreus: Bangham and Hunter 1939; 13%; L-M; western Lake Erie
Sander vitreus: Dechtiar and Nepszy 1988; 20%; L; lns
Aplodinotus grunniens: Bangham 1972; 2%; minp; South Bass Island, Ohio
Remarks: Records of *Ergasilus caeruleus* on fish hosts before Roberts (1970) should be treated with caution.

Ergasilus centrarchidarum (Wright, 1882) Wilson, 1932

Synonym: None

Site of Infection: Gills

Host:

Ambloplites rupestris: Tidd 1931; 1927-1929; pnp; minp; lnk; llnk
Ambloplites rupestris: Bangham and Hunter 1939; 1927-1929; 10%; L; eastern Lake Erie; llnk; 8%; M; western Lake Erie; llnk
Lepomis macrochirus: Bangham and Hunter 1939; 10%; L; western Lake Erie
Micropterus dolomieu: Bangham 1972; 1957; 8%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"
Micropterus dolomieu: Bangham and Hunter 1939; 18%; L-M; eastern Lake Erie; 7%; L; western Lake Erie; llnk
Micropterus dolomieu: Dechtiar and Nepszy 1988; 1970-1975; 31%; lns; llnk
Micropterus salmoides: Tidd 1931; 1927-1929; pnp; minp; lnk; llnk
Micropterus salmoides: Bangham 1972; 5%; minp; South Bass Island, Ohio
Micropterus salmoides (young): Bangham and Hunter 1939; 6%; L; western Lake Erie
Micropterus salmoides: Bangham and Hunter 1939; 33%; L; eastern Lake Erie; 8%; M; western Lake Erie
Sander canadensis: Bangham and Hunter 1939; 70%; L-M; eastern Lake Erie
Sander glaucum: Dechtiar 1972a; 1961-1969; 100%; minp; lns; Ontario; llnk
Sander vitreus: Bangham and Hunter 1939; 40%; M; eastern Lake Erie

Ergasilus cotti Kellicott, 1879

Synonym: None

Site of Infection: [Gills]

Host: *Etheostoma caeruleum*: Tidd 1931; 1927-1929; pnp; minp; lnk; llnk

Table 20, continued.

Ergasilus luciopercarum Henderson, 1926

Synonym: *Ergasilus confusus* Bere, 1931; *Ergasilus skrjabini* Mueller, 1936; *Ergasilus caeruleus* Wilson in Mueller, 1936

Site of Infection: Gills

Host:

Perca flavescens: Dechtiar and Nepszy 1988; 1970-1975; 22%; L; lns; llnk

Sander vitreus: Dechtiar and Nepszy 1988; 53%; M; lns

Ergasilus versicolor Wilson, 1911

Synonym: *Ergasilus elegans* Wilson, 1916

Site of Infection: Gills

Host:

Ameiurus nebulosus: Bangham 1972; 1957; 2%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ameiurus nebulosus: Dechtiar 1972a; 1961-1969; 64%; minp; lns; Ontario; llnk

Ictalurus punctatus: Tidd 1931; 1927-1929; pnp; minp; lnk; llnk

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 48%; 5; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham 1972; 51%; minp; South Bass Island, Ohio

Ictalurus punctatus: Bangham and Hunter 1939; 1927-1929; 14%; L; western Lake Erie; llnk

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 51%; M; lns; llnk

Noturus gyrinus: Bangham and Hunter 1939; 100%; L; western Lake Erie

Ergasilus sp.

Site of Infection: [Gills]

Host:

Cottus bairdii: Bangham 1972; 1957; 67%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Morone chrysops: Dechtiar and Nepszy 1988; 1970-1975; 8%; L; lns; llnk

Lernaeidae Cobbold, 1879

Lernaea catostomi (Kroyer, 1863)

Synonym: *Lernaea tortua* Kellicott, 1882

Site of Infection: [Gills]

Host: *Notropis stramineus*: Tidd 1931; 1927-1929; pnp; minp; lnk; llnk

Table 20, continued.

Lernaea cruciata (LeSeuer, 1824)

Synonym: *Lernaeocera cruciata*

Site of Infection: [Head embedded in musculature with body protruding externally]

Host:

Ambloplites rupestris: Tidd 1931; 1927-1929; pnp; minp; lnk; lnk

Ambloplites rupestris: Bangham 1972; 1957; 28%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Lernaea cyprinacea Linnaeus, 1758

Synonym: *Lernaea elegans* Leigh-Sharpe, 1925; *Lernaeocera esocina* Hermann, 1783; *Lernaea carasii* Tidd, 1933; probably *Lernaea ranae* Stunkard and Cable, 1913

Site of Infection: [Head embedded in musculature with body protruding externally]

Host:

Carassius auratus: Bangham 1972; 1957; 9%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Carassius auratus: Dechtiar 1972a; 1961-1969; 33%; minp; lns; Ontario; lnk

Cyprinus carpio: Dechtiar 1972a; 42%; minp; lns; Ontario

Opsopoeodus emiliae: Bangham 1972; 2%; minp; South Bass Island, Ohio

Semotilus atromaculatus: Dechtiar 1972a; 25%; minp; lns; Ontario

Lepomis gibbosus: Dechtiar 1972a; 6%; minp; lns; Ontario

Lepomis macrochirus: Dechtiar 1972a; 3%; minp; lns; Ontario

Lernaea sp.

Site of Infection: [Head embedded in musculature with body protruding externally]

Host:

Notropis hudsonius: Bangham 1972; 1957; 1%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Catostomus commersonii: Bangham 1972; 7%; minp; South Bass Island, Ohio

Lepomis gibbosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Micropterus dolomieu: Bangham 1972; 2%; minp; South Bass Island, Ohio

Unidentified lernaeid

Synonym: ?

Site of Infection: [Head embedded in musculature with body protruding externally]

Host: *Micropterus dolomieu*: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; lnk

Lernaeopodidae Olsson, 1869

Achtheres pimelodi Kroyer, 1863

Synonym: *Achtheres ambloplitis* Kellicot, 1880; *Achtheres micropteri* Wright, 1882

Site of Infection: Gills, gill arches

Table 20, continued.

Host:

Ictalurus punctatus: Baker and Crites 1976; June-September 1973 and 1974; 6%; 2; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham 1972; 1957; 3%; minp, South Bass Island, Ohio; 41°39'0"/-82°49'14"

Ictalurus punctatus: Bangham and Hunter 1939; 1927-1929; 3%; L; western Lake Erie; lnk

Ictalurus punctatus: Dechtiar and Nepszy 1988; 1970-1975; 8%; L; lns; lnk

Coregonus clupeaformis: Dechtiar 1972a; 1961-1969; 25%; minp; Port Dover, Ontario; 42°46'59"/-80°12'0"

Ambloplites rupestris: Tidd 1931; 1927-1929; pnp; minp; lnk; lnk

Ambloplites rupestris: Bangham 1972; 35%; minp; South Bass Island, Ohio

Ambloplites rupestris: Bangham and Hunter 1939; 33%; L; western Lake Erie

Micropterus dolomieu: Bangham 1972; 12%; minp; South Bass Island, Ohio

Micropterus dolomieu: Bangham and Hunter 1939; 4%; L; eastern Lake Erie; lnk; 7%; L; western Lake Erie

Micropterus dolomieu: Dechtiar and Nepszy 1988; 8%; L; lns

Micropterus salmoides: Bangham 1972; 8%; minp; South Bass Island, Ohio

Micropterus salmoides (young): Bangham and Hunter 1939; 1%; L; western Lake Erie

Micropterus salmoides: Bangham and Hunter 1939; 8%; L; western Lake Erie

Perca flavescens: Dechtiar and Nepszy 1988; 2%; L; lns

Achtheres coregoni Smith, 1874

Synonym: None

Site of Infection: [Gills]

Host: *Coregonus clupeaformis*: Tidd 1931; 1927-1929; pnp; minp; lnk; lnk

Achtheres sp.

Site of Infection: [Gills]

Host:

Ameiurus nebulosus: Bangham 1972; 1957; 4%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Morone chrysops: Bangham 1972; 2%; minp; South Bass Island, Ohio

Perca flavescens: Bangham 1972; 1%; minp; South Bass Island, Ohio

Salmincola inermis Wilson, 1911

Synonym: None

Site of Infection: [Gills]

Host: *Coregonus artedii*: Tidd 1931; 1927-1929; pnp; minp; lnk; lnk

Table 20, continued.

Mollusca (Molluscs)

Unionidae Rafinesque, 1820

Glochidia of *Anodonta* sp.

Site of Infection: [Gills]

Host: *Lepomis gibbosus*: Bangham 1972; 1957; 16%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Unknown Family

Unidentified glochidia

Synonym: ?

Site of Infection: Gills

Host:

Cyprinella spiloptera: Bangham 1972; 1957; 1%; minp; South Bass Island, Ohio; 41°39'0"/-82°49'14"

Cyprinus carpio: Dechtiar 1972a; 1961-1969; 13%; minp; lns; Ontario; llnk

Notropis atherinoides: Dechtiar 1972a; 56%; minp; lns; Ontario

Notropis hudsonius: Bangham 1972; 21%; minp; South Bass Island, Ohio

Pimephales notatus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Carpionodes cyprinus: Dechtiar 1972a; 2%; minp; lns; Ontario; llnk

Carpionodes cyprinus: Dechtiar and Nepszy 1988; 1970-1975; 4%; L; lns; llnk

Catostomus commersonii: Dechtiar and Nepszy 1988; 7%; L; lns

Erimyzon sucetta: Bangham 1972; 2%; minp; South Bass Island, Ohio

Ameiurus nebulosus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Ictalurus punctatus: Bangham 1972; 3%; minp; South Bass Island, Ohio

Ictalurus punctatus: Dechtiar and Nepszy 1988; 11%; M; lns

Percopsis omiscomaycus: Bangham 1972; 2%; minp; South Bass Island, Ohio

Morone chrysops: Bangham and Hunter 1939; 1927-1929; 4%; H; western Lake Erie; llnk

Morone chrysops: Dechtiar and Nepszy 1988; 8%; L; lns

Ambloplites rupestris: Bangham 1972; 9%; minp; South Bass Island, Ohio

Lepomis cyanellus: Bangham 1972; 8%; minp; South Bass Island, Ohio

Lepomis macrochirus: Bangham 1972; 7%; minp; South Bass Island, Ohio

Lepomis macrochirus: Bangham and Hunter 1939; 10%; M; western Lake Erie

Pomoxis nigromaculatus: Bangham and Hunter 1939; 11%; L; western Lake Erie

Micropterus dolomieu: Bangham 1972; 6%; minp; South Bass Island, Ohio

Micropterus dolomieu: Dechtiar and Nepszy 1988; 10%; L; lns

Etheostoma nigrum: Bangham 1972; 10%; minp; South Bass Island, Ohio

Perca flavescens: Bangham 1972; 57%; minp; South Bass Island, Ohio

Perca flavescens: Dechtiar and Nepszy 1988; 6%; L; lns

Percina caprodes: Bangham 1972; 19%; minp; South Bass Island, Ohio

Percina copelandi: Bangham 1972; 33%; minp; South Bass Island, Ohio

Sander canadensis: Bangham and Hunter 1939; 3%; M; western Lake Erie

Table 20, continued.

Sander vitreus: Bangham 1972; 3%; minp; South Bass Island, Ohio
Sander vitreus: Dechtiar and Nepszy 1988; 16%; L; Ins
Aplodinotus grunniens: Bangham 1972; 35%; minp; South Bass Island, Ohio
Aplodinotus grunniens: Bangham and Hunter 1939; 36%; L-H; western Lake Erie
Aplodinotus grunniens: Dechtiar and Nepszy 1988; 10%; M; Ins

Table 21. Fishes by family from Lake Erie from which parasites have been reported during 1914-2010 using parasite data in Table 20. References in parentheses following parasites refer to references for host records.

Acipenseridae

Acipenser fulvescens (lake sturgeon)

Adult Digenea: *Allocreadium* sp., (Bangham and Hunter 1939); *Crepidostomum lintoni*, (Bangham and Hunter 1939)

Monogenea: *Diclybothrium armatum*, (Dechtiar 1972a)

Adult Nematoda: *Truttaedacnitis clitellarius*, (Bangham and Hunter 1939); *Rhabdochona cascadilla*, (Dechtiar 1972a)

Lepisosteidae

Lepisosteus osseus (longnose gar)

Adult Digenea: *Macroderoides spiniferus*, (Bangham and Hunter 1939; Bangham 1972)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972)

Adult Cestoda: *Proteocephalus perplexus*, (Dechtiar 1972a); *Proteocephalus singularis*, (Bangham 1972; Bangham and Hunter 1939)

Larval/Immature Cestoda: *Bothriocephalus* sp., (Bangham and Hunter 1939); *Proteocephalus ambloplitis*, (Bangham 1972; Bangham and Hunter 1939)

Adult Nematoda: *Cystidicola lepisostei*, (Bangham and Hunter 1939; Hunter and Bangham 1933)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

Amiidae

Amia calva (bowfin)

Adult Digenea: *Crepidostomum cornutum*, (Bangham 1972; Bangham and Hunter 1939); *Leucoruthrus micropteri*, (Bangham and Hunter 1939); *Microphallus opacus*, (Bangham and Hunter 1939);

Macroderoides typicus, (Bangham 1972; Bangham and Hunter 1939)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972)

Table 21, continued.

Adult Cestoda: *Haplobothrium globuliforme*, (Bangham and Hunter 1939); *Proteocephalus ambloplitis*, (Bangham and Hunter 1939; La Rue 1914); *Proteocephalus perplexus*, (Bangham 1972)

Adult Nematoda: *Haplonema immutatum*, (Bangham 1972; Bangham and Hunter 1939)

Adult Acanthocephala: *Acanthocephalus dirus*, (Bangham 1972); *Leptorhynchoides thecatus*, (Bangham 1972; Bangham and Hunter 1939)

Hiodontidae

Hiodon tergisus (mooneye)

Adult Digenea: *Crepidostomum illionoiense*, (Bangham 1972; Bangham and Hunter 1939; Hunter and Bangham 1932); *Leuceruthrus* sp., (Bangham and Hunter 1939); *Paurorhynchus hiodontis*, (Bangham 1972; Dickerman 1954)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972)

Monogenea: *Mazacraeoides* sp., (Dechtiar 1972a)

Adult Cestoda: *Bothriocephalus cuspidatus*, (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Proteocephalus* sp., (Bangham and Hunter 1939)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939); *Rhabdochona cascadilla*, (Bangham 1972; Bangham and Hunter 1939)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar 1972a)

Anguillidae

Anguilla rostrata (American eel)

Myxozoa: *Myxobolus* sp., (Dechtiar 1972a)

Adult Digenea: *Crepidostomum cornutum*, (Dechtiar 1972a); *Azygia longa*, (Dechtiar 1972a); *Microphallus opacus*, (Dechtiar 1972a)

Larval/Immature Digenea: *Diplostomum flexicaudum*, (Dechtiar 1972a)

Adult Cestoda: *Proteocephalus macrocephalus*, (Dechtiar 1972a)

Copepoda: *Ergasilus caeruleus*, (Dechtiar 1972a)

Clupeidae

Alosa pseudoharengus (alewife)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); unidentified metacercariae, (Bangham 1972)

Monogenea: *Octomacrum* sp., (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Stromberg and Crites 1975b; Stromberg et al. 1973);

Capillaria sp., (Bangham 1972)

Table 21, continued.

***Dorosoma cepedianum* (gizzard shad)**

Microspora: *Glugea cepedianae*, (Dechtiar 1972a)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972)

Monogenea: *Octomacrum* sp., (Bangham 1972); *Mazocraeoides olentangiensis*, (Dechtiar 1972a)

Adult Nematoda: *Camallanus oxycephalus*, (Stromberg and Crites 1975b; Stromberg et al. 1973); unidentified nematode, (Bangham 1972)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939); *Camallanus oxycephalus*, (Stromberg and Crites 1974b; Stromberg and Crites 1975a; Stromberg and Crites 1975b); unidentified nematode, (Bangham 1972)

Cyprinidae

***Campostoma anomalum* (central stoneroller)**

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1972); *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Hirudinea: *Myzobdella* sp., (Bangham 1972)

***Carassius auratus* (goldfish)**

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972)

Monogenea: *Dactylogyrus anchoratus*, (Dechtiar 1972a); *Dactylogyrus vastator*, (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Dechtiar 1972a)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Immature Acanthocephala: *Pomphorhynchus* sp., (Bangham and Hunter 1939)

Copepoda: *Lernaea cyprinacea*, (Bangham 1972; Dechtiar 1972a)

***Cyprinella spiloptera* (spotfin shiner)**

Ciliophora: *Ichthyophthirius multifiliis*, (Bangham 1972)

Myxozoa: Unidentified myxozoan, (Bangham 1972)

Adult Digenea: *Plagioporus cooperi*, (Bangham 1972)

Table 21, continued.

Larval/Immature Digenea: *Neascus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Larval/Immature Cestoda: *Proteocephalus* sp., (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Stromberg and Crites 1974b; Stromberg and Crites 1975a; Stromberg and Crites 1975b; Stromberg et al. 1973); *Skrjabinocapillaria bakeri*, (Bangham 1972)

Larval/Immature Nematoda: *Rhabdochona* sp., (Bangham 1972)

Hirudinea: *Myzobdella* sp., (Bangham 1972)

Mollusca: Unidentified glochidia, (Bangham 1972)

***Cyprinella whipplei* (steelcolor shiner)**

Adult Digenea: *Plagioporus cooperi*, (Bangham and Hunter 1939; Hunter and Bangham 1932)

Larval/Immature Digenea: *Neascus* sp., (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Ligula intestinalis*, (Bangham and Hunter 1939)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939); *Rhabdochona cascadilla*, (Bangham and Hunter 1939; Gustafson 1949)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Hirudinea: *Piscicola punctata*, (Bangham and Hunter 1939)

***Cyprinus carpio* (common carp)**

Ciliophora: *Ichthyophthirius multifiliis*, (Bangham 1972)

Myxozoa: Unidentified myxozoa, (Bangham 1972)

Larval/Immature Digenea: *Diplostomum flexicaudum*, (Dechtiar 1972a); *Diplostomum* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham and Hunter 1939)

Monogenea: *Dactylogyrus anchoratus*, (Dechtiar 1972a); *Dactylogyrus extensus*, (Dechtiar 1972a); *Pseudocolpenteron pavlovskii*, (Dechtiar 1971b; Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)

Adult Cestoda: *Khawia iowensis*, (Bangham 1972; Dechtiar 1972a)

Larval/Immature Cestoda: *Ligula intestinalis*, (Dechtiar 1972a); unidentified cestode, (Bangham and Hunter 1939)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939); *Camallanus oxycephalus*, (Bangham 1972)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939); *Pomphorhynchus bulbocolli*, (Bangham 1972; Dechtiar 1972a)

Copepoda: *Argulus appendiculatus*, (Dechtiar 1972a); *Ergasilus caeruleus*, (Dechtiar 1972a); *Lernaea cyprinacea*, (Dechtiar 1972a)

Mollusca: Unidentified glochidia, (Dechtiar 1972a)

Table 21, continued.

***Luxilus cornutus* (common shiner)**

Ciliophora: *Ichthyophthirius multifiliis*, (Bangham 1972)

Myxozoa: *Myxobolus* sp., (Dechtiar 1972a); unidentified myxozoan, (Bangham 1972)

Adult Digenea: *Allocreadium lobatum*, (Bangham 1972); *Plagioporus cooperi*, (Bangham 1972)

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1972); *Diplostomum flexicaudum*, (Dechtiar 1972a); *Diplostomum* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham and Hunter 1939); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Monogenea: *Dactylogyrus* sp., (Dechtiar 1972a)

Larval/Immature Cestoda: *Ligula intestinalis*, (Bangham 1972; Bangham and Hunter 1939); *Trienophorus nodulosus*, (Dechtiar 1972a)

Adult Nematoda: *Rhabdochona cascadilla*, (Bangham 1972)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Bangham 1972)

***Lythrurus umbratilis* (redfin shiner)**

Ciliophora: *Ichthyophthirius multifiliis*, (Bangham 1972)

Myxozoa: Unidentified myxozoan, (Bangham 1972)

Adult Digenea: *Plagioporus cooperi*, (Bangham 1972)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Larval/Immature Cestoda: *Proteocephalus* sp., (Bangham 1972)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Bangham 1972)

Copepoda: *Ergasilus caeruleus*, (Bangham 1972)

***Macrhybopsis storeriana* (silver chub)**

Myxozoa: Unidentified myxozoan, (Bangham 1972)

Adult Digenea: *Plagioporus cooperi*, (Bangham and Hunter 1939; Hunter and Bangham 1932); *Allocreadium lobatum*, (Bangham 1972)

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1972); *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939); *Ichthyocotylurus* sp., (Bangham 1972); unidentified Strigeidae, (Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Larval/Immature Cestoda: *Ligula intestinalis*, (Bangham and Hunter 1939)

Adult Nematoda: *Rhabdochona cascadilla*, (Bangham 1972)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

***Nocomis micropogon* (river chub)**

Larval/Immature Digenea: *Posthodiplostomum minimum*, (Bangham and Hunter 1939); *Neascus* sp., (Bangham and Hunter 1939)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Table 21, continued.

***Notemigonus crysoleucas* (golden shiner)**

Myxozoa: Unidentified myxozoan, (Bangham 1972; Bangham and Hunter 1939)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

***Notropis anogenus* (pugnose shiner)**

Myxozoa: *Myxobolus aureatus*, (Ward 1919); *Henneguya brachyura*, (Ward 1919)

***Notropis atherinoides* (emerald shiner)**

Myxozoa: Unidentified myxozoan, (Bangham and Hunter 1939)

Adult Digenea: *Leuceruthrus* sp., (Bangham and Hunter 1939); *Plagioporus cooperi*, (Bangham 1972; Bangham and Hunter 1939; Hunter and Bangham 1932)

Larval/Immature Digenea: *Diplostomum flexicaudum*, (Dechtiar 1972a); *Diplostomum* sp., (Bangham 1972); *Neasus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar 1972a); unidentified Strigeidae, (Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972); *Neochasmus umbellus*, (Kvach and Stepien 2008a)

Monogenea: *Dactylogyrus* sp., (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)

Adult Cestoda: *Proteocephalus* sp., (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Bothriocephalus cuspidatus*, (Bangham and Hunter 1939); *Proteocephalus ambloplitis*, (Bangham and Hunter 1939); *Proteocephalus pinguis*, (Bangham and Hunter 1939)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939; Stromberg and Crites 1975b); *Rhabdochona cascadilla*, (Bangham 1972)

Mollusca: Unidentified glochidia, (Dechtiar 1972a)

***Notropis buccatus* (silverjaw minnow)**

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Crassiphiala bulboglossa*, (Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939)

Copepoda: *Ergasilus caeruleus*, (Bangham 1972)

***Notropis heterodon* (blackchin shiner)**

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939); *Skrjabinocapillaria bakeri*, (Bangham 1972)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Table 21, continued.

***Notropis hudsonius* (spottail shiner)**

Myxozoa: *Myxobolus algonquinensis*, (Cone et al. 2004); *Myxobolus bartai*, (Cone et al. 2004); *Myxobolus burti*, (Cone et al. 2004; Cone and Marcogliese 2010); *Thelohanellus notatus*, (Cone et al. 2004); *Thelohanellus* sp., (Dechtiar 1972a); *Zschokkella* sp., (Cone et al. 2004); unidentified myxozoan, (Bangham and Hunter 1939)

Adult Digenea: *Plagioporus cooperi*, (Bangham and Hunter 1939; Bangham 1972; Hunter and Bangham 1932) *Sanguinicola* sp., (Dechtiar 1972a)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Bangham 1972; Bangham and Hunter 1939); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar 1972a); *Centrovarium lobotes*, (Dechtiar 1972a); unidentified metacercariae, (Bangham 1972)

Monogenea: *Dactylogyrus* sp., (Dechtiar 1972a); *Gyrodactylus* sp., (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)

Adult Cestoda: *Proteocephalus* sp., (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Ligula intestinalis*, (Bangham and Hunter 1939; Mahon 1976); *Proteocephalus ambloplitis*, (Bangham and Hunter 1939)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939); *Rhabdochona cascadilla*, (Bangham 1972; Bangham and Hunter 1939)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939); *Camallanus oxycephalus*, (Bangham 1972); unidentified nematode, (Bangham 1972)

Adult Acanthocephala: *Neoechinorhynchus rutili*, (Dechtiar 1972a); *Pomphorhynchus bulbocolli*, (Bangham 1972)

Mollusca: Unidentified glochidia, (Bangham 1972)

Copepoda: *Lernaea* sp., (Bangham 1972)

***Notropis stramineus* (sand shiner)**

Myxozoa: *Ceratomyxa* sp., (Dechtiar 1972a); unidentified myxozoan, (Bangham and Hunter 1939)

Adult Digenea: *Plagioporus cooperi*, (Hunter and Bangham 1932; Bangham and Hunter 1939)

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1972); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972)

Larval/Immature Cestoda: *Ligula intestinalis*, (Bangham and Hunter 1939)

Copepoda: *Lernaea catostomi*, (Tidd 1931)

***Notropis volucellus* (mimic shiner)**

Adult Digenea: *Plagioporus cooperi*, (Bangham 1972; Bangham and Hunter 1939; Hunter and Bangham 1932)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Bangham 1972); *Neascus* sp., (Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972); unidentified metacercariae, (Bangham 1972)

Table 21, continued.

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)
Adult Nematoda: *Rhabdochona cascadilla*, (Bangham and Hunter 1939)
Larval/Immature Nematoda: *Rhabdochona* sp., (Bangham 1972)
Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Bangham 1972)

***Opsopoeodus emiliae* (pugnose minnow)**

Myxozoa: Unidentified myxozoan, (Bangham and Hunter 1939)
Adult Digenea: *Plagioporus cooperi*, (Bangham 1972; Bangham and Hunter 1939)
Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972); unidentified metacercariae, (Bangham 1972)
Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)
Larval/Immature Cestoda: *Ligula intestinalis*, (Bangham and Hunter 1939)
Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972); *Skrjabinocapillaria bakeri*, (Bangham 1972)
Copepoda: *Lernaea cyprinacea*, (Bangham 1972)

***Pimephales notatus* (bluntnose minnow)**

Ciliophora: *Ichthyophthirius multifiliis*, (Bangham 1972)
Myxozoa: Unidentified myxozoan, (Bangham 1972; Bangham and Hunter 1939)
Adult Digenea: *Plagioporus cooperi*, (Bangham 1972, Bangham and Hunter 1939)
Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)
Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)
Larval/Immature Cestoda: *Ligula intestinalis*, (Bangham and Hunter 1939)
Mollusca: Unidentified glochidia, (Bangham 1972)

***Pimephales promelas* (fathead minnow)**

Myxozoa: Unidentified myxozoan, (Bangham and Hunter 1939)
Larval/Immature Digenea: *Neascus* sp., (Bangham and Hunter 1939)
Larval/Immature Cestoda: *Proteocephalus* sp., (Bangham 1972)

***Rhinichthys cataractae* (longnose dace)**

Adult Digenea: *Plagioporus cooperi*, (Bangham and Hunter 1939; Hunter and Bangham 1932)
Larval/Immature Digenea: *Neascus rhinichthysi*, (Bangham and Hunter 1939)
Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939)

Table 21, continued.

***Rhinichthys obtusus* (western blacknose dace)**

Myxozoa: Unidentified myxozoan, (Bangham 1972)

Larval/Immature Digenea: *Neascus rhinichthysi*, (Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939)

Adult Nematoda: *Rhabdochona cascadilla*, (Bangham 1972)

***Semotilus atromaculatus* (creek chub)**

Myxozoa: *Myxobolus pendula*, (Dechtiar 1972a)

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Bangham and Hunter 1939); *Neascus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939)

Monogenea: *Cleidodiscus brachus*, (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)

Adult Cestoda: *Proteocephalus* sp., (Bangham and Hunter 1939)

Adult Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Copepoda: *Lernaea cyprinacea*, (Dechtiar 1972a)

Catostomidae

***Carpionodes cyprinus* (quillback)**

Ciliophora: *Trichodina* sp., (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Myxozoa: *Myxobolus rotundum*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); unidentified myxozoan, (Bangham 1972)

Adult Digenea: *Phyllodistomum lysteri*, (Dechtiar and Nepszy 1988); *Lissorchis attenuatus*, (Bangham 1972; Dechtiar 1972a; Dechtiar and Nepszy 1988); *Sanguinicola* sp., (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Nepszy 1988); *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Ichthyocotylurus* sp., (Dechtiar and Nepszy 1988)

Monogenea: *Neodiscocotyle carpioditis*, (Dechtiar 1967b, 1972a; Dechtiar and Nepszy 1988); *Octomacrum lanceatum*, (Bangham 1972); *Pellucidhaptor angularis*, (Dechtiar and Nepszy 1988); *Pellucidhaptor eremitus*, (Dechtiar and Nepszy 1988); *Pellucidhaptor microcanthus*, (Dechtiar and Nepszy 1988); *Pellucidhaptor* sp., (Dechtiar 1972a); *Anonchhaptor anomalus*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Anonchhaptor muelleri*, (Dechtiar and Nepszy 1988); *Anonchhaptor* sp., (Dechtiar 1972a); *Icelanonchhaptor fyviei*, (Dechtiar and Dillon 1974; Dechtiar and Nepszy 1988); *Icelanonchhaptor microcotyle*, (Dechtiar and Nepszy 1988); *Acolpenteron catostomi*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Gyrodactylus* sp., (Dechtiar and Nepszy 1988)

Adult Cestoda: *Spartoides wardi*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Hypocaryophyllaeus paratarius*, (Bangham 1972; Bangham and Hunter 1939); *Biacetabulum* sp., (Dechtiar and Nepszy 1988)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Dechtiar and Nepszy 1988)

Adult Nematoda: *Camallanus ancyloDIRUS*, (Dechtiar and Nepszy 1988); *Camallanus oxycephalus*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Rhabdochona cascadilla*, (Bangham and Hunter 1939); *Rhabdochona milleri*, (Dechtiar and Nepszy 1988); *Philometroides nodulosa*, (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Table 21, continued.

Adult Acanthocephala: *Neoechinorhynchus carpodi*, (Dechtiar 1968; Dechtiar 1972a; Dechtiar and Nepszy 1988); *Neoechinorhynchus crassus*, (Dechtiar 1972a); *Pomphorhynchus bulbocolli*, (Bangham 1972; Dechtiar 1972a; Dechtiar and Nepszy 1988)

Hirudinea: *Actinobdella inequiannulata*, (Bangham 1972)

Mollusca: Unidentified glochidia, (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Copepoda: *Argulus catostomi*, (Dechtiar and Nepszy 1988); *Ergasilus caeruleus*, (Dechtiar 1972a; Dechtiar and Nepszy 1988)

***Catostomus commersonii* (white sucker)**

Mastigophora: *Trypanoplasma catostomi*, (Bower and Woo 1977)

Myxozoa: *Myxobolus bibullatum*, (Dechtiar and Nepszy 1988); *Myxobolus* sp., (Dechtiar 1972a); unidentified myxozoan, (Bangham 1972)

Adult Digenea: *Phyllodistomum lysteri*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Bucephalus* sp., (Dechtiar and Nepszy 1988); *Lissorchis attenuatus*, (Bangham 1972; Dechtiar and Nepszy 1988); *Sanguinicola* sp., (Dechtiar and Nepszy 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Nepszy 1988); *Diplostomum flexicaudum*, (Dechtiar 1972a); *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Dechtiar and Nepszy 1988); *Posthodiplostomum minimum*, (Dechtiar and Nepszy 1988)

Monogenea: *Octomacrum lanceatum*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Anonchohaptor anomalus*, (Dechtiar 1972a; Dechtiar and Dillon 1974; Dechtiar and Nepszy 1988); *Acolpenteron catostomi*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Pseudomurraytrema copulatum*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Gyrodactylus spathulatus*, (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Adult Cestoda: *Biacetabulum* sp., (Dechtiar and Nepszy 1988); *Glaridacris catostomi*, (Hunter 1927; Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

Larval/Immature Cestoda: *Ligula intestinalis*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Triaenophorus nodulosus*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

Adult Nematoda: *Rhabdochona ovifilamenta*, (Dechtiar and Nepszy 1988); *Philometroides nodulosa*, (Dechtiar and Nepszy 1988)

Larval/Immature Nematoda: *Eustrongylides tubifex*, (Dechtiar and Nepszy 1988); *Agamonema* sp., (Bangham and Hunter 1939); unidentified nematode, (Bangham 1972)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Nepszy 1988); *Neoechinorhynchus crassus*, (Bangham and Hunter 1939; Dechtiar 1972a; Dechtiar and Nepszy 1988; Van Cleave 1949); *Neoechinorhynchus cristatus*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Octospinifer macilentus*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988; Van Cleave 1949); *Pomphorhynchus bulbocolli*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

Hirudinea: *Actinobdella* sp., (Bower and Woo 1977); *Myzobdella* sp., (Dechtiar and Nepszy 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Nepszy 1988)

Copepoda: *Argulus catostomi*, (Dechtiar and Nepszy 1988); *Ergasilus caeruleus*, (Bangham 1972; Dechtiar and Nepszy 1988); *Lernaea* sp., (Bangham 1972)

Table 21, continued.

***Erimyzon sucetta* (lake chubsucker)**

Larval/Immature Digenea: *Neascus* sp., (Bangham 1972)

Mollusca: Unidentified glochidia, (Bangham 1972)

***Hypentelium nigricans* (northern hog sucker)**

Myxozoa: Unidentified myxozoan, (Bangham 1972; Bangham and Hunter 1939)

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1972); *Neascus* sp., (Bangham 1972)

Adult Cestoda: *Glaridacris catostomi*, (Bangham 1972)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Bangham 1972)

***Minytrema melanops* (spotted sucker)**

Myxozoa: Unidentified myxozoan, (Bangham 1972)

Larval/Immature Digenea: *Neascus* sp., (Bangham 1972)

Larval/Immature Cestoda: *Glaridacris* sp., (Bangham 1972)

Larval/Immature Nematoda: *Philonema* sp., (Bangham 1972)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar 1972a)

***Moxostoma anisurum* (silver redhorse)**

Myxozoa: *Myxobolus conspicuus*, (Dechtiar 1972a); *Myxobolus* sp., (Dechtiar 1972a)

Adult Monogenea: *Anonchohaptor anomalus*, (Dechtiar 1972a); *Dactylogyrus urus*, (Dechtiar 1972a);

Pseudomurraytrema copulatum, (Dechtiar 1972a); *Gyrodactylus* sp., (Dechtiar 1972a)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Dechtiar 1972a)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar 1972a)

***Moxostoma aureolum* (pealip shorthead redhorse)**

Myxozoa: Unidentified myxozoan, (Bangham 1972)

Adult Digenea: *Lissorchis attenuatus*, (Bangham 1972)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939)

Monogenea: *Dactylogyrus urus*, (Dechtiar 1972a)

Adult Nematoda: Unidentified nematode, (Bangham and Hunter 1939)

Adult Acanthocephala: *Octospinifer macilentus*, (Bangham 1972)

***Moxostoma erythrurum* (golden redhorse)**

Myxozoa: *Myxobolus* sp., (Dechtiar 1972a)

Adult Digenea: *Phyllodistomum* sp., (Dechtiar 1972a); *Sanguinicola* sp., (Dechtiar 1972a)

Larval/Immature Digenea: *Diplostomum flexicaudum*, (Dechtiar 1972a)

Monogenea: *Anonchohaptor anomalus*, (Dechtiar 1972a); *Dactylogyrus* sp., (Dechtiar 1972a);

Pseudomurraytrema copulatum, (Dechtiar 1972a)

Table 21, continued.

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Dechtiar 1972a)
Adult Nematoda: *Rhabdochona milleri*, A. Dechtiar (unpublished data); Moravec and Arai 1971; Dechtiar 1972a
Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar 1972a)

***Moxostoma macrolepidotum* (shorthead redhorse)**

Myxozoa: Unidentified myxozoan, (Bangham and Hunter 1939)
Adult Digenea: *Phyllodistomum* sp., (Dechtiar 1972a); *Sanguinicola* sp., (Dechtiar 1972a)
Larval/Immature Digenea: *Diplostomum flexicaudum*, (Dechtiar 1972a)
Monogenea: *Anonchohaptor anomalus*, (Dechtiar 1972a); *Dactylogyrus* sp., (Dechtiar 1972a);
Pellucidhaptor sp., (Dechtiar 1972a); *Pseudomurraytrema copulatum*, (Dechtiar 1972a);
Pseudomurraytrema moxostomi, (Dechtiar 1972a); *Gyrodactylus* sp., (Dechtiar 1972a)
Adult Nematoda: *Rhabdochona cascadilla*, (Bangham and Hunter 1939); *Rhabdochona milleri*, (Dechtiar 1972a; A. Dechtiar (unpublished data); Moravec and Arai 1971
Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar 1972a)

Ictaluridae

***Ameiurus melas* (black bullhead)**

Adult Digenea: *Polylekithum ictaluri*, (Bangham 1972); *Crepidostomum cooperi*, (Bangham 1972);
Crepidostomum sp., (Bangham and Hunter 1939); *Megalogonia ictaluri*, (Bangham and Hunter 1939);
Leuceruthrus micropteri, (Bangham and Hunter 1939); *Acetodextra amiuri*, (Bangham 1972);
Alloglossidium corti, (Bangham 1972)
Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham and Hunter 1939); *Diplostomum* sp.,
(Bangham 1972); unidentified metacercariae, (Bangham 1972)
Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)
Adult Cestoda: *Corallobothrium fimbriatum*, (Bangham 1972; Bangham and Hunter 1939);
Corallobothrium sp., (Bangham and Hunter 1939)
Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham and Hunter 1939)
Adult Nematoda: *Dichelyne cotylophora*, (Bangham and Hunter 1939); *Dichelyne robustus*, (Bangham 1972);
Spinitectus gracilis, (Bangham 1972)
Adult Acanthocephala: *Leptorhynchoides thecatus*, (Bangham 1972)
Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)
Hirudinea: *Piscicola punctata*, (Bangham and Hunter 1939)

***Ameiurus natalis* (yellow bullhead)**

Ciliophora: *Ichthyophthirius multifiliis*, (Bangham 1972)
Myxozoa: Unidentified myxozoan, (Bangham 1972)
Adult Digenea: *Polylekithum ictaluri*, (Bangham 1972); *Acetodextra amiuri*, (Bangham 1972);
Phyllodistomum staffordi, (Bangham 1972)
Larval/Immature Digenea: *Bucephalus elegans*, (Bangham 1972); *Diplostomum* sp., (Bangham 1972);
unidentified metacercariae, (Bangham 1972)

Table 21, continued.

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)
Adult Cestoda: *Corallobothrium fimbriatum*, (Bangham 1972)
Larval/Immature Cestoda: *Bothriocephalus* sp., (Bangham 1972); *Proteocephalus ambloplitis*, (Bangham 1972)
Adult Nematoda: *Dichelyne robustus*, (Bangham 1972)
Hirudinea: *Myzobdella* sp., (Bangham 1972)
Copepoda: *Achtheres pimelodi*, (Tidd 1931)

***Ameiurus nebulosus* (brown bullhead)**

Ciliophora: *Ichthyophthirius multifiliis*, (Bangham 1972)
Myxozoa: *Hennuguya exilis*, (Dechtiar 1972a); unidentified myxozoan, (Bangham 1972)
Adult Digenea: *Polylekithum ictaluri*, (Bangham 1972); *Acetodextra amiuri*, (Bangham 1972);
Phyllodistomum lacustri, (Bangham 1972); *Phyllodistomum staffordi*, (Bangham 1972; Dechtiar 1972a);
Phyllodistomum superbum, (Bangham and Hunter 1939); *Glossidium geminum*, (Bangham 1972)
Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham and Hunter 1939); *Diplostomum* sp.,
(Bangham 1972); *Ichthyocotylurus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Dechtiar 1972a);
unidentified metacercariae, (Bangham 1972)
Monogenea: *Ligictaluridus floridanus*, (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)
Adult Cestoda: *Corallobothrium fimbriatum*, (Bangham 1972); *Corallobothrium* sp., (Bangham and Hunter 1939);
Proteocephalus pearsei, (Bangham 1972)
Adult Nematoda: *Camallanus oxycephalus*, (Dechtiar 1972a); *Spinitectus carolini*, (Jilek and Crites 1981);
Spinitectus gracilis, (Bangham 1972; Jilek and Crites 1981); *Dichelyne robustus*, (Bangham 1972)
Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)
Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar 1972a); *Leptorhynchoides thecatus*,
(Bangham 1972)
Hirudinea: *Myzobdella* sp., (Bangham 1972)
Mollusca: Unidentified glochidia, (Bangham 1972)
Copepoda: *Argulus appendiculosus*, (Tidd 1931); *Ergasilus versicolor*, (Bangham 1972; Dechtiar 1972a);
Achtheres sp., (Bangham 1972)

***Ictalurus punctatus* (channel catfish)**

Ciliophora: *Ichthyophthirius multifiliis*, (Baker and Crites 1976; Bangham 1972; Dechtiar and Nepszy 1988)
Myxozoa: *Hennuguya exilis*, (Baker and Crites 1976; Dechtiar 1972a; Dechtiar and Nepszy 1988);
unidentified myxozoan, (Bangham 1972; Bangham and Hunter 1939)
Adult Digenea: *Allocreadium corti*, (Baker and Crites 1976); *Polylekithum ictaluri*, (Baker and Crites 1976;
Bangham 1972); *Megalogonia ictaluri*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988);
Acetodextra amiuri, (Baker and Crites 1976; Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988);
Allacanthochoasmus varius, (Baker and Crites 1976); *Vietsoma parvum*, (Bangham and Hunter 1939);
Phyllodistomum lacustri, (Baker and Crites 1976; Bangham 1972; Dechtiar 1972a; Dechtiar and Nepszy 1988);
Phyllodistomum sp., (Bangham and Hunter 1939); *Macroderoides* sp., (Bangham and Hunter 1939);
Alloglossidium corti, (Bangham 1972; Dechtiar and Nepszy 1988)

Table 21, continued.

Larval/Immature Digenea: *Clinostomum complanatum*, (Dechtiar and Nepszy 1988); *Diplostomum spathaceum*, (Baker and Crites 1976; Dechtiar and Nepszy 1988); *Diplostomum* sp., (Bangham 1972)

Monogenea: *Ligictaluridus floridanus*, (Baker and Crites 1976; Dechtiar 1972a; Dechtiar and Nepszy 1988); *Ligictaluridus pricei*, (Baker and Crites 1976; Dechtiar 1972a; Dechtiar and Nepszy 1988); *Gyrodactylus* sp., (Dechtiar and Nepszy 1988); unidentified Gyrodactyloidea, (Bangham 1972; Bangham and Hunter 1939)

Adult Cestoda: *Haplobothrium globuliforme*, (Dechtiar 1972a); *Corallobothrium fimbriatum*, (Baker and Crites 1976; Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Megathylacoides giganteum*, (Baker and Crites 1976; Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

Larval/Immature Cestoda: *Bothriocephalus* sp., (Bangham 1972; Dechtiar and Nepszy 1988); *Proteocephalus ambloplitis*, (Dechtiar and Nepszy 1988)

Adult Nematoda: *Camallanus oxycephalus*, (Baker and Crites 1976; Bangham 1972; Stromberg and Crites 1975b); *Dichelyne robustus*, (Baker and Crites 1976; Bangham 1972); *Spinitectus carolini*, (Jilek and Crites 1981); *Spinitectus gracilis*, (Baker and Crites 1976; Bangham and Hunter 1939; Bangham 1972; Jilek and Crites 1981)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939); *Camallanus oxycephalus*, (Bangham and Hunter 1939); *Eustrongylides tubifex*, (Baker and Crites 1976; Cooper et al. 1978b; Dechtiar and Nepszy 1988); *Eustrongylides* sp., (Bangham 1972)

Adult Acanthocephala: *Neoechinorhynchus rutili*, (Baker and Crites 1976); *Pomphorhynchus* sp., (Bangham and Hunter 1939); *Leptorhynchoides thecatus*, (Bangham 1972)

Immature Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar and Nepszy 1988); *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

Hirudinea: *Myzobdella lugubris*, (Baker and Crites 1976; Bangham 1972; Dechtiar 1972a; Dechtiar and Nepszy 1988)

Mollusca: Unidentified glochidia, (Bangham 1972; Dechtiar and Nepszy 1988)

Copepoda: *Argulus biramosus*, (Dechtiar and Nepszy 1988); *Ergasilus versicolor*, (Tidd 1931; Baker and Crites 1976; Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Achtheres pimelodi*, (Tidd 1931; Baker and Crites 1976; Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

***Noturus flavus* (stonecat)**

Adult Digenea: *Megalogonia ictaluri*, (Bangham and Hunter 1939); *Acetodextra amiuri*, (Bangham and Hunter 1939; Dechtiar 1972a); *Alloglossidium corti*, (Bangham 1972)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); unidentified metacercariae, (Bangham 1972)

Monogenea: *Cleidodiscus pricei*, (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)

Adult Cestoda: *Corallobothrium fimbriatum*, (Bangham 1972; Bangham and Hunter 1939)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972; Bangham and Hunter 1939)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939); *Spinitectus gracilis*, (Bangham and Hunter 1939)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

Table 21, continued.

***Noturus gyrinus* (tadpole madtom)**

Adult Digenea: *Acetodextra amiuri*, (Bangham and Hunter 1939); *Alloglossidium corti*, (Bangham and Hunter 1939)

Monogenea: *Ligictaluridus floridanus*, (Dechtiar 1972a); *Ligictaluridus pricei*, (Dechtiar 1972a)

Copepoda: *Ergasilus versicolor*, (Bangham and Hunter 1939)

***Noturus miurus* (brindled madtom)**

Adult Digenea: *Megalogonia ictaluri*, (Bangham and Hunter 1939)

Larval/Immature Digenea: *Neascus* sp., (Bangham and Hunter 1939)

Adult Cestoda: *Bothriocephalus* sp., (Bangham and Hunter 1939); *Corallobothrium fimbriatum*, (Bangham and Hunter 1939)

Esocidae

***Esox americanus* (grass pickerel)**

Adult Digenea: *Azygia angusticauda*, (Bangham and Hunter 1939); *Centrovarium lobotes*, (Bangham and Hunter 1939)

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1972); *Neascus* sp., (Bangham 1972); *Macroderoides* sp., (Bangham 1972)

Adult Cestoda: *Proteocephalus pinguis*, (Bangham 1972; Bangham and Hunter 1939)

Adult Nematoda: *Spinitectus gracilis*, (Bangham and Hunter 1939)

***Esox lucius* (northern pike)**

Ciliophora: *Trichodina* sp., (Dechtiar 1972a)

Adult Digenea: *Azygia angusticauda*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Centrovarium lobotes*, (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Larval/Immature Digenea: *Uvulifer ambloplitis*, (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Monogenea: *Tetraonchus monenteron*, (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Adult Cestoda: *Proteocephalus pinguis*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988; Hunter 1929); *Trienophorus nodulosus*, (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Adult Nematoda: *Raphidascaris acus*, (Smith 1984); *Hysterothylacium brachyurum*, (Dechtiar and Nepszy 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar 1972a; Dechtiar and Nepszy 1988);

Neoechinorhynchus tenellus, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

Immature Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Nepszy 1988)

***Esox masquinongy* (muskellunge)**

Larval/Immature Digenea: *Diplostomum flexicaudum*, (Dechtiar 1972a)

Copepoda: *Ergasilus caeruleus*, (Dechtiar 1972a)

Table 21, continued.

Umbridae

***Umbra limi* (central mudminnow)**

Larval/Immature Nematoda: *Spiroxys* sp., (Bangham and Hunter 1939)

Osmeridae

***Osmerus mordax* (rainbow smelt)**

Microspora: *Glugea hertwigi*, (Chen and Power 1972; Dechtiar 1965b; Dechtiar 1972a; Dechtiar and Nepszy 1988; Nepszy and Dechtiar 1972; Nepszy et al. 1978; Nsembukya-Katuramu et al. 1981)

Myxozoa: Unidentified myxozoan, (Bangham 1972)

Larval/Immature Digenea: *Crepidostomum* sp., (Bangham 1972); *Proterometra* sp., (Bangham 1972); *Diplostomum flexicaudum*, (Dechtiar 1972a); *Diplostomum spathaceum*, (Dechtiar and Nepszy 1988); *Ichthyocotylurus intermedia*, (Dechtiar and Nepszy 1988); *Ichthyocotylurus* sp., (Bangham 1972; Dechtiar 1972a)

Larval/Immature Cestoda: *Proteocephalus* sp., (Bangham and Hunter 1939; Dechtiar 1972a; Dechtiar and Nepszy 1988)

Adult Nematoda: *Camallanus oxycephalus*, (Stromberg and Crites 1975b; Stromberg et al. 1973)

Larval/Immature Nematoda: Unidentified nematode, (Bangham 1972)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Nepszy 1988); *Echinorhynchus salmonis*, (Bangham 1972; Dechtiar 1972a; Dechtiar and Nepszy 1988); *Neoechinorhynchus rutili*, (Dechtiar and Nepszy 1988)

Salmonidae

***Coregonus artedii* (lake herring/cisco)**

Larval/Immature Digenea: *Ichthyocotylurus* sp., (Dechtiar 1972a)

Adult Cestoda: *Proteocephalus exiguus*, (Bangham and Hunter 1939); *Proteocephalus wickliffi*, (Bangham and Hunter 1939; Hunter and Bangham 1933)

Larval/Immature Cestoda: bothriocephalid plerocercoids, (Vergeer 1928); *Eubothrium crassum*, (Bangham and Hunter 1939)

Adult Nematoda: *Cystidicola stigmatura*, (Bangham and Hunter 1939; Hunter and Bangham 1933; Ward and Magath 1916)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar 1972a)

Copepoda: *Salmincola inermis*, (Tidd 1931)

***Coregonus clupeaformis* (lake whitefish)**

Adult Digenea: Unidentified digenean, (Bangham and Hunter 1939)

Larval/Immature Digenea: *Diplostomum flexicaudum*, (Dechtiar 1972a)

Adult Cestoda: *Eubothrium crassum*, (Bangham and Hunter 1939); *Proteocephalus exiguus*, (Bangham and Hunter 1939; Hunter and Bangham 1933)

Larval/Immature Cestoda: *Schistocephalus* sp., (Bangham and Hunter 1939)

Table 21, continued.

Adult Nematoda: *Cystidicola stigmatura*, (Bangham and Hunter 1939; Ward and Magath 1916)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Bangham and Hunter 1939; Dechtiar 1972a);
Neoechinorhynchus tumidus, (Dechtiar 1972a)
Immature Acanthocephala: *Echinorhynchus* sp., (Bangham and Hunter 1939)
Copepoda: *Achtheres coregoni*, (Tidd 1931); *Achtheres pimelodi*, (Dechtiar 1972a)

***Coregonus* sp. (herring)**

Larval/Immature Cestoda: *Diphyllobothrium laruei*, (Vergeer 1942)

***Salvelinus fontinalis* (brook trout)**

Adult Nematoda: *Cystidicoloides ephemeridarum*, (Bangham and Hunter 1939)

***Salvelinus namaycush* (lake trout)**

Adult Nematoda: *Cystidicola stigmatura*, (Ward and Magath 1916)

Percopsidae

***Percopsis omiscomaycus* (trout-perch)**

Myxozoa: Unidentified myxozoan, (Bangham and Hunter 1939; Bangham 1972)
Adult Digenea: *Crepidostomum isostomum*, (Bangham and Hunter 1939; Bangham 1972)
Larval/Immature Digenea: *Bucephalus* sp., (Dechtiar 1972a); *Diplostomum flexicaudum*, (Dechtiar 1972a);
Diplostomum sp., (Bangham 1972a); *Ichthyocotylurus* sp., (Bangham 1972); *Ichthyocotylurus pileatus*,
(Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939);
Centrovarium lobotes, (Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)
Monogenea: *Cleidodiscus* sp., (Dechtiar 1972a); *Urocleidus baldwini*, (Dechtiar 1974b); unidentified
Gyrodactyloidea, (Bangham 1972)
Adult Cestoda: *Bothriocephalus claviceps*, (Bangham and Hunter 1939); *Bothriocephalus cuspidatus*,
(Bangham and Hunter 1939); *Proteocephalus pearsei*, (Bangham and Hunter 1939)
Larval/Immature Cestoda: *Bothriocephalus cuspidatus*, (Bangham and Hunter 1939); *Triaenophorus*
stizostedionis, (Dechtiar 1972a); *Triaenophorus* sp., (Bangham and Hunter 1939)
Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939; Stromberg and
Crites 1975b); *Spinitectus gracilis*, (Bangham 1972)
Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)
Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)
Hirudinea: *Myzobdella* sp., (Dechtiar 1972a)
Mollusca: Unidentified glochidia, (Bangham 1972)
Copepoda: *Ergasilus caeruleus*, (Bangham 1972; Dechtiar 1972a); *Ergasilus caeruleus*, (Tidd 1931)

Gadidae

***Lota lota* (burbot)**

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972)

Adult Cestoda: *Eubothrium crassum*, (Bangham and Hunter 1939); unidentified cestode, (Ward 1937)

Larval/Immature Cestoda: *Sparganum pseudosegmentatum*, (Vergeer 1942)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972); *Haplonema hamulatum*, (Bangham and Hunter 1939)

Adult Acanthocephala: *Echinorhynchus leidyi*, (Ward 1937); *Echinorhynchus salmonis*, (Bangham and Hunter 1939; Ward 1937)

Immature Acanthocephala: *Neoechinorhynchus cylindratus*, (Ward 1937); *Leptorhynchoides thecatus*, (Ward 1937)

Hirudinea: *Piscicola punctata*, (Bangham and Hunter 1939)

Fundulidae

***Fundulus diaphanus* (banded killifish)**

Myxozoa: Unidentified myxozoan, (Bangham and Hunter 1939)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Adult Cestoda: *Proteocephalus* sp., (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Proteocephalus* sp., (Bangham and Hunter 1939)

Adult Nematoda: *Rhabdochona* sp., (Bangham and Hunter 1939)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Immature Acanthocephala: *Neoechinorhynchus* sp., (Bangham and Hunter 1939); *Leptorhynchoides thecatus*, (Bangham 1972)

Atherinopsidae

***Labidesthes sicculus* (brook silverside)**

Larval/Immature Digenea: *Allocreadium* sp., (Bangham and Hunter 1939); *Allacanthochasmus varius*, (Bangham and Hunter 1939); *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Larval/Immature Cestoda: *Bothriocephalus* sp., (Bangham and Hunter 1939); *Proteocephalus ambloplitis*, (Bangham and Hunter 1939)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Table 21, continued.

Gasterosteidae

***Culaea inconstans* (brook stickleback)**

Adult Digenea: *Bunoderina eucaliae*, (Bangham 1972; Bangham and Hunter 1939)

Monogenea: *Dactylogyrus eucalius*, (Dechtiar 1972a); *Gyrodactylus* sp., (Dechtiar 1972a)

Adult Cestoda: *Proteocephalus* sp., (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Proteocephalus* sp., (Bangham and Hunter 1939)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Cottidae

***Cottus bairdii* (mottled sculpin)**

Myxozoa: Unidentified myxozoa, (Bangham 1972)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Dechtiar 1972a)

Monogenea: *Dactylogyrus buddi*, (Dechtiar 1974a); *Dactylogyrus* sp., (Dechtiar 1972a); *Gyrodactylus bairdi*, (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)

Adult Cestoda: *Proteocephalus* sp., (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham and Hunter 1939); *Proteocephalus* sp., (Bangham and Hunter 1939)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Bangham 1972)

Copepoda: *Ergasilus* sp., (Bangham 1972)

***Cottus cognatus* (slimy sculpin)**

Monogenea: *Dactylogyrus buddi*, (Dechtiar 1974a)

Moronidae

***Morone americana* (white perch)**

Larval/Immature Digenea: *Neochasmus umbellus*, (Kvach and Stepien 2008a)

***Morone chrysops* (white bass)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Trichodina* sp., (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Capriniana piscium*, (Dechtiar and Nepszy 1988); *Capriniana* sp., (Dechtiar 1972a)

Myxozoa: Unidentified myxozoan, (Bangham 1972)

Adult Digenea: *Crepidostomum cooperi*, (Bangham 1972); *Leuceruthrus micropteri*, (Dechtiar and Nepszy 1988); *Leuceruthrus* sp., (Bangham and Hunter 1939); *Proterometra macrostoma*, (Bangham 1972);

Bucephalus elegans, (Bangham 1972); *Allacanthochasmus artus*, (Bangham 1972; Dechtiar and Nepszy 1988); *Allacanthochasmus varius*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988);

Neochasmus umbellus, (Dechtiar and Nepszy 1988; Kvach and Stepien 2008a; Kvach and Stepien 2008b); unidentified digenean, (Bangham and Hunter 1939)

Table 21, continued.

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Nepszy 1988); *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Bangham 1972); *Neascus* sp., (Bangham and Hunter 1939)
Monogenea: *Urocleidus chrysops*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); unidentified
Gyrodactyloidea, (Bangham 1972; Bangham and Hunter 1939)
Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972; Bangham and Hunter 1939); *Proteocephalus pearsei*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Bothriocephalus cuspidatus*, (Dechtiar and Nepszy 1988); *Bothriocephalus* sp., (Bangham 1972); *Triaenophorus nodulosus*, (Bangham 1972; Dechtiar 1972a; Dechtiar and Nepszy 1988; Stromberg and Crites 1974a)
Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988; Stromberg and Crites 1974b, 1975a, 1975b; Stromberg et al. 1973); *Dichelyne cotylophora*, (Bangham and Hunter 1939); *Spinitectus carolini*, (Bangham 1972); *Spinitectus gracilis*, (Bangham 1972; Jilek and Crites 1981); *Rhabdochona* sp., (Bangham and Hunter 1939)
Larval/Immature Nematoda: *Raphidascaris acus*, (Dechtiar and Nepszy 1988); *Eustrongylides tubifex*, (Dechtiar and Nepszy 1988); *Spiroxys* sp., (Dechtiar and Nepszy 1988); *Agamonema* sp., (Bangham and Hunter 1939)
Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Nepszy 1988)
Mollusca: Unidentified glochidia, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988)
Copepoda: *Ergasilus caeruleus*, (Bangham 1972); *Ergasilus* sp., (Dechtiar and Nepszy 1988); *Achtheres* sp., (Bangham 1972)

Centrarchidae

***Ambloplites rupestris* (rock bass)**

Myxozoa: Unidentified myxozoan, (Bangham 1972)
Adult Digenea: *Crepidostomum cooperi*, (Bangham 1972); *Crepidostomum cornutum*, (Bangham 1972; Bangham and Hunter 1939); *Leuceruthrus micropteri*, (Bangham and Hunter 1939); *Bucephalus elegans*, (Bangham 1972); *Cryptogonimus chili*, (Bangham 1972; Bangham and Hunter 1939); *Phyllodistomum* sp., (Dechtiar 1972a)
Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham and Hunter 1939); *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939); *Uvulifer ambloplitis*, (Bangham and Hunter 1939)
Monogenea: *Cleidodiscus* sp., (Dechtiar 1972a); *Cleidodiscus alatus*, (Dechtiar 1972a); *Onchocleidus chautauguensis*, (Dechtiar 1972a); *Tetracleidus stentor*, (Dechtiar 1972a); *Lyrodiscus rupestris*, (Dechtiar 1972a; Dechtiar 1973); *Gyrodactylus* sp., (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)
Adult Cestoda: *Bothriocephalus claviceps*, (Bangham and Hunter 1939); *Proteocephalus ambloplitis*, (Bangham and Hunter 1939); *Proteocephalus pearsei*, (Bangham and Hunter 1939)
Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham and Hunter 1939; Bangham 1972); *Proteocephalus pearsei*, (Bangham 1972); *Bothriocephalus* sp., (Bangham 1972); *Triaenophorus nodulosus*, (Bangham 1972)
Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939; Stromberg and Crites 1975b); *Contracaecum* sp., (Bangham and Hunter 1939); *Capillaria catenata*, (Bangham 1972); *Dichelyne cotylophora*, (Bangham 1972); *Spinitectus carolini*, (Bangham 1972; Bangham and Hunter 1939; Jilek and Crites 1981); *Spinitectus gracilis*, (Bangham and Hunter 1939; Jilek and Crites 1981); *Rhabdochona* sp., (Bangham and Hunter 1939)

Table 21, continued.

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939); *Philometra cylindracea*, (Bangham 1972)
Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Bangham 1972); *Pomphorhynchus bulbocolli*, (Bangham 1972); *Pomphorhynchus rocci*, (Dechtiar 1972a); *Leptorhynchoides thecatus*, (Bangham 1972; Bangham and Hunter 1939)
Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)
Hirudinea: *Myzobdella* sp., (Bangham 1972)
Mollusca: Unidentified glochidia, (Bangham 1972)
Copepoda: *Ergasilus centrarchidarum*, (Tidd 1931; Bangham and Hunter 1939); *Ergasilus caeruleus*, (Bangham 1972); *Lernaea cruciata*, (Tidd 1931; Bangham 1972); *Achtheres pimelodi*, (Tidd 1931; Bangham 1972; Bangham and Hunter 1939)

***Lepomis cyanellus* (green sunfish)**

Adult Digenea: *Crepidostomum cornutum*, (Bangham 1972); *Proterometra macrostoma*, (Bangham 1972)
Larval/Immature Digenea: *Crepidostomum* sp., (Bangham 1972); *Bucephalus elegans*, (Bangham 1972); *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972)
Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)
Larval/Immature Cestoda: *Bothriocephalus* sp., (Bangham 1972); *Proteocephalus ambloplitis*, (Bangham 1972); *Proteocephalus* sp., (Bangham 1972)
Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972); *Hysterothylacium brachyurum*, (Bangham 1972); *Spinitectus carolini*, (Bangham 1972)
Adult Acanthocephala: *Leptorhynchoides thecatus*, (Bangham 1972)
Hirudinea: *Myzobdella* sp., (Bangham 1972)
Mollusca: Unidentified glochidia, (Bangham 1972)
Copepoda: *Ergasilus caeruleus*, (Bangham 1972)

***Lepomis gibbosus* (pumpkinseed)**

Ciliophora: *Ichthyophthirius multifiliis*, (Bangham 1972)
Myxozoa: *Chloromyxum gibbosum*, (Herrick 1941); *Henneguya ohioensis*, (Herrick 1941); *Myxobolus gibbosus*, (Herrick 1941); *Myxobolus osburni*, (Herrick 1936); unidentified myxozoan, (Bangham 1972; Bangham and Hunter 1939)
Adult Digenea: *Allocreadium* sp., (Bangham and Hunter 1939); *Crepidostomum cooperi*, (Bangham 1972); *Crepidostomum cornutum*, (Bangham 1972); *Megalogonia ictaluri*, (Bangham 1972); *Bucephalus elegans*, (Bangham 1972); unidentified digenean, (Bangham and Hunter 1939)
Larval/Immature Digenea: *Bucephalus elegans*, (Bangham 1972); *Clinostomum complanatum*, (Bangham 1972; Bangham and Hunter 1939); *Diplostomum* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar 1972a); *Uvulifer ambloplitis*, (Bangham and Hunter 1939)
Monogenea: *Actinocleidus oculatus*, (Dechtiar 1972a); *Actinocleidus recurvatus*, (Dechtiar 1972a); *Onchocleidus ferox*, (Dechtiar 1972a); *Cleidodiscus similis*, (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)

Table 21, continued.

Larval/Immature Cestoda: *Bothriocephalus* sp., (Bangham and Hunter 1939); *Proteocephalus ambloplitis*, (Bangham 1972; Bangham and Hunter 1939)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939; Stromberg and Crites 1975b); *Spinitectus carolini*, (Bangham 1972; Bangham and Hunter 1939; Jilek and Crites 1981); *Spinitectus gracilis*, (Jilek and Crites 1981)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Bangham 1972); *Pomphorhynchus bulbocolli*, (Bangham 1972; Dechtiar 1972a); *Leptorhynchoides thecatus*, (Bangham 1972; Bangham and Hunter 1939)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

Hirudinea: *Piscicola punctata*, (Bangham and Hunter 1939)

Mollusca: Glochidia of *Anodonta* sp., (Bangham 1972)

Copepoda: *Ergasilus caeruleus*, (Bangham 1972); *Lernaea cyprinacea*, (Dechtiar 1972a); *Lernaea* sp., (Bangham 1972)

***Lepomis humilis* (orangespotted sunfish)**

Adult Digenea: *Phyllodistomum lohrenzi*, (Bangham 1972)

Larval/Immature Digenea: *Posthodiplostomum minimum*, (Bangham 1972); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Adult Nematoda: *Spinitectus carolini*, (Bangham 1972)

***Lepomis macrochirus* (bluegill)**

Adult Digenea: *Crepidostomum cooperi*, (Bangham 1972); *Bucephalus elegans*, (Bangham 1972)

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham and Hunter 1939); *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Bangham and Hunter 1939; Bangham 1972); *Neascus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar 1972a); *Uvulifer ambloplitis*, (Bangham and Hunter 1939)

Monogenea: *Actinocleidus bakeri*, (Dechtiar 1972a); *Clavunculus unguis*, (Dechtiar 1972a); *Cleidodiscus venardi*, (Dechtiar 1972a); *Cleidodiscus* sp., (Dechtiar 1972a); *Lyrodiscus longibasus*, (Dechtiar 1972a); *Lyrodiscus seminolensis*, (Dechtiar 1973); *Lyrodiscus* sp., (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972; Bangham and Hunter 1939)

Adult Cestoda: *Proteocephalus pearsei*, (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham and Hunter 1939; Bangham 1972); *Bothriocephalus* sp., (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939); *Dichelyne cotylophora*, (Bangham and Hunter 1939); *Rhabdochona* sp., (Bangham and Hunter 1939); *Spinitectus carolini*, (Bangham 1972; Jilek and Crites 1981); *Spinitectus gracilis*, (Jilek and Crites 1981)

Larval/Immature Nematoda: *Philometra cylindracea*, (Bangham 1972)

Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Bangham 1972); *Pomphorhynchus bulbocolli*, (Bangham 1972); *Leptorhynchoides thecatus*, (Bangham and Hunter 1939; Bangham 1972)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

Hirudinea: *Piscicola punctata*, (Bangham and Hunter 1939)

Table 21, continued.

Mollusca: Unidentified glochidia, (Bangham 1972; Bangham and Hunter 1939)

Copepoda: *Ergasilus centrarchidarum*, (Bangham and Hunter 1939); *Ergasilus caeruleus*, (Tidd 1931; Bangham 1972); *Lernaea cyprinacea*, (Dechtiar 1972a)

***Lepomis megalotis* (longear sunfish)**

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham 1972); *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972); *Spinitectus carolini*, (Bangham 1972)

Larval/Immature Nematoda: Unidentified nematode, (Bangham 1972)

***Micropterus dolomieu* (smallmouth bass)**

Ciliophora: *Ichthyophthirius multifiliis*, (Bangham 1972; Bangham and Hunter 1939)

Myxozoa: *Myxobolus inornatus*, (Dechtiar and Nepszy 1988); *Myxobolus kostiri*, (Herrick 1936); *Myxobolus osburni*, (Herrick 1936); *Myxobolus* sp., (Bangham and Hunter 1939); unidentified myxozoan, (Bangham 1972)

Adult Digenea: *Crepidostomum cornutum*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Azygia angusticauda*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Leucorhynchus micropteri*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Rhipidocotyle papillosa*, (Bangham 1972; Bangham and Hunter 1939); *Neochasmus umbellus*, (Bangham and Hunter 1939); *Cryptogonimus chili*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Microphallus opacus*, (Bangham and Hunter 1939); *Centrovarium lobotes*, (Bangham and Hunter 1939)

Larval/Immature Digenea: *Uvulifer ambloplitis*, (Dechtiar and Nepszy 1988); *Bucephalus* sp., (Dechtiar and Nepszy 1988); *Clinostomum complanatum*, (Bangham 1972; Bangham and Hunter 1939); *Diplostomum spathaceum*, (Dechtiar and Nepszy 1988); *Diplostomum* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972; Dechtiar and Nepszy 1988); unidentified metacercariae, (Bangham 1972)

Monogenea: *Cleidodiscus* sp., (Dechtiar 1972a); *Tetracleidus banghami*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Synclathrium fusiformis*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Gyrodactylus macrochiri*, (Dechtiar and Nepszy 1988); unidentified Gyrodactyloidea, (Bangham 1972; Bangham and Hunter 1939)

Adult Cestoda: *Bothriocephalus claviceps*, (Bangham and Hunter 1939); *Proteocephalus ambloplitis*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Proteocephalus fluviatilis*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Proteocephalus pearsei*, (Bangham and Hunter 1939); *Proteocephalus stizostethi*, (Hunter and Bangham 1933)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Proteocephalus pearsei*, (Bangham 1972); *Bothriocephalus* sp., (Bangham 1972); *Triaenophorus nodulosus*, (Dechtiar and Nepszy 1988); *Triaenophorus* sp., (Bangham and Hunter 1939)

Table 21, continued.

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Nepszy 1988); *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988; Stromberg and Crites 1975b); *Dichelyne cotylophora*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Spinitectus carolini*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988; Jilek and Crites 1981); *Spinitectus gracilis*, (Jilek and Crites 1981)

Larval/Immature Nematoda: *Spiroxys* sp., (Dechtiar and Nepszy 1988); *Agamonema* sp., (Bangham and Hunter 1939); *Eustrongylides tubifex*, (Cooper et al. 1978b; Dechtiar and Nepszy 1988)

Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Pomphorhynchus bulbocolli*, (Dechtiar 1972a); *Leptorhynchoides thecatus*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

Immature Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar and Nepszy 1988); *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

Hirudinea: *Myzobdella moorei*, (Dechtiar and Nepszy 1988); *Piscicola punctata*, (Bangham and Hunter 1939)

Mollusca: Unidentified glochidia, (Bangham 1972; Dechtiar and Nepszy 1988)

Copepoda: *Ergasilus centrarchidarum*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Lernaea* sp., (Bangham 1972); unidentified lernaeid, (Bangham and Hunter 1939); *Achtheres pimelodi*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

***Micropterus salmoides* (largemouth bass)**

Ciliophora: *Trichodina domerguei*, (Bangham and Hunter 1939)

Myxozoa: *Myxobolus* sp., (Bangham and Hunter 1939); unidentified myxozoan, (Bangham 1972; Bangham and Hunter 1939)

Adult Digenea: *Crepidostomum cornutum*, (Bangham 1972; Bangham and Hunter 1939); *Leuceruthrus micropteri*, (Bangham 1972; Bangham and Hunter 1939); *Caecicola parvulus*, (Bangham 1972); *Rhipidocotyle papillosa*, (Bangham 1972); *Cryptogonimus chili*, (Bangham 1972; Bangham and Hunter 1939)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Monogenea: *Onchocleidus helcis*, (Dechtiar 1972a); *Syncleithrium fusiformis*, (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972; Bangham and Hunter 1939)

Adult Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972; Bangham and Hunter 1939); *Proteocephalus fluviatilis*, (Bangham 1972); *Proteocephalus pearsei*, (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972; Bangham and Hunter 1939); *Proteocephalus pearsei*, (Bangham 1972); *Bothriocephalus* sp., (Bangham 1972); *Triaenophorus nodulosus*, (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939); *Hysterothylacium brachyurum*, (Bangham and Hunter 1939); *Dichelyne cotylophora*, (Bangham and Hunter 1939); *Spinitectus carolini*, (Bangham 1972; Bangham and Hunter 1939; Jilek and Crites 1981); *Spinitectus gracilis*, (Jilek and Crites 1981)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939); *Diocetophyma* sp., (Bangham and Hunter 1939); *Eustrongylides tubifex*, (Cooper et al. 1978b)

Table 21, continued.

Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Bangham and Hunter 1939; Bangham 1972); *Leptorhynchoides thecatus*, (Bangham 1972, Bangham and Hunter 1939)
Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)
Hirudinea: *Placobdella montifera*, (Bangham and Hunter 1939)
Copepoda: *Ergasilus centrarchidarum*, (Tidd 1931; Bangham 1972; Bangham and Hunter 1939); *Ergasilus caeruleus*, (Bangham 1972); *Achtheres pimelodi*, (Tidd 1931; Bangham 1972; Bangham and Hunter 1939)

***Micropterus* sp. (bass)**

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1927)

***Pomoxis annularis* (white crappie)**

Myxozoa: Unidentified myxozoan, (Bangham 1972; Bangham and Hunter 1939)
Adult Digenea: *Crepidostomum cooperi*, (Bangham 1972); *Cryptogonimus chili*, (Bangham 1972)
Larval/Immature Digenea: *Bucephalus elegans*, (Bangham 1972); *Ichthyocotylurus* sp., (Dechtiar 1972a); *Neascus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972)
Monogenea: *Tetracleidus longus*, (Dechtiar 1972a); *Cleidodiscus uniformis*, (Dechtiar 1972a); *Lyrodiscus longibasus*, (Dechtiar 1972a, 1973); *Tetracleidus capax*, (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)
Larval/Immature Cestoda: *Bothriocephalus* sp., (Bangham 1972); *Proteocephalus ambloplitis*, (Bangham 1972); *Proteocephalus pearsei*, (Bangham 1972)
Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939; Stromberg and Crites 1975b); *Rhabdochona* sp., (Bangham 1972); *Spinitectus gracilis*, (Bangham 1972)
Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)
Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Bangham 1972); *Leptorhynchoides thecatus*, (Bangham and Hunter 1939; Bangham 1972)

***Pomoxis nigromaculatus* (black crappie)**

Myxozoa: *Myxobolus* sp., (Dechtiar 1972a); unidentified myxozoan, (Bangham 1972).
Adult Digenea: *Crepidostomum cooperi*, (Bangham 1972)
Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)
Monogenea: *Tetracleidus longus*, (Dechtiar 1972a); *Lyrodiscus longibasus*, (Dechtiar 1972a, 1973); *Lyrodiscus* sp., (Dechtiar 1972a); *Tetracleidus capax*, (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)
Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972); *Proteocephalus pearsei*, (Bangham 1972); *Triaenophorus nodulosus*, (Bangham 1972)
Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939; Stromberg and Crites 1975b); *Spinitectus gracilis*, (Bangham 1972)
Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)
Mollusca: Unidentified glochidia, (Bangham and Hunter 1939)
Copepoda: *Ergasilus caeruleus*, (Dechtiar 1972a)

Table 21, continued.

Percidae

***Ammocrypta pellucida* (eastern sand darter)**

Adult Digenea: *Plagioporus cooperi*, (Bangham and Hunter 1939; Hunter and Bangham 1932)

Larval/Immature Digenea: *Ichthyocotylurus* sp., (Bangham and Hunter 1939); *Neascus* sp., (Bangham and Hunter 1939)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

***Etheostoma blennioides* (greenside darter)**

Adult Digenea: *Allocreadium boleosomi*, (Bangham 1972); *Allocreadium* sp., (Bangham and Hunter 1939)

Larval/Immature Digenea: *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Bangham and Hunter 1939); *Neascus* sp., (Bangham 1972); *Posthodiplostomum minimum*, (Bangham 1972); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939)

***Etheostoma caeruleum* (rainbow darter)**

Larval/Immature Digenea: *Neascus* sp., (Bangham 1972)

Copepoda: *Ergasilus cotti*, (Tidd 1931)

***Etheostoma exile* (Iowa darter)**

Adult Digenea: *Allocreadium* sp., (Bangham and Hunter 1939)

Larval/Immature Digenea: *Ichthyocotylurus* sp., (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Bothriocephalaeus cuspidatus*, (Bangham and Hunter 1939)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

***Etheostoma flabellare* (fantail darter)**

Adult Digenea: *Allocreadium boleosomi*, (Bangham 1972)

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham and Hunter 1939); *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus platycephalus*, (Bangham and Hunter 1939); *Ichthyocotylurus* sp., (Bangham 1972); *Neascus* sp., (Bangham and Hunter 1939; Bangham 1972); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Bangham 1972)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham 1972)

Table 21, continued.

***Etheostoma nigrum* (Johnny darter)**

Adult Digenea: *Allocreidium boleosomi*, (Bangham 1972)

Larval/Immature Digenea: *Leuceruthrus* sp., (Bangham and Hunter 1939); *Clinostomum complanatum*, (Bangham 1972; Bangham and Hunter 1939); *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Bangham 1972); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972; Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Adult Cestoda: *Bothriocephalus formosus*, (Bangham 1972); *Proteocephalus pearsei*, (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham 1972)

Mollusca: Unidentified glochidia, (Bangham 1972)

***Perca flavescens* (yellow perch)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Trichodina urinaria*, (Dechtiar and Nepszy 1988); *Trichodina* sp., (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Myxozoa: *Hennuguya doori*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Myxobolus scleroperca*, (Dechtiar 1965a; Dechtiar 1972a; Dechtiar and Nepszy 1988); unidentified myxozoan, (Bangham 1972)

Adult Digenea: *Bunodera lucioperca*, (Bangham and Hunter 1939); *Bunodera sacculata*, (Dechtiar and Nepszy 1988); *Crepidostomum cooperi*, (Bangham and Hunter 1939; Cooper et al. 1977; Dechtiar and Nepszy 1988); *Megalogonia ictaluri*, (Bangham 1972); *Apophallus brevis*, (Dechtiar and Nepszy 1988); *Cryptogonimus chili*, (Bangham and Hunter 1939); *Microphallus opacus*, (Bangham and Hunter 1939); *Sanguinicola occidentalis*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); unidentified trematode, (Bangham 1972)

Larval/Immature Digenea: *Leuceruthrus* sp., (Bangham and Hunter 1939); *Bucephalus elegans*, (Bangham 1972); *Clinostomum complanatum*, (Bangham and Hunter 1939); *Allacanthochoasmus* sp., (Bangham 1972); *Tylodelphys scheuringi*, (Bangham and Hunter 1939); *Diplostomum spathaceum*, (Dechtiar and Nepszy 1988); *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus pileatus*, (Dechtiar and Nepszy 1988); *Ichthyocotylurus* sp., (Bangham 1972); *Neascus* sp., (Bangham and Hunter 1939; Bangham 1972); *Apophallus brevis*, (Dechtiar 1972a); *Crassiphiala bulboglossa*, (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Monogenea: *Urocleidus adspectus*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Cleidodiscus* sp., (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)

Adult Cestoda: *Bothriocephalus cuspidatus*, (Bangham and Hunter 1939); *Proteocephalus pearsei*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

Larval/Immature Cestoda: *Bothriocephalus cuspidatus*, (Bangham 1972; Bangham and Hunter 1939); *Bothriocephalus* sp., (Cooper et al. 1977); *Proteocephalus ambloplitis*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Proteocephalus pearsei*, (Bangham 1972); *Proteocephalus pinguis*, (Bangham and Hunter 1939); *Proteocephalus* sp., (Cooper et al. 1977); *Triaenophorus nodulosus*, (Bangham 1972; Cooper et al. 1977; Crites 1982; Dechtiar and Nepszy 1988); *Triaenophorus* sp., (Bangham and Hunter 1939)

Table 21, continued.

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939; Cooper et al. 1977; Dechtiar and Nepszy 1988; Stromberg and Crites 1975b); *Dichelyne cotylophora*, (Baker 1984a; Baker 1984b; Bangham 1972; Bangham and Hunter 1939; Cooper et al. 1977; Dechtiar and Nepszy 1988; Smedley 1934); *Spinitectus carolini*, (Jilek and Crites 1981); *Spinitectus* sp., (Bangham 1972); *Philometra cylindracea*, (Ashmead and Crites 1975; Bangham and Hunter 1939; Cooper et al. 1977; Crites 1982; Dechtiar and Nepszy 1988)

Larval/Immature Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Nepszy 1988); *Raphidascaris acus*, (Dechtiar and Nepszy 1988); *Agamonema* sp., (Bangham and Hunter 1939); *Eustrongylides tubifex*, (Cooper et al. 1977; Cooper et al. 1978b; Crites 1975; Crites 1982; Measures 1988a; Measures 1988b; Sprinkle Fastzkie and Crites 1977); *Eustrongylides* sp., (Bangham 1972; Cooper et al. 1978a; Dechtiar 1972a; Dechtiar and Nepszy 1988)

Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Cooper et al. 1977); *Neoechinorhynchus rutili*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Neoechinorhynchus* sp., (Dechtiar 1972a); *Pomphorhynchus bulbocolli*, (Bangham 1972); *Leptorhynchoides thecatus*, (Bangham 1972; Dechtiar and Nepszy 1988)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

Hirudinea: *Myzobdella lugubris*, (Bangham 1972); *Piscicola punctata*, (Bangham and Hunter 1939)

Mollusca: Unidentified glochidia, (Bangham 1972; Dechtiar and Nepszy 1988)

Copepoda: *Ergasilus caeruleus*, (Tidd 1931; Bangham 1972); *Ergasilus luciopercarum*, (Dechtiar and Nepszy 1988); *Achtheres ambloplitis*, (Dechtiar and Nepszy 1988); *Achtheres* sp., (Bangham 1972)

***Percina caprodes* (logperch)**

Adult Digenea: *Leuceruthrus micropteri*, (Bangham 1972); *Leuceruthrus* sp., (Bangham and Hunter 1939); *Allocreadium boleosomi*, (Bangham and Hunter 1939; Bangham 1972)

Larval/Immature Digenea: *Clinostomum complanatum*, (Bangham and Hunter 1939); *Diplostomum* sp., (Bangham 1972; Bangham and Hunter 1939); *Ichthyocotylurus* sp., (Bangham 1972; Bangham and Hunter 1939); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Monogenea: *Aethycteron malleus*, (Dechtiar 1972a); unidentified Gyrodactyloidea, (Bangham 1972)

Adult Cestoda: *Bothriocephalus formosus*, (Bangham 1972); *Proteocephalus pearsei*, (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Bothriocephalus cuspidatus*, (Bangham and Hunter 1939); *Proteocephalus stizostethi*, (Bangham and Hunter 1939); *Proteocephalus ambloplitis*, (Bangham 1972); *Proteocephalus* sp., (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939); *Spinitectus gracilis*, (Bangham 1972); *Rhabdochona* sp., (Bangham 1972)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939); *Eustrongylides* sp., (Bangham 1972); *Philometra cylindracea*, (Bangham 1972)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Bangham and Hunter 1939)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Bangham 1972; Bangham and Hunter 1939)

Hirudinea: *Myzobdella* sp., (Bangham 1972); *Piscicola punctata*, (Bangham and Hunter 1939)

Mollusca: Unidentified glochidia, (Bangham 1972)

Copepoda: *Ergasilus caeruleus*, (Bangham 1972)

Table 21, continued.

***Percina copelandi* (channel darter)**

Adult Digenea: *Allocreadium boleosomi*, (Bangham 1972); *Plagioporus cooperi*, (Bangham and Hunter 1939; Hunter and Bangham 1932)

Larval/Immature Digenea: *Ichthyocotylurus* sp., (Bangham 1972); *Neascus* sp., (Bangham and Hunter 1939); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Adult Cestoda: *Bothriocephalus cuspidatus*, (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939)

Hirudinea: *Myzobdella* sp., (Bangham 1972)

Mollusca: Unidentified glochidia, (Bangham 1972)

***Percina maculata* (blackside darter)**

Larval/Immature Digenea: *Neascus* sp., (Bangham 1972); unidentified metacercariae, (Bangham 1972)

Monogenea: Unidentified Gyrodactyloidea, (Bangham 1972)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939)

***Sander canadensis* (sauger)**

Myxozoa: Unidentified myxozoan, (Bangham and Hunter 1939)

Adult Digenea: *Megalogonia ictaluri*, (Bangham 1972); *Prosorhynchoides pusilla*, (Bangham and Hunter 1939); *Centrovarium lobotes*, (Bangham and Hunter 1939)

Larval/Immature Digenea: *Ichthyocotylurus platycephalus*, (Hughes 1928); *Ichthyocotylurus* sp., (Dechtiar 1972a); *Neascus* sp., (Bangham and Hunter 1939)

Monogenea: *Urocleidus aculeatus*, (Dechtiar 1972a)

Adult Cestoda: *Bothriocephalus claviceps*, (Bangham and Hunter 1939); *Bothriocephalus cuspidatus*, (Bangham 1972; Bangham and Hunter 1939); *Proteocephalus stizostethi*, (Bangham 1972; Bangham and Hunter 1939; Hunter and Bangham 1933); *Triaenophorus* sp., (Bangham and Hunter 1939)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham 1972); *Triaenophorus nodulosus*, (Bangham 1972); *Triaenophorus* sp., (Bangham and Hunter 1939)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham and Hunter 1939)

Larval/Immature Nematoda: *Eustrongylides* sp., (Dechtiar 1972a)

Adult Acanthocephala: *Neoechinorhynchus* sp., (Bangham and Hunter 1939)

Mollusca: Unidentified glochidia, (Bangham and Hunter 1939)

Copepoda: *Ergasilus centrarchidarum*, (Bangham and Hunter 1939); *Ergasilus caeruleus*, (Tidd 1931; Bangham and Hunter 1939)

***Sander glaucum* (blue pike)**

Adult Digenea: *Prosorhynchoides pusilla*, (Bangham and Hunter 1939); *Centrovarium lobotes*, (Bangham and Hunter 1939)

Monogenea: *Urocleidus aculeatus*, (Dechtiar 1972a)

Table 21, continued.

Adult Cestoda: *Bothriocephalus cuspidatus*, (Bangham and Hunter 1939); *Proteocephalus ambloplitis*, (Bangham and Hunter 1939); *Proteocephalus stizostethi*, (Hunter and Bangham 1933; Bangham and Hunter 1939); *Triaenophorus* sp., (Bangham and Hunter 1939)
Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham and Hunter 1939)
Adult Nematoda: *Philometra cylindracea*, (Bangham and Hunter 1939)
Immature Acanthocephala: *Leptorhynchoides* sp., (Bangham and Hunter 1939)
Copepoda: *Ergasilus centrarchidarum*, (Dechtiar 1972a); *Ergasilus caeruleus*, (Tidd 1931; Bangham and Hunter 1939)

***Sander vitreus* (walleye)**

Adult Digenea: *Azygia angusticauda*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Prosorhynchoides pusilla*, (Bangham 1972; Bangham and Hunter 1939; Wolfert et al. 1967); *Centrovarium lobotes*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Sanguinicola occidentalis*, (Bangham 1972; Dechtiar 1972a; Dechtiar and Nepszy 1988)
Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar and Nepszy 1988); *Diplostomum spathaceum*, (Dechtiar and Nepszy 1988); *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus* sp., (Dechtiar and Nepszy 1988); *Posthodiplostomum minimum*, (Bangham and Hunter 1939); *Bucephalus elegans*, (Dechtiar and Nepszy 1988); *Neascus* sp., (Bangham 1972; Bangham and Hunter 1939)
Monogenea: *Urocleidus aculeatus*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); unidentified Gyrodactyloidea, (Bangham 1972)
Adult Cestoda: *Bothriocephalus cuspidatus*, (Bangham and Hunter 1939; Cooper 1919; Dechtiar and Nepszy 1988; Wolfert et al. 1967); *Proteocephalus stizostethi*, (Bangham 1972; Connor 1943; Dechtiar and Nepszy 1988; Hunter and Bangham 1933); *Triaenophorus stizostedionis*, (Bangham 1972; Dechtiar and Nepszy 1988)
Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Bangham and Hunter 1939; Bangham 1972); *Proteocephalus stizostethi*, (Bangham and Hunter 1939); *Triaenophorus nodulosus*, (Bangham 1972); *Triaenophorus* sp., (Bangham and Hunter 1939)
Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988; Stromberg and Crites 1975b); *Dichelyne cotylophora*, (Bangham and Hunter 1939), *Spinitectus gracilis*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988), unidentified nematode, (Wolfert et al. 1967)
Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939)
Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988), *Neoechinorhynchus tenellus*, (Dechtiar 1972a; Dechtiar and Nepszy 1988), *Leptorhynchoides thecatus*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988)
Hirudinea: *Myzobdella lugubris*, (Dechtiar 1972a; Dechtiar and Nepszy 1988); *Piscicola punctata*, (Bangham and Hunter 1939)
Mollusca: Unidentified glochidia, (Bangham 1972; Dechtiar and Nepszy 1988)
Copepoda: *Ergasilus centrarchidarum*, (Bangham and Hunter 1939); *Ergasilus caeruleus*, (Tidd 1931; Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Ergasilus luciopercarum*, (Dechtiar and Nepszy 1988)

Table 21, continued.

Sciaenidae

***Aplodinotus grunniens* (freshwater drum)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Myxozoa: Unidentified myxozoan, (Bangham and Hunter 1939)

Adult Digenea: *Crepidostomum cooperi*, (Bangham 1972); *Crepidostomum* sp., (Bangham and Hunter 1939); *Homalometron armatum*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988; Hunter and Bangham 1932); *Homalometron pallidum*, (Vendeland 1968); *Microcreadium parvum*, (Vendeland 1968); *Phyllodistomum fausti*, (Bangham 1972; Dechtiar and Nepszy 1988; Vendeland 1968); *Phyllodistomum* sp., (Dechtiar 1972a); *Sanguinicola occidentalis*, (Dechtiar 1972a); *Sanguinicola* sp., (Dechtiar and Nepszy 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Nepszy 1988; Vendeland 1968); *Diplostomum* sp., (Bangham 1972); *Ichthyocotylurus communis*, (Vendeland 1968); *Ichthyocotylurus* sp., (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Neascus* sp., (Bangham and Hunter 1939); *Posthodiplostomum minimum*, (Bangham 1972); unidentified metacercariae, (Bangham 1972)

Monogenea: *Lintaxine cokeri*, (Dechtiar 1972a; Dechtiar and Nepszy 1988; Vendeland 1968); *Microcotyle eriensis*, (Bangham 1972; Bangham and Hunter 1936; Bangham and Hunter 1939; Dechtiar and Nepszy 1988); *Microcotyle spinicirrus*, (Bangham 1972; Bangham and Hunter 1936; Bangham and Hunter 1939; Dechtiar and Nepszy 1988; Vendeland 1968)

Aspidobothrea: *Cotylogaster occidentalis*, (Dechtiar 1972a; Dechtiar and Nepszy 1988; Vendeland 1968)

Adult Cestoda: *Bothriocephalus claviceps*, (Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

Larval/Immature Cestoda: *Bothriocephalus cuspidatus*, (Bangham and Hunter 1939; Vendeland 1968); *Bothriocephalus* sp., (Bangham 1972; Dechtiar and Nepszy 1988); *Proteocephalus ambloplitis*, (Bangham 1972; Vendeland 1968); *Proteocephalus pearsei*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

Adult Nematoda: *Camallanus oxycephalus*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988; Stromberg and Crites 1975b); *Capillaria* sp., (Bangham 1972); *Dichelyne cotylophora*, (Bangham 1972; Bangham and Hunter 1939; Vendeland 1968); *Spinitectus gracilis*, (Bangham and Hunter 1939); *Spinitectus* sp., (Bangham 1972); *Philometra cylindracea*, (Bangham and Hunter 1939); *Philometra* sp., (Dechtiar 1972a; Dechtiar and Nepszy 1988)

Larval/Immature Nematoda: *Agamonema* sp., (Bangham and Hunter 1939); *Camallanus oxycephalus*, (Bangham and Hunter 1939; Crites 1976; Vendeland 1968); *Eustrongylides tubifex*, (Cooper et al. 1978b; Dechtiar and Nepszy 1988); *Eustrongylides* sp., (Bangham 1972; Vendeland 1968); *Philometra cylindracea*, (Bangham 1972; Vendeland 1968); *Spiroxys contortus*, (Vendeland 1968); *Capillaria catenata*, (Vendeland 1968); unidentified Spiruroidea, (Vendeland 1968)

Adult Acanthocephala: *Pomphorhynchus bulbocolli*, (Dechtiar 1972a; Vendeland 1968); *Leptorhynchoides thecatus*, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988; Vendeland 1968)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Vendeland 1968); *Pomphorhynchus bulbocolli*, (Dechtiar and Nepszy 1988; Vendeland 1968)

Table 21, continued.

Hirudinea: *Actinobdella pediculata*, (Bur 1994); *Macrobdella decora*, (Dechtiar and Nepszy 1988); *Myzobdella lugubris*, (Bangham 1972; Vendeland 1968); *Myzobdella* sp., (Vendeland 1968); *Piscicola punctata*, (Bangham and Hunter 1939)

Mollusca: Unidentified glochidia, (Bangham 1972; Bangham and Hunter 1939; Dechtiar and Nepszy 1988)

Copepoda: *Ergasilus caeruleus*, (Bangham 1972); *Argulus* sp., (Bangham 1972)

Gobiidae

***Apollonia melanostoma* (round goby)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Kvach and Stepien 2008b); *Neochasmus umbellus*, (Kvach and Stepien 2008a; Kvach and Stepien 2008b)

Adult Nematoda: *Rhabdochona* sp., (Kvach and Stepien 2008b)

Larval/Immature Nematoda: Anisakidae gen. sp., (Kvach and Stepien 2008b)

Unknown Fish Family

Unknown fish species

Adult Nematoda: *Camallanus oxycephalus*, (Kelly et al. 1989); *Philometra cylindracea*, (Kelly et al. 1989); *Philometra* sp., (Kelly et al. 1989)

Table 22. Numbers and percentages (in parentheses) of parasite species in each major parasite group reported for the five major fish families from Lake Erie, 1914-2010. Parasite group abbreviations are Ma (Mastigophora), Ci (Ciliophora), My (Myxozoa), Dt (Digenea), Mo (Monogenea), Ce (Cestoda), Ne (Nematoda), Ac (Acanthocephala), Hi (Hirudinea), Co (Copepoda), and Mol (Mollusca). If a parasite in a group did not infect fish, the parasite group was not included in the table.

| Fish family | Parasite group | | | | | | | | | | | Total |
|---------------|----------------|----------|-----------|------------|------------|------------|------------|-----------|----------|----------|----------|-------|
| | Ma | Ci | My | Dt | Mo | Ce | Ne | Ac | Hi | Co | Mol | |
| Cyprinidae | 0 | 1 (2) | 9 (19) | 12 (26) | 6 (13) | 6 (13) | 3 (6) | 3 (6) | 2 (4) | 4 (9) | 1 (2) | 47 |
| Catostomidae | 1 (2) | 0 | 4 (7) | 10 (18) | 14 (26) | 6 (11) | 8 (15) | 5 (9) | 2 (4) | 3 (6) | 1 (2) | 54 |
| Centrarchidae | 0 | 2 (3) | 6 (8) | 20 (26) | 20 (26) | 6 (8) | 10 (13) | 3 (4) | 3 (4) | 5 (7) | 1 (1) | 76 |
| Percidae | 0 | 2 (3) | 2 (3) | 24 (38) | 5 (8) | 10 (15) | 9 (14) | 5 (8) | 2 (3) | 4 (6) | 1 (2) | 64 |
| Salmonidae | 0 | 0 | 0 | 3 (21) | 0 | 6 (43) | 2 (14) | 2 (14) | 0 | 1 (7) | 0 | 14 |

Table 23. Jaccard coefficients of parasite-community similarity based on the reported presence of parasites between the five major fish families from Lake Erie, 1914-2010.

| Fish family | Cyprinidae | Catostomidae | Salmonidae | Centrarchidae |
|--------------------|-------------------|---------------------|-------------------|----------------------|
| Cyprinidae | 1.0000 | 0.1463 | 0.0192 | 0.1278 |
| Catostomidae | 0.1463 | 1.0000 | 0.0151 | 0.0847 |
| Salmonidae | 0.0192 | 0.0151 | 1.0000 | 0.0235 |
| Centrarchidae | 0.1287 | 0.0847 | 0.0235 | 1.0000 |
| Percidae | 0.2375 | 0.1078 | 0.0140 | 0.3168 |

NIAGARA RIVER

The Niagara River flows in a northerly direction from Lake Erie to Lake Ontario, a distance of approximately 35 miles.

Results and Discussion

Three studies (Kellicott in Tidd 1931; George et al. 1977; and Harrison and Hadley 1982) have reported on the parasites of fish from the Niagara River. Three parasite species (*Myxobolus dentium*, unknown larval trematodes, *Argulus stizostethi*) have been reported from three fish species (Tables 24, 25).

Table 24. Parasites reported in fishes from the Niagara River, 1931-2010. Host documentation, in order, consists of references, when observed, prevalence defined as the percentage (%) of fish infected (pnp = prevalence not provided), mean intensity defined as the mean number of parasites per infected fish (minp = mean intensity not provided), location (lns = location not specified or incomplete), latitude and longitude (llnk = latitude and longitude not known).

Myxozoa (Myxosporans)

Myxobolidae Thelohan, 1892

Myxobolus dentium Fantham et al. 1939

Synonym: None

Site of Infection: Bases of the palatine and vomerine teeth, epithelium covering dentary bone

Host: *Esox masquinongy*: George et al. 1977; 1968-1976; 34%; minp; upper Niagara River (Grand Island to Strawberry Island); llnk

Larval/Immature Digenea/ Digenetic Trematodes

Unknown Family

Black spot

Synonym: ?

Site of Infection: External surface

Host: *Esox lucius*: Harrison and Hadley 1982; 1975-1976; prevalence separated by age-class; minp; 11 tributaries and river proper; lns; llnk

Copepoda (Copepods)

Argulidae Yamaguti 1963

Argulus stizostethi Kellicott 1880

Synonym: None

Site of Infection: [Body surface]

Host: *Sander glaucum*: Kellicott in Tidd (1931); pnp; minp; Buffalo, New York; 42°53' 11", -78°52'42")

Table 25. Fishes by family from the Niagara River from which parasites have been reported during 1931-2010 using parasite data in Table 24. References in parentheses following parasites refer to references for host records.

Esocidae

Esox lucius (northern pike)

Larval/Immature Digenea: Blackspot (Harrison and Hadley 1982)

Esox masquinongy (muskellunge)

Myxozoa: *Myxobolus dentium* (George et al. 1977)

Percidae

Sander glaucum (blue pike)

Copepoda: *Argulus stizostethi* (Kellicott in Tidd 1931)

LAKE ONTARIO

Results

Parasite Species—Overview

Thirty-nine studies that reported on a parasite species infecting one or more fish species were conducted during 1930-2010 in Lake Ontario, most during 1970-1989 (Table 4). A total of 228 parasite species (5 Ciliophora, 15 Myxozoa, 3 Microspora, 34 adult Digenea, 15 larval/immature Digenea, 79 Monogenea, 1 Aspidobothrea, 22 adult Cestoda, 5 larval/immature Cestoda, 16 adult Nematoda, 5 larval/immature Nematoda, 13 adult Acanthocephala, 4 Hirudinea, 8 Copepoda, 3 Mollusca) were reported (Tables 2, 26). Although *Bothriocephalus cuspidatus*, *Proteocephalus ambloplitis*, *Triaenophorus nodulosus*, *Triaenophorus stizostedionis*, *Hysterothylacium brachyurum*, *Raphidascaris acus*, *Camallanus oxycephalus*, *Spinitectus gracilis*, *Rhabdochona* sp., and *Leptorhynchoides thecatus* were represented in both adult and larval/immature groups, they are listed in the adult category, and only counted once.

Protozoans

Five species of ciliates (*Ichthyophthirius multifiliis*, *Trichodina urinaria*, *Trichodina* sp., *Capriniana piscium*, *Scyphidia micropteri*) representing four families were found in Lake Ontario fish. Some species occurred on the gills; *Ichthyophthirius multifiliis* also infected the fins and body surface, and *Trichodina urinaria* and *Trichodina* sp. were found in the ureters. Unidentified species of *Trichodina* occurred on seven fish species.

Fifteen species of myxozoans in two families were documented. Nine of these species are in the genus *Myxobolus*. All species are host-specific occurring in non-intestinal sites in one fish species or in one family. Three species of microsporans, *Glugea cepedianae*, *Glugea hertwigi*, *Glugea pimephales*, have been reported with each species being host-specific to *Dorosoma cepedianum*, *Osmerus mordax*, and *Pimephales* spp., respectively.

Digenetic Trematodes

Thirty-four species of adult digenetic trematodes in 14 families were reported. Ten species were in the Allocreadiidae, with the genus *Crepidostomum* (5 species) being most common. Five species of *Phyllodistomum* (Gorgoderidae) have been reported. *Azygia angusticauda* infected six fish species. Several species are host-specific to one fish species or one family. Most species occurred in the intestine or pyloric ceca, except for *Acetodextra amiuri* (swim bladder, ovaries), *Phyllodistomum* spp. (ureters, urinary bladder), *Plagioporus sinitsini* (also gall bladder), *Sanguinicola occidentalis* (blood), and *Prototransversotrema* sp. (under scales).

Fifteen larval digenetic trematode species representing six families occurred in various non-intestinal sites. The Diplostomidae was represented by eight species. The most prevalent were *Diplostomum spathaceum* in 39 fish species, *Ichthyocotylurus* sp. in 17 fish species, and *Clinostomum complanatum* and *Posthodiplostomum minimum* each in 7 fish species. *Bucephalus* sp. was the only immature trematode found in the intestine.

Monogeneans

Eighty species of monogeneans representing 10 families have been documented on Lake Ontario fish. The best represented families were the Ancyrocephalidae (43 species), the Gyrodactylidae (14 species), and the Dactylogyridae (11 species). The genus *Gyrodactylus* was represented by 14 species, *Onchocleidus* by 10 species, and *Dactylogyrus* by 10 species. *Gyrodactylus macrochiri* was found on four species of centrarchids. Most species are host-specific to one fish species or one family. The ancyrocephalids and dactylogyrids were primarily found on the gills and the gyrodactylids on the fins. *Ligictaluridus monticelli* occurred in the nares; *Lyrodiscus rupestris* occurred in the nares, gills, and fins; and *Acolpenteron catostomi* occurred in the ureters.

Aspidobothreans

Cotylogaster occidentalis was the only aspidobothrean found infecting the intestine of only *Aplodinotus grunniens* in one study.

Cestodes

Twenty-two species of adult cestodes in seven families infected Lake Ontario fish. Eleven species are in the Proteocephalidae with *Proteocephalus* being the most-common genus (9 species). The genera *Eubothrium*, *Bothriocephalus*, and *Triaenophorus* each are represented by two species. Many species are host specific to one fish species or one family. *Glaridacris catostomi* and *Hunterella nodulosa* were found only on catostomids.

Nine species of larval/immature cestodes in five families were found. *Bothriocephalus cuspidatus* and *Proteocephalus* sp. were the only immature cestodes occurring in the intestine. All other species were found in non-intestinal sites. Three species of larval cestodes (*Diphyllobothrium ditremum*, *Diphyllobothrium laruei*, and *Ligula intestinalis*) are in the Diphyllbothriidae. Three species of *Triaenophorus* infected the muscle, liver, and mesentery of several fish species. Larvae of *Proteocephalus ambloplitis* and *Triaenophorus nodulosus* each infected nine fish species.

Nematodes

Sixteen species of adult nematodes representing seven families have been found. The Cystidicolidae and Rhabdochonidae each were represented by four species. Four species are in the genus *Rhabdochona*. Most species occurred in the digestive tract, except for *Cystidicola* spp. (swim bladder), *Philometra cylindracea* (body cavity), *Philometra* sp. (gills, blood vessel), and *Philometroides nodulosa* (fins). *Hysterothylacium brachyurum* infected six fish species, and *Dichelyne cotylophora*, *Cystidicola farionis*, and *Spinitectus gracilis* each infected five fish species. Some species, such as *Truttaedacnitis clitellarius*, *P. cylindracea*, *P. nodulosa*, *Cystidicoloides ephemeridarum*, and *Rhabdochona milleri*, are host-specific to one fish species or one family.

Ten species of larval/immature nematodes in eight families were found. *Cosmocephalus obvelatus*, *Paracuaria adunca*, *Contraecaecum spiculigerum*, *Hysterothylacium brachyurum*, *Eustrongylides tubifex*, *Spiroxys* sp., and *Philometra cylindracea* were represented by larval stages occurring in the body cavity, liver, and mesentery. *Camallanus oxycephalus*, *Spinitectus* sp., and *Rhabdochona* sp. were immature nematodes found in the intestine. Immature individuals of *Camallanus oxycephalus* and larval *Eustrongylides tubifex* each infected eight fish species.

Acanthocephalans

Thirteen species of adult acanthocephalans in four families have been documented. Nine species are in the Neoechinorhynchidae, with *Neoechinorhynchus rutili* infecting six fish species. However, most species in this family (*Neoechinorhynchus crassus*, *N. cristatus*, *N. notemigoni*, *N. saginatus*, *N. tenellus*, *N. tumidus*, and *Octospinifer macilentus*) are host-specific.

Echinorhynchus salmonis infected 20 fish species, *Acanthocephalus dirus* infected 9 species, and *Leptorhynchoides thecatus* infected 15 species. Immature individuals of *Leptorhynchoides thecatus* occurred encysted in the mesentery of *Fundulus diaphanus menona*.

Leeches

Four species of leeches (*Actinobdella inequiannulata*, *A. pediculata*, *Myzobdella lugubris*, and *Piscicola* sp.) in two families occurred on the gill cover, fins, and body surface of fish. *Myzobdella lugubris* was found on six fish species.

Crustaceans

Eight species of parasitic copepods in three families were found on the body surface, fins, gills, and gill arches of Lake Ontario fish. Four species of the genus *Ergasilus* were reported. *Ergasilus caeruleus* and *E. centrarchidarum* occurred on eight and five fish species, respectively. *Achtheres coregoni* only infected *Coregonus clupeaformis*, *Achtheres pimelodi* only infected centrarchids, and *Salmincola extumescens* infected five species of coregonines.

Molluscs

Glochidia (larval stage) of three mollusc species have been reported from the fins and/or gills of fish. Glochidia of *Anodonta* sp. and *Elliptio complanatus* have been found on *Perca flavescens*. Glochidia of *Lampsilis radiata siliquoidea* occurred on *Perca flavescens* and three other species.

Fish Species—Parasite Analyses Overview

Parasites have been reported from 60 (57%) of the 106 established fish species in 21 families in Lake Ontario (Table 27). Most of these species (34) are in four families—Cyprinidae (12), Salmonidae (9), Centrarchidae (7), and Percidae (6). In terms of parasitological studies, 35 of the 61 species have been studied only once (*Acipenser fulvescens*, *Lepisosteus osseus*, *Amia calva*, *Anguilla rostrata*, *Alosa pseudoharengus*, *Couesius plumbeus*, *Cyprinus carpio*, *Luxilus cornutus*, *Notropis atherinoides*, *Phoxinus neogaeus*, *Pimephales notatus*, *P. promelas*, *Rhinichthys cataractae*, *Catostomus commersonii*, *Moxostoma erythrurum*, *Ictalurus punctatus*, *Noturus flavus*, *N. gyrinus*, *Esox masquinongy*, *Umbra limi*, *Oncorhynchus kisutch*, *O. mykiss*, *Salvelinus fontinalis*, *Percopsis omiscomaycus*, *Labidesthes sicculus*, *Culaea inconstans*, *Cottus bairdii*, *C. cognatus*, *Morone chrysops*, *Pomoxis annularis*, *Etheostoma caeruleum*, *E. exile*, *Percina caprodes*, *Sander vitreus*, and *Aplodinotus grunniens*) and nine have been studied only twice (*Dorosoma cepedianum*, *Notemigonus crysoleucas*, *Lepomis macrochirus*, *Rhinichthys obtusus*, *Moxostoma macrolepidotum*, *Esox lucius*, *Coregonus kiyi*, *Salvelinus namaycush*, *Pomoxis nigromaculatus*). The most-studied species were *Ambloplites rupestris* (10 studies) and *Perca flavescens* (13 studies). The most-parasitized fishes in terms of numbers of parasite species present were *Perca flavescens* (45), *Lepomis gibbosus* (37), *Ambloplites rupestris* (31), *Morone americana* (24), *Catostomus commersonii* (23), and *Notropis hudsonius* (19).

The 49 fish species from Lake Ontario whose parasites have not been reported on are: *Ichthyomyzon unicuspis*, *Lampetra appendix*, *Petromyzon marinus*, *Lepisosteus oculatus*, *Hiodon tergisus*, *Campostoma anomalum*, *Carassius auratus*, *Cyprinella spiloptera*, *Hybognathus hankinsoni*, *Luxilus chrysocephalus*, *Macrhybopsis storeriana*, *Margariscus margarita*, *Nocomis biguttatus*, *N. micropogon*, *Notropis anogenus*, *N. bifrenatus*, *N. heterodon*, *N. heterolepis*, *N. rubellus*, *N. stramineus*, *N. volucellus*, *Phoxinus eos*, *Scardinius erythrophthalmus*, *Semotilus corporalis*, *Carpiodes cyprinus*, *Catostomus catostomus*, *Erimyzon oblongus*, *E. sucetta*, *Hypentelium nigricans*, *Moxostoma anisurum*, *M. valenciennesi*, *Ameiurus natalis*, *Esox americanus*, *E. niger*, *Oncorhynchus gorboscha*, *O. tshawytscha*, *Prosopium cylindraceum*, *Salmo trutta*, *Aphredoderus sayanus*, *Lota lota*, *Pungitius pungitius*, *Myoxocephalus thompsonii*, *Lepomis cyanellus*, *L. megalotis*, *Etheostoma flabellare*, *E. microperca*, *E. olmstedii*, *Percina copelandi*, and *P. maculata*.

Fish Families—Parasite Species-Richness, Parasite Analyses

The values for parasite species–richness, regardless of life-stage, and number of fish species examined (in parentheses) for each of the major fish families were Centrarchidae (69, 7), Cyprinidae (47, 12), Catostomidae (25, 3), Percidae (58, 6), and Salmonidae (21, 9). The correlation coefficient between species-richness and number of fish species examined for each family using these values for all five families was nonsignificant ($r_s = -0.100$). The parasite taxonomic groups, by numbers and percentages, for each of the five fish families for Lake Ontario are in Table 28. The parasite group(s) (in parentheses) most common in each fish family were Cyprinidae (monogeneans followed by digenetic trematodes), Catostomidae (monogeneans followed by cestodes and acanthocephalans), Centrarchidae (monogeneans), Percidae (digenetic trematodes), and Salmonidae (cestodes).

Parasite species or a specific genus found in centrarchids were protozoans (*Scyphidia micropteri*), adult digenetic trematodes (*Crepidostomum cornutum*, *Leuceruthrus micropteri*, *Phyllodistomum lohrenzi*, *Proterometra macrostoma*), monogeneans (*Actinocleidus gibbosus*, *A. brevicirrus*, *A. recurvatus*, *A. triangularis*, *Cleidodiscus alatus*, *C. glenorensis*, *C. robustus*, *C. venardi*, *Gyrodactylus avalonia*, *G. goerani*, *G. macrochiri*, *Haplodiscus dispar*, *H. furcatus*, *Lyrodiscus longibasus*, *L. minimus*, *L. rupestris*, *L. seminolensis*, *Onchocleidus chautauquaensis*, *O. ferox*, *O. helicus*, *O. pricipalis*, *O. similis*, *Synclithrum fusiformis*, *Pterocleidus acer*, *Tetracleidus banghami*, *T. capax*, *T. longus*, *T. stentor*, *Urocleidus acer*, *U. aculeatus*, *U. attenuatus*, *U. alatus*, *U. dispar*, *U. ferox*), adult cestodes (*Proteocephalus ambloplitis*, *P. fluviatilis*), larval/immature cestodes (*Dilepis* sp.), adult nematodes (*Camallanus oxycephalus*, *Raphidascaris acus*), and copepods (*Achtheres pimelodi*, *Ergasilus centrarchidarum*). Parasite species only found in cyprinids were protozoans (*Myxobolus bartai*, *M. burti*, *M. fanthami*, *M. hendrickson*, *M. pendula*, *M. xiaoi*, *Thelohanellus notatus*, *Zschokkella* sp.), adult digenetic trematodes (*Plagiocirrus primus*, *Plagioporus sinitsini*, *Prototransversotrema* sp.), monogeneans (*Dactylogyrus aureus*, *D. banghami*, *D. bulbosus*, *D. cornutus*, *D. extensus*, *D. luxili*, *Gyrodactyloides* sp., *Gyrodactylus dechtiara*, *G. medius*, *G. stunkardi*, *Octomacrum semotili*, *Pseudocolpenteron pavlovskii*, *Urocleidus brachus*), adult cestodes (*Pliovittellaria wisconsensis*), and adult acanthocephalans (*Neoechinorhynchus notemigoni*, *N. saginatus*). Parasites only found

in catostomids were protozoans (*Myxobolus bibullatum*), adult digenetic trematodes (*Lissorchis attenuatus*, *Phyllodistomum lysteri*), monogeneans (*Acolpenteron catostomi*, *Anonchohaptor anomalus*, *Dactylogyrus ursus*, *Gyrodactylus spathulatus*, *Octomacrum lanceatum*), adult cestodes (*Hunterella nodulosa*), larval cestodes (*Ligula intestinalis*), adult nematodes (*Philometroides nodulosa*, *Rhabdochona milleri*), adult acanthocephalans (*Neoechinorhynchus crassus*, *N. cristatus*, *Octospinifer macilentus*), and leeches (*Actinobdella inequiannulata*). Parasites only found in percids were protozoans (*Trichodina urinaria*, *Henneguya doori*), adult digenetic trematodes (*Bunodera luciopercae*, *Crepidostomum canadense*, *C. cooperi*, *Rhipidocotyle papillosum*, *Sanguinicola occidentalis*), larval digenetic trematodes (*Apophallus venustus*, *Diplostomum adamsi*, *D. huronense*, *Neascus* sp.), monogeneans (*Aethycteron hargisi*, *A. malleus*, *Gyrodactylus etheostomae*, *G. freemani*, *Urocleidus adspetus*), adult cestodes (*Bothriocephalus cuspidatus*, *Proteocephalus pearsei*, *Triaenophorus stizostedionis*), adult nematodes (*Philometra cylindracea*), adult acanthocephalans (*Neoechinorhynchus tenellus*), copepods (*Ergasilus confusus*), and mollusks (*Anodonta* sp., *Elliptio complanatus*). Parasites only found in salmonids were adult digenetic trematodes (*Phyllodistomum coregoni*), larval/immature digenetic trematodes (*Ichthyocotylurus intermedia*), adult cestodes (*Eubothrium salvelini*, *Proteocephalus exiguus*, *P. laruei*), larval cestodes (*Diphyllobothrium ditremum*, *Diphyllobothrium* sp., “rhyncobothrid” cestode, *Triaenophorus crassus*), adult nematodes (*Capillaria salvelini*, *Cystidicola farionis*, *Cystidicoloides ephemeridarum*), adult acanthocephalans (*Neoechinorhynchus tumidus*), and copepods (*Achtheres coregoni*, *Ergasilus nerkae*, *Salmincola extumescens*).

The numbers and percentages of autogenic and allogenic helminth species (in parentheses) for the fish families, respectively, were Centrarchidae (20 species, 77%, 6 species, 23%), Cyprinidae (13 species, 62%, 8 species, 38%), Catostomidae (12 species, 86%, 2 species, 14%), Percidae (27 species, 69%, 12 species, 31%), and Salmonidae (13 species, 76%, 4 species, 24%).

Jaccard Coefficients of Parasite Communities—Fish Families

The species involved in calculating Jaccard coefficients of parasite-community similarity in the five major fish families were Centrarchidae (*Ambloplites rupestris*, *Lepomis gibbosus*, *L. macrochirus*, *Micropterus dolomieu*, *M. salmoides*, *Pomoxis annularis*, *P. nigromaculatus*), Cyprinidae (*Couesius plumbeus*, *Cyprinus carpio*, *Luxilus cornutus*, *Notemigonus crysoleucas*, *Notropis atherinoides*, *N. hudsonius*, *Phoxinus neogaeus*, *Pimephales notatus*, *P. promelas*, *Rhinichthys cataractae*, *R. obtusus*, *Semotilus atromaculatus*), Catostomidae (*Catostomus commersonii*, *Moxostoma erythrurum*, *M. macrolepidotum*), Percidae (*Etheostoma caeruleum*, *E. exile*, *E. nigrum*, *Perca flavescens*, *Percina caprodes*, *Sander vitreus*), and Salmonidae (*Coregonus artedi*, *C. clupeaformis*, *C. hoyi*, *C. kiyi*, *C. reighardi*, *Oncorhynchus kisutch*, *O. mykiss*, *Salvelinus fontinalis*, *S. namaycush*).

The Jaccard coefficients of parasite-community similarity were low for all fish-family comparisons (Table 29). These coefficients ranged from a low of 0.0227 (Salmonidae and Catostomidae) to a high of 0.1588 (Centrarchidae and Percidae). The next highest coefficient involved the Percidae and Cyprinidae (0.1136).

Parasite species or a specific genus found in two or more fish families (in parentheses) were protozoans—*Ichthyophthirius multifiliis* (3); adult digenetic trematodes—*Azygia angusticauda* (3), *Azygia longa* (3), *Bunodera sacculata* (2), *Crepidostomum isostomum* (2); larval/immature digenetic trematodes—*Apophallus brevis* (3), *Clinostomum complanatum* (5), *Crassiphiala bulboglossa* (2), *Diplostomum spathaceum* (20), *Posthodiplostomum minimum* (6), *Uvulifer ambloplitis* (3), *Ichthyocotylurus diminuta* (2), *Tylodelphys scheuringi* (2); monogeneans—*Gyrodactylus avalonia* (4); adult cestodes—*Cyathocephalus truncatus* (2), *Proteocephalus pearsei* (2); larval/immature cestodes—*Bothriocephalus cuspidatus* (2), *Proteocephalus ambloplitis* (5), *Triaenophorus nodulosus* (6); adult nematodes—*Dichelyne cotylophora* (3), *Hysterothylacium brachyurum* (3), *Rhabdochona decaturensis* (2), *Rhabdochona ovifilamenta* (2), *Spinitectus carolini* (2), *Spinitectus gracilis* (5); larval/immature nematodes—*Cosmocephalus obvelatus* (4), *Paracuaria adunca* (3), *Contracecum spiculigerum* (2), *Camallanus oxycephalus* (3), *Eustrongylides tubifex* (3), *Hysterothylacium brachyurum* (2); adult acanthocephalans—*Acanthocephalus dirus* (6), *Echinorhynchus salmonis* (12), *Leptorhynchoides thecatus* (8), *Neoechinorhynchus cylindratus* (3), *Neoechinorhynchus rutili* (5), *Pomphorhynchus bulbocolli* (2); leeches—*Myzobdella lugubris* (2); copepods—*Argulus catostomi* (2), *Ergasilus caeruleus* (4), *Ergasilus luciopercarum* (2); mollusks—glochidia of *Lampsilis radiata siliquoidea* (3).

Discussion

Lake Ontario is the smallest in surface area of the Great Lakes with an approximate length and width of 311 km and 85 km, respectively. Its mean depth (maximum) is 86 m (244 m). Its surface area is 18,960 km². The major outflow of Lake Ontario is through the St. Lawrence River into the Atlantic Ocean. Cudmore-Vokey and Crossman (2000) listed 106 fish species that are established in Lake Ontario. A total of 60 fish species (57%) in 21 families from Lake Ontario have had their parasites studied. The numbers of fish species examined and not examined for parasites do not add up to 106 established fish species as listed by Cudmore-Vokey and Crossman (2000). One reason for this is that *Moxostoma erythrurum*, *Coregonus hoyi*, *C. kiyi*, *C. reighardi*, and *Salvelinus fontinalis* were examined for parasites from this lake, but these species were not listed as being established.

The most-extensive study of fish parasites in Lake Ontario was that by Dechtiar and Christie (1988) who reported 224 parasite species (not including agnaths) associated with 56 fish species. The numbers in each main parasite group they found were Protozoa (20), Digenetic Trematoda (50), Monogenea (75), Cestoda (28), Nematoda (23) Acanthocephala (14), Crustacea (9), Hirudinea (4), and Mollusca (1). The number of parasite species found by Dechtiar and Christie (1988) in 56 fish species and summarized in this synopsis (226) from 62 fish species are very similar. Only five fish-parasite studies (making up 13% of all studies) have been done in this lake since 1980.

Pathogenic Parasites

Protozoans

Ichthyophthirius multifiliis can cause weight loss and mortality in fish (Davis 1944; Elser 1955; and Allison and Kelly 1963). *Trichodina* spp. may cause severe hyperplasia of the gill lamellae and inflammation of the ureters (Richardson 1938; Davis 1947; Hoffman and Lom 1967). Several species of myxosporidians (*Myxidium* spp., *Henneguya* spp., *Myxobolus* spp., and *Thelohanellus notatus*) were found in the gills, kidney, muscle, mouth tissue, connective tissue, skin, cartilage, fins, heart, mesentery, and bile ducts, and can damage their fish host (Dogiel et al. 1958; Reichenbach-Kline and Elkan 1965; Reichenbach-Klinke 1973; Edwards et al. 1977). *Glugea cepedianae*, *G. hertwigi*, and *G. pimephales* can damage the mesentery and internal organs of fish. The gonads of *Osmerus mordax* have been damaged by *G. hertwigi* (see Dechtiar 1972a; Nepszy et al. 1978; Putz et al. 1965).

Digenetic Trematodes

Adults of several species of *Crepidostomum*, *Acetodextra amiuri*, and *Sanguinicola occidentalis* can cause inflammation and lesions of the intestine, reproductive system, and circulatory system in their fish hosts (Davis 1937; Perkins 1951, 1956; Wales 1958b). Of the larval digenetic trematodes, *Clinostomum complanatum*, *Centrovarium lobotes*, *Crassiphiala bulboglossa*, *Posthodiplostomum minimum*, *Uvulifer ambloplitis*, *Apophallus brevis*, *A. venustus*, *Ichthyocotylurus diminuta*, *I. intermedia*, *Ichthyocotylurus* sp., and *Tylodelphys scheuringi* can be considered pathogens to fish as well as play a role in anglers discarding infected fish because of unsightly parasites (Kozicka 1958; Meyer 1958; Wales 1958b; Bychovskaya-Pavlovskaya and Petrushevski 1963; Dukes 1975). Smitherman (1968) demonstrated that fingerlings of *Lepomis macrochirus* had a significant reduction in growth and increased mortality when infected with more than 353 metacercariae of *Posthodiplostomum minimum*. The three species of *Diplostomum* can possibly cause subcapsular cataracts, lens discoloration and blindness, exophthalmic condition, and emaciation (Shariff et al. 1980). Crowden and Broom (1980) reported that *Leuciscus leuciscus* heavily infected with *Diplostomum spathaceum* spent more time feeding but caught fewer *Gammarus*, and spent more time in the surface water, which increased their vulnerability to predators.

Monogeneans

The ancyrocephalids, *Dactylogyrus* spp., *Diclybothrium armatum*, *Gyrodactylus* spp., and *Tetraonchus monenteron* can cause thinning of the epidermis of the gills, excessive mucus production, epithelial hyperplasia, and can produce portals of entry for secondary fungal infections (Mizelle 1938; Tripathi 1959; Dogiel et al. 1958; Prost 1963; Lester and Adams 1974; Hoffman 1976; Wobeser et al. 1976; Cusack and Cone 1986).

Cestodes

Several adult cestodes (*Eubothrium salvelini*, *Cyathocephalus truncatus*, *Triaenophorus nodulosus*, *Triaenophorus stizostedionis*) can be considered pathogens of fish by causing inflammation of the intestinal epithelium, disruption of the mucosa, and rupture of blood vessels at point of attachment. *Eubothrium salvelini* retarded the growth and condition factor, caused poor swimming performance, and caused aberrant behavior of *Oncorhynchus nerka*, thereby increasing susceptibility to predation (Smith and Margolis 1970; Smith 1973; Boyce 1979). *Eubothrium salvelini* also reduced condition factor in *Salvelinus alpinus* (see Hoffman et al. 1986). Vik (1958) reported that *Cyathocephalus truncatus* caused the distension and perforation of the ceca and also mortality of trout. *Proteocephalus exiguus* and *P. laruei* were possibly involved in the mortality of young coregonines (Nümann 1972).

Plerocercoids of *Diphyllbothrium ditremum*, *D. laruei*, *Proteocephalus ambloplitis*, *Triaenophorus nodulosus*, and *T. stizostedionis* can be pathogenic to fish. Duguid and Sheppard (1944) and Hoffman and Dunbar (1961) reported that *Diphyllbothrium* sp. caused an epizootic in *Salvelinus fontinalis* and *S. alpinus*. A major decline of *Salmo trutta* and *Salvelinus alpinus* in Norway was caused by *Diphyllbothrium* sp. (Vik 1965). Plerocercoids of *Proteocephalus ambloplitis* can cause severe damage to gonads, liver, spleen, and mesentery of *Micropterus* spp. and other fish species (Bangham 1972; Dechtiar 1972a; Esch and Huffines 1973; McCormick and Stokes 1982). Esch and Huffines (1973) and McCormick and Stokes (1982) demonstrated that the plerocercoids of *Proteocephalus ambloplitis* in female *Micropterus dolomieu* reduced their reproductive capacity by loss of oogenic tissue caused by scarring of ovaries, fibrosis, and direct oocyte destruction. Stromberg and Crites (1974a) reported that plerocercoids of *Triaenophorus nodulosus* infecting the mesentery and liver of *Morone chrysops* caused an acute inflammatory response, hemorrhage, liver necrosis, squamous metaplasia, fibrosis, and liver tissue displacement. Furthermore, Dechtiar and Christie (1988) reported that the livers of *Morone chrysops* had moderate to heavy infection of *Triaenophorus nodulosus*, causing serious problems.

Nematodes

Black (1984) reported that lesions of the swim bladder of *Salvelinus namaycush* may develop as a result of chronic mechanical irritation caused by mature *Cystidicola stigmatura*. Lankester and Smith (1980) reported that *Cystidicola farionis* caused raised ulcers in the swim bladders of *Oncorhynchus mykiss*. Willers et al. (1991) and Knudsen et al. (2002) reported histopathological changes in swim bladders of *Salvelinus alpinus* infected with *Cystidicola farionis*.

Larvae of several nematodes (*Cosmocephalus obvelatus*, *Paracuaria adunca*, *Contraecaecum spiculigerum*, *Hysterothylacium brachyurum*, *Hysterothylacium* sp. *Eustrongylides tubifex*, *Spiroxys* sp., and *Philometra cylindracea*) can cause problems and damage to a variety of non-intestinal sites in fishes when they occur in high intensities, and encysted or non-encysted. *Eustrongylides tubifex*, commonly called the large redworm, can cause the formation of large capsules in infected fish. Crites (1982) indicated that the larvae of *Eustrongylides tubifex* become encapsulated by the tissues of the organs they penetrate. He further suggested there is evidence that as these capsules in the body wall continue to grow and enlarge they put pressure on the

viscera, which may castrate and even kill infected *Perca flavescens*. Larvae of *Eustrongylides tubifex* and adults of *Philometra cylindracea* may play a role in reduced growth and high mortality of *Perca flavescens* (see Allison 1966; Crites 1982; and Salz 1989). If infected fish are not cleaned in a timely manner, these redworms may move out of these capsules into the body cavity and cause anglers to possibly discard the infected fish.

Acanthocephalans

High intensities of the acanthocephalans *Acanthocephalus dirus*, *Echinorhynchus salmonis*, *Pomphorhynchus bulbocollis*, and *Leptorhynchoides thecatus* can cause fibrosis, inflammation and hemorrhaging of the intestinal wall of fish resulting in impaired nutrient uptake (Petrushevski and Kogteva 1954; Bullock 1963; Schmidt et al. 1974; McDonough and Gleason 1981).

Leeches

Only *Actinobdella inequiannulata*, *Myzobdella lugubris*, and *Piscicola* sp. have been reported from Lake Ontario fishes but in low prevalences and/or intensities. They are of minor pathological importance, except possibly for *A. inequiannulata* that can damage the gills and operculum of catostomids (Dechtiar and Lawrie 1988).

Crustaceans

The copepod parasites *Ergasilus* spp., *Argulus catostomi*, and *Achtheres* spp. can be considered serious pathogens when they occur in high intensities. Copepod movements on the gills of fish can cause destruction and hypertrophy of gill filaments. The first legs of *Ergasilus* spp. detach epithelial and underlying cells of their attachment area and sweep them toward the mouth. Heavy infections with *Ergasilus* spp. can severely damage gill tissue, interfere with respiration, open the way to secondary infection, and lead to death (Roberts and Janovy 2009). Although not in Lake Ontario, fish mortalities caused by parasitic copepods have been reported by Schumacher (1952), Allum and Huggins (1959), Kabata (1970), and Rogers and Hawke (1978). *Argulus* spp., when feeding and attached, cause severe localized damage to the integument of their hosts, and these wounds may become secondarily infected with bacteria and fungi (Piasecki and Avenant-Oldewage 2008). *Achtheres* spp. attached to the gill filaments can cause epithelial hyperplasia, gill lamellae fusion, and partial or total loss of gill filaments (Piasecki and Avenant-Oldewage 2008).

Molluscs

The glochidia of *Anodonta* sp., *Elliptio complanatus*, and *Lampsilis radiata siliquoidea* have been identified on the gills and fins of fish. Karna and Milleman (1978) reported that heavy infestations of glochidia can result in early death of fish by asphyxiation.

Parasite Host Specificity—Jaccard Coefficients

Forty-one parasite species reported from fish in two or more families make up 18% of all the parasites reported from fish in this lake. These 41 parasite species have indirect life cycles with fish becoming infected by eating intermediate hosts or paratenic hosts, except for *Ichthyophthirius multifiliis*, *Gyrodactylus avalonia*, *Myzobdella lugubris*, *Argulus catostomi*, and *Ergasilus* spp. Most of the 41 species were digenetic trematodes (29%) and nematodes (27%). Only one monogenean species was shared between fish families. There are 185 parasite species that are host specific to one fish species or family in Lake Ontario.

Jaccard coefficients of similarity for the parasite communities between individuals in the five fish-family comparisons were low, indicating these families did not share many parasite species. As was the case in Lakes Huron and Erie, the highest coefficient (0.1158) involved the Percidae and Centrarchidae. Although fish in Centrarchidae and Percidae have the most parasite species (69 and 58, respectively), these two families shared only 17 parasite species and this maximum coefficient was the lowest maximum in the Great Lakes. The next highest coefficient involved the Percidae and Cyprinidae (0.1136).

Fish Families—Parasite Communities

The monogeneans were the most-common parasite group, in terms of percentage, infecting the cyprinids, catostomids, and centrarchids. The digenetic trematodes were the most-common group in the percids. Cestodes were the most-common parasite group found in the salmonids.

Most fish species examined for parasites from Lake Ontario were cyprinids (12 species) followed by salmonids (9 species). Cyprinids and salmonids harbored 47 and 21 parasite species, respectively. The centrarchids were infected with the most parasite species (69) followed by the percids (58 species). Catostomids were infected with 25 parasite species and had the highest percentage of autogenic helminth species. Cyprinids had the highest percentage (38%) of allogenic helminth species. As with the other Great Lakes, allogenic species did not make up 50% or more of the parasites found in these fish families. Based on the literature regarding the numbers of fish species examined in each family and the number of parasite species found, Lake Ontario is characterized by a mixture of cyprinids, centrarchids, and percids and their autogenic helminth species followed by the catostomids and salmonids with their autogenic parasites.

The autogenic helminth species found that mature in fish include the larval/immature digenetic trematodes (*Bucephalus* sp., *Centrovarium lobotes*), larval/immature cestodes (*Bothriocephalus cuspidatus*, bothriacephalid plerocercoids, *Proteocephalus ambloplitis*, *Proteocephalus* sp., *Triaenophorus crassus*, *T. nodulosus*, *T. stizostedionis*) and larval/immature nematodes (*Hysterothylacium brachyurum*, *Hysterothylacium* sp., *Raphidascaris acus*, *Camallanus oxycephalus*, *Spinitectus* sp., *Philometra cylindracea*, *Rhabdochona* sp.). Of the allogenic helminth species found in fish, larvae of the digenetic trematodes of *Clinostomum complanatum*, *Crassiphiala bulboglossa*, *Diplostomum adamsi*, *D. spathaceum*, *D. spathaceum huronensis*, *Diplostomum* sp., *Neascus* sp., *Posthodiplostomum minimum*, *P. minimum centrarchi*, *Uvulifer*

ambloplitis, *Apophallus brevis*, *A. venustus*, *Ichthyocotylurus diminuta*, *I. intermedia*, *Ichthyocotylurus* sp., and *Tylodelphys scheuringi* mature in piscivorous birds; larvae of the cestode *Dilepis* sp. mature in piscivorous reptiles, birds or mammals; larvae of the cestodes of *Diphyllobothrium ditremum* and *Ligula intestinalis* mature in piscivorous birds; larvae of *Diphyllobothrium laruei* mature in mammals; non-intestinal nematode larvae of *Cosmocephalus obvelatus*, *Paracuaria adunca*, *Contraecaecum spiculigerum*, and *Eustrongylides tubifex* mature in piscivorous birds; and *Spiroxys* sp. matures in turtles.

Table 26. Parasites reported in fishes from Lake Ontario, 1930-2010. Host documentation, in order, consists of references; when observed (cdnp = collection date not provided); prevalence defined as the percentage (%) of fish infected (pnp = prevalence not provided); mean intensity defined as the mean number of parasites per infected fish (minp = mean intensity not provided); for the Dechtiar et al. (1988) article, intensity of infection (L = light, 1-9 parasites per host; M = medium, 10-49 parasites per host; and H = heavy, ≥ 50 parasites per host); location (Ins = location not specified or incomplete); latitude and longitude (llnk = latitude/longitude not known).

Ciliophora (Ciliates)

Ichthyophthiriidae Kent, 1881

Ichthyophthirius multifiliis (Fouquet, 1876)

Synonym: None

Site of Infection: Body surface, fins, gills

Host:

Anguilla rostrata: Dechtiar and Christie 1988; 1961-1971; 5%; H; Ins; Ontario; llnk

Ictalurus punctatus: Dechtiar and Christie 1988; 13%; M; Ins; Ontario

Perca flavescens: Dechtiar and Christie 1988; 2%; L; Ins; Ontario

Trichodinidae Raabe, 1959

Trichodina urinaria Dogiel, 1940

Synonym: *Trichodina algonquinensis* Li and Desser, 1983

Site of Infection: Ureters

Host: *Perca flavescens*: Dechtiar and Christie 1988; 1961-1971; 5%; H; Ins; Ontario; llnk

Trichodina sp.

Site of Infection: Gills

Table 26, continued.

Host:

Anguilla rostrata: Dechtiar and Christie 1988; 1961-1971; 5%; H; lns; Ontario; llnk

Phoxinus neogaeus: Dechtiar and Christie 1988; 28%; H; lns; Ontario

Morone americana: Dechtiar and Christie 1988; 8%; H; lns; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 4%; H; lns; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 6%; H; lns; Ontario

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 14%; H; lns; Ontario

Perca flavescens: Dechtiar and Christie 1988; 5%; H; lns; Ontario

Trichodina sp.

Site of Infection: Ureters

Host:

Notemigonus crysoleucas: Dechtiar and Christie 1988; 1961-1971; 12%; H; lns; Ontario; llnk

Notropis hudsonius: Dechtiar and Christie 1988; 15%; M; lns; Ontario

Fundulus diaphanus: Dechtiar and Christie 1988; 10%; H; lns; Ontario

Trichophryidae Fraipont, 1878

Capriniana piscium (Buetschli, 1889) Jankovski, 1973

Synonym: *Trichophrya piscium* Buetschli, 1889; *Trichophrya sinensis* Chen, 1955; *Trichophrya intermedia* Prost, 1952; *Trichophrya micropteri* Davis, 1947; *Trichophrya ictalurus* Davis, 1942; *Trichophrya salvelinus* Davis, 1942; *Capriniana aurantiaca* Strand, 1926

Site of Infection: Gills

Host: *Morone chrysops*: Dechtiar and Christie 1988; 1961-1971; 7%; H; lns; Ontario; llnk

Capriniana sp.

Site of Infection: Gills

Host: *Gasterosteus aculeatus*: Dechtiar and Christie 1988; 1961-1971; 17%; H; lns; Ontario; llnk

Scyphidiidae Kahl, 1933

Scyphidia micropteri Surber, 1940

Synonym: None

Site of Infection: Gills

Host:

Micropterus dolomieu: Dechtiar and Christie 1988; 1961-1971; 6%; M; lns; Ontario; llnk

Micropterus salmoides: Dechtiar and Christie 1988; 7%; H; lns; Ontario

Table 26, continued.

Scyphidia sp.

Site of Infection: Gills

Host: *Morone americana*: Dechtiar and Christie 1988; 1961-1971; 3%; M; lns; Ontario; llnk

Myxozoa (Myxozoans)

Myxidiidae Thelohan, 1892

Myxidium illinoisense Meglitsch, 1937

Synonym: None

Site of Infection: Gills, kidney

Host: *Anguilla rostrata*: Dechtiar and Christie 1988; 1961-1971; 10%; L; lns; Ontario; llnk

Myxobolidae Thelohan, 1892

Henneguya acuta Bond, 1939

Synonym: None

Site of Infection: Gills

Host: *Esox masquinongy*: Dechtiar and Christie 1988; 1961-1971; 100%; M; lns; Ontario; llnk

Henneguya doori Guilford, 1963

Synonym: None

Site of Infection: Gills

Host: *Perca flavescens*: Dechtiar and Christie 1988; 1961-1971; 3%; H; lns; Ontario; llnk

Henneguya exilis Kudo, 1929

Synonym: None

Site of Infection: Gills

Host:

Ameiurus nebulosus: Dechtiar and Christie 1988; 1961-1971; 12%; H; lns; Ontario; llnk

Ictalurus punctatus: Dechtiar and Christie 1988; 20%; L; lns; Ontario

Henneguya sp.

Site of Infection: Gills

Host:

Luxilus cornutus: Dechtiar and Christie 1988; 1961-1971; 20%; L; lns; Ontario, llnk

Morone americana: Tedla and Fernando 1969d; 1958-1964, October 1967, July 1968; 4%; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970a; May 1967-April 1968 and May 1968-September 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Myxobolus bartai Salim and Desser, 2000

Synonym: None

Site of Infection: Intracellular in striated muscle

Host: *Notropis hudsonius*: Cone et al. 2004; August 2001; 93%; minp; Hamilton Harbor; 43°17'N, 79°40'W

Myxobolus bibullatum (Kudo, 1934) Landsberg and Lom, 1991

Synonym: *Myxosoma bibullatum* Kudo, 1934

Site of Infection: Gills

Host: *Catostomus commersonii*: Dechtiar and Christsie 1988; 1961-1971; 65%; M; lns; Ontario; llnk

Myxobolus burti Cone and Marcogliese 2010

Synonym: *Myxobolus* sp. of Cone et al. 2004

Site of infection: Intracelleular in striated muscle

Host: *Notropis hudsonius*: Cone et al. 2004; August 2001; 46%; minp; Hamilton Harbor; 43°17'N, 79°40'W

Myxobolus dentium Fantham, Porter, and Richardson, 1939

Synonym: None

Site of Infection: Mouth tissue

Host: *Esox masquinongy*: Dechtiar and Christie 1988; 1961-1971; 100%; H; lns; Ontario; llnk

Myxobolus fanthami Landsberg and Lom, 1991

Synonym: None

Site of Infection: Loose connective tissue of head, body, gut

Host: *Notropis hudsonius*: Cone et al. 2004; August 2001; 46%; minp; Hamilton Harbor; 43°17'N, 79°40'W

Myxobolus hendricksoni Mitchell, Seymour and Gamble, 1985

Synonym: None

Site of Infection: Intracellular among tissues of brain

Host: *Notropis hudsonius*: Cone et al. 2004; August 2001; 6%; minp; Hamilton Harbor; 43°17'N, 79°40'W

Myxobolus pendula (Guilford, 1967)

Synonym: *Myxosoma pendula* (Guilford, 1967)

Site of Infection: Gills

Host: *Semotilus atromaculatus*: Dechtiar and Christie 1988; 1961-1971; 20%; L; lns; Ontario; llnk

Table 26, continued.

Myxobolus procercum (Kudo, 1934) Lom and Noble, 1984

Synonym: *Myxosoma procercum* (Kudo, 1934) Lom and Noble, 1984

Site of Infection: Skin

Host: *Percopsis omiscomaycus*: Dechtiar and Christie 1988; 1961-1971; 26%; M; Ins; Ontario; lnk

Myxobolus xiaoi Salim and Desser, 2000

Synonym: None

Site of Infection: Cartilaginous tissue

Host: *Notropis hudsonius*: Cone et al. 2004; August 2001; 33%; minp; Hamilton Harbor; 43°17'N, 79°40'W

Myxobolus sp.

Site of Infection: Fins, gills, heart, muscle

Host:

Notemigonus crysoleucas: Dechtiar and Christie 1988; 1961-1971; 8%; L; Ins; Ontario

Rhinichthys cataractae: Dechtiar and Christie 1988; 8%; L; Ins; Ontario

Moxostoma macrolepidotum: Dechtiar and Christie 1988; 33%; M; Ins; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 4%; H; Ins; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 3%; H; Ins; Ontario

Micropterus salmoides: Dechtiar and Christie 1988; 7%; M; Ins; Ontario

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 24%; L; Ins; Ontario

Sander vitreus: Dechtiar and Christie 1988; 24%; M; Ins; Ontario

Thelohanellus notatus (Mavor 1916) Kudo, 1933

Synonym: None

Site of Infection: Body musculature, mesenteries, base of fins

Host: *Notropis hudsonius*: Cone et al. 2004; August 2001; 20%; minp; Hamilton Harbor; 43°17'N, 79°40'W

Zschokkella sp.

Site of Infection: Bile ducts of liver

Host: *Notropis hudsonius*: Cone et al. 2004; August 2001; 6%; minp; Hamilton Harbor; 43°17'N, 79°40'W

Table 26, continued.

Microspora (Microsporans)

Glugeidae Thelohan, 1892

Glugea cepedianae (Putz, Hoffman and Dunbar, 1965) Canning, Lom and Dykova, 1986

Synonym: *Pleistophora cepedianae* Putz et al. 1965

Site of Infection: Mesentery

Host: *Dorosoma cepedianum*: Dechtiar and Christie 1988; 1961-1971; 8%; M; Ins; Ontario; llnk

Glugea hertwigi Weissenberg, 1911

Synonym: *Glugea hertwigi* var. *canadensis* Fantham, Porter and Richardson, 1941

Site of Infection: Intestinal wall, ovaries and mesentery

Host:

Osmerus mordax: Chen and Power 1972; April 1968- May 1969; 63%; minp; Ins; llnk

Osmerus mordax: Dechtiar and Christie 1988; 1961-1971; 23%; H; Ins; Ontario; llnk

Osmerus mordax: Ehlinger 1966; pnp; minp; Port Ontario; 43°34'0"/-76°11'16"

Glugea pimephales (Fantham, Porter, and Richardson, 1941) Morrison, Hoffman, and Sprague, 1985

Synonym: *Nosema pimephales* Fantham et al. 1941

Site of Infection: Internal organs, muscle

Host:

Pimephales notatus: Dechtiar and Christie 1988; 1961-1971; 5%; H; Ins; Ontario; llnk

Pimephales promelas: Dechtiar and Christie 1988; 27%; L; Ins; Ontario; llnk

Adult Digenea (Digenetic Trematodes)

Acanthocolpidae Luhe, 1909

Skrjabinopsolus manteri (Cable, 1952) Cable, 1955

Synonym: None

Site of Infection: Intestine

Host: *Acipenser fulvescens*: Dechtiar and Christie 1988; 1961-1971; 50%; L; upper St. Lawrence River, Ontario; llnk

Allocreadiidae Loos, 1902

Bunodera luciopercae (Muller, 1776) Luhe, 1909

Synonym: *Bunodera nodulosa* Froelich, 11791

Site of Infection: Intestine

Host:

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-September 1969; 30%; 7; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Bunodera sacculata (Van Cleave and Mueller, 1932) Yamaguti, 1958

Synonym: *Bunoderina sacculata*

Site of Infection: Intestine

Host:

Lepomis macrochirus: Dechtiar and Christie 1988; 1961-1971; 12%; L; Ins; Ontario; llnk

Perca flavescens: Dechtiar and Christie 1988; 5%; Ins; Ontario

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-September 1969; 17%; 7; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Bunoderina eucaliae Miller, 1936

Synonym: *Bunodera eucaliae* (Miller, 1936)

Site of Infection: Intestine

Host:

Culaea inconstans: Dechtiar and Christie 1988; 1961-1971; 41%; L; Ins; Ontario; llnk

Gasterosteus aculeatus: Dechtiar and Christie 1988; 13%; L; Ins; Ontario

Crepidostomum canadense Hopkins 1931

Synonym: None

Site of Infection: [Intestine]

Host: *Etheostoma nigrum*: Hopkins 1931; June 1912; pnp; minp; Go-Home Bay, Ontario; llnk

Crepidostomum cooperi Hopkins, 1931

Synonym: *Crepidostomum ambloplitis* Hopkins, 1931; *Crepidostomum solidum* Van Cleave and Mueller, 1932; *Crepidostomum fausti* Hunninen and Hunter, 1933; *Crepidostomum laureatum* of Stafford (1904) and Cooper (1915) (partim); *Bunodera nodulosa* of Stafford (1904) (partim), *Crepidostomum cornutum* of Cooper (1915) (partim)

Site of Infection: Intestine

Host:

Perca flavescens: Hopkins 1931; June 1912; pnp; minp; Go-Home Bay, Ontario; llnk

Perca flavescens: Dechtiar and Christie 1988; 1961-1971; 5%; L; Ins; Ontario; llnk

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; 2%; 1; Bay of Quinte 44°9'0"/-77°15'0"

Table 26, continued.

Crepidostomum cornutum (Osborn, 1903) Stafford, 1904

Synonym: None

Site of Infection: Intestine

Host:

Ambloplites rupestris: Dechtiar and Christie 1988; 1961-1971; 39%; M; lns; Ontario; llnk

Lepomis macrochirus: Dechtiar and Christie 1988; 12%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 6%; M; lns; Ontario

Micropterus salmoides: Dechtiar and Christie 1988; 29%; M; lns; Ontario

Crepidostomum isostomum Hopkins, 1931

Synonym: *Crepidostomum laureatum* of Cooper (1915) (partim); *Crepidostomum canadense* Hopkins, 1931

Site of Infection: Intestine

Host:

Percopsis omiscomaycus: Dechtiar and Christie 1988; 1961-1971; 46%; M; lns; Ontario; llnk

Percina caprodes: Dechtiar and Christie 1988; 60%; L; lns; Ontario

Crepidostomum lintoni (Pratt and Linton, 1901) Hopkins, 1933

Synonym: *Crepidostomum petalosum* Lander

Site of Infection: Intestine

Host: *Acipenser fulvescens*: Dechtiar and Christie 1988; 1961-1971; 100%; M; upper St. Lawrence River, Ontario; llnk

Crepidostomum sp.

Site of Infection: Pyloric ceca

Host: *Ambloplites rupestris*: Hopkins 1931; June 1912; pnp; minp; Go-Home Bay, Ontario; llnk

Creptotrema funduli Mueller, 1934

Synonym: ?*Allocreadium commune* of Cooper, 1915 (partim)

Site of Infection: Intestine

Host: *Umbra limi*: Dechtiar and Christie 1988; 1961-1971; 12%; L; lns; Ontario; llnk

Plagiocirrus primus Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Intestine

Host: *Notemigonus crysoleucas*: Dechtiar and Christie 1988; 1961-1971; 3%; L; lns; Ontario; llnk

Table 26, continued.

Azygidae Luhe, 1909

Azygia angusticauda (Stafford, 1904) Manter, 1926

Synonym: *Mimodistomum angusticaudum* Stafford, 1904; *Ptychogonimus fontanus* Lyster, 1939

Site of Infection: Intestine

Host:

Esox lucius: Dechtiar and Christie 1988; 1961-1971; 24%; L; lns; Ontario; llnk

Lepomis gibbosus: Dechtiar and Christie 1988; 18%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Micropterus salmoides: Dechtiar and Christie 1988; 43%; L; lns; Ontario

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Sander vitreus: Dechtiar and Christie 1988; 27%; L; lns; Ontario

Azygia longa (Leidy, 1851) Manter, 1926

Synonym: *Megadistomum longum* (Leidy, 1851); *Azygia acuminata* Goldberger, 1911; *Azygia lucii* of Cooper, 1915; *Azygia tereticolle* of Stafford, 1904

Site of Infection: Intestine

Host:

Amia calva: Dechtiar and Christie 1988; 1961-1971; 50%; L; lns; Ontario; llnk

Anguilla rostrata: Dechtiar and Christie 1988; 10%; L; lns; Ontario

Esox masquinongy: Dechtiar and Christie 1988; 100%; L; lns; Ontario

Leuceruthrus micropteri Marshall and Gilbert, 1905

Synonym: None

Site of Infection: Intestine

Host: *Micropterus salmoides*: Dechtiar and Christie 1988; 1961-1971; 7%; L; lns; Ontario; llnk

Proterometra macrostoma (Faust, 1918) Horsfall, 1934

Synonym: None

Site of Infection: Intestine

Host:

Ambloplites rupestris: Dechtiar and Christie 1988; 1961-1971; 13%; L; lns; Ontario; llnk

Lepomis gibbosus: Dechtiar and Christie 1988; 3%; L; lns; Ontario

Bucephalidae Poche, 1907

Prosorhynchoides pusilla Stafford, 1904

Synonym: *Bucephalopsis pusilla* (Stafford, 1904); *Bucephalus pusillus* (Stafford, 1904); *Gasterostomum pusillum* (Stafford, 1904)

Site of Infection: Intestine

Host: *Sander vitreus*: Dechtiar and Christie 1988; 1961-1971; 24%; L; lns; Ontario; llnk

Table 26, continued.

Cryptogonimidae (Ward, 1917) Ciurea, 1933

Acetodextra amiuri (Stafford, 1904) Pearse, 1924

Synonym: *Monostomum amiuri* (Stafford, 1900) Pearse, 1924

Site of Infection: Air bladder, ovaries

Host: *Ameiurus nebulosus*: Dechtiar and Christie 1988; 1961-1971; 24%; L; Ins; Ontario; llnk

Allacanthochasmus artus Mueller and Van Cleave, 1932

Synonym: None

Site of Infection: Intestine

Host: *Morone chrysops*: Dechtiar and Christie 1988; 1961-1971; 100%; M; Ins; Ontario; llnk

Allacanthochasmus varius Van Cleave, 1922

Synonym: None

Site of Infection: Intestine

Host: *Morone chrysops*: Dechtiar and Christie 1988; 1961-1971; 100%; M; Ins; Ontario; llnk

Neochasmus umbellus Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Intestine

Host: *Morone chrysops*: Dechtiar and Christie 1988; 1961-1971; 33%; M; Ins; Ontario; llnk

Gorgoderidae Looss, 1901

Phyllodistomum coregoni Dechtiar, 1966

Synonym: None

Site of Infection: Ureters

Host: *Coregonus clupeaformis*: Dechtiar and Christie 1988; 1961-1971; 24%; L; Ins; Ontario; llnk

Phyllodistomum lohrenzi (Loewen, 1935)

Synonym: None

Site of Infection: Ureters

Host: *Ambloplites rupestris*: Dechtiar and Christie 1988; 1961-1971; 5%; L; Ins; Ontario; llnk

Phyllodistomum lysteri Miller, 1940

Synonym: None

Site of Infection: Ureters

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 6%; L; Ins; Ontario; llnk

Table 26, continued.

Phyllodistomum staffordi Pearse, 1924

Synonym: *Phyllodistomum folium* (Olfers, 1816) (partim) of Stafford (1902); *Phyllodistomum superbum* Stafford, 1904 (partim); ?*Phyllodistomum carolini* Holl, 1929; *Phyllodistomum lacustri* of Dechtiar (1972) and Dechtiar and Nepszy (1988); *Phyllodistomum hunteri* Arnold, 1934

Site of Infection: Ureters

Host: *Ameiurus nebulosus*: Dechtiar and Christie 1988; 1961-1971; 24%; L; lns; Ontario; llnk

Phyllodistomum sp.

Site of Infection: Urinary bladder

Host: *Esox lucius*: Dechtiar and Christie 1988; 1961-1971; 24%; L; lns; Ontario; llnk

Homalometridae (Cable and Hunninen, 1942) Yamaguti, 1971

Synonym: Anallocreadiidae Hunter and Bangham, 1932

Homalometron armatum (MacCallum, 1895) Manter, 1947

Synonym: *Distomum isoporum* var. *armatum* MacCallum, 1895; *Anallocreadium armatum* MacCallum, 1895 Simer, 1929; *Bunodera armatum* (MacCallum, 1895); *Anallocreadium pearsei* Hunter and Bangham, 1932

Site of Infection: Intestine

Host: *Aplodinotus grunniens*: Dechtiar and Christie 1988; 1961-1971; 42%; M; lns; Ontario; llnk

Lepocreadiidae (Odhner, 1905) Nicoll, 1935

Megalogonia ictaluri Surber, 1928

Synonym: *Crepidostomum ictaluri* Surber, 1928

Site of Infection: Intestine

Host:

Ameiurus nebulosus: Dechtiar and Christie 1988; 1961-1971; 29%; M; lns; Ontario; llnk

Noturus flavus: Dechtiar and Christie 1988; 50%; L; lns; Ontario

Noturus gyrinus: Dechtiar and Christie 1988; 60%; M; lns; Ontario

Lissorchiidae (Poche, 1926) Yamaguti, 1971

Lissorchis attenuatus (Mueller and Van Cleave, 1932) Krygier and Macy, 1969

Synonym: *Triganodistomum attenuatum* Mueller and Van Cleave, 1932

Site of Infection: Intestine

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 13%; L; lns; Ontario; llnk

Macroderodiidae McMullen, 1957

Alloglossidium corti (Lamont, 1921) Van Cleave and Mueller, 1934

Synonym: *Plagiorchis corti* Lamont, *Plagiorchis ameiurensis* McCoy, 1928

Site of Infection: Intestine

Table 26, continued.

Host:

Ictalurus punctatus: Dechtiar and Christie 1988; 1961-1971; 13%; L; lns; Ontario; llnk

Noturus flavus: Dechtiar and Christie 1988; 33%; L; lns; Ontario

Noturus gyrinus: Dechtiar and Christie 1988; 60%; M; lns; Ontario

Glossidium geminum (Mueller, 1930) Yamaguti, 1954

Synonym: *Alloglossidium geminus* (Mueller, 1930); *Plagiorchis geminum* Mueller, 1930

Site of Infection: Intestine

Host:

Ameiurus nebulosus: Dechtiar and Christie 1988; 1961-1971; 15%; L; lns; Ontario; llnk

Noturus flavus: Dechtiar and Christie 1988; 17%; L; lns; Ontario

Macroderoides typicus (Winfield, 1929) Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Intestine

Host: *Amia calva*: Dechtiar and Christie 1988; 1961-1971; 25%; L; lns; Ontario; llnk

Microphallidae (Ward, 1901) Travassos, 1920

Microphallus opacus (Ward, 1894) Ward, 1901

Synonym: *Distomum opacum* Ward, 1894; *Microphallus opacus ovatus* Strandine, 1943

Site of Infection: Intestine

Host: *Ictalurus punctatus*: Dechtiar and Christie 1988; 1961-1971; 13%; L; lns; Ontario; llnk

Opecoelidae Ozaki, 1925

Plagioporus sinitsini Mueller, 1934b

Synonym: ?*Allocreadium commune* of Cooper, 1915 (partim)

Site of Infection: Gall bladder, intestine

Host:

Luxilus cornutus: Dechtiar and Christie 1988; 1961-1971; 13%; L; lns; Ontario; llnk

Notropis hudsonius: Dechtiar and Christie 1988; 36%; L; lns; Ontario

Sanguinicolidae Graaff, 1907

Sanguinicola occidentalis Van Cleave and Mueller, 1932

Synonym: None

Site of Infection: Blood

Host: *Sander vitreus*: Dechtiar and Christie 1988; 1961-1971; 8%; M; lns; Ontario; llnk

Table 26, continued.

Transversotrematidae Witenberg, 1944 (Yamaguti, 1954)

Prototransversotrema sp.

Site of Infection: Under scales

Host: *Luxilus cornutus*: Dechtiar and Christie 1988; 1961-1971; 13%; L; Credit River, Ontario; 43°33'0"/-79°34'59"

Remarks: This is the only report of *Prototransversotrema* infecting a fish in the Great Lakes.

Larval/Immature Digenea (Digenetic Trematodes)

Bucephalidae Poche, 1907

Bucephalus sp.

Site of Infection: Intestine

Host: *Percopsis omiscomaycus*: Dechtiar and Christie 1988; 1961-1971; 10%; L; lns; Ontario; llnk

Clinostomidae Luhe, 1901

Clinostomum complanatum (Rudolphi, 1814) Braun, 1899

Synonym: *Clinostomum marginatum* (Rudolphi, 1814) Braun, 1879; ?*Clinostomum gracile* of Stafford, 1904; ?*Distomum gracile* of Wright, 1879

Site of infection: Gill arches, muscle

Host:

Luxilus cornutus: Dechtiar and Christie 1988; 1961-1971; 33%; L; lns; Ontario; llnk

Morone americana: Tedla and Fernando 1969d; 1958-1964, October 1967, July 1968; 4%; 1; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 23%; L; lns; Ontario

Micropterus salmoides: Dechtiar and Christie 1988; 21%; L; lns; Ontario

Perca flavescens: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; 2%; 1; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Aplodinotus grunniens: Dechtiar and Christie 1988; 13%; L; lns; Ontario

Remarks: Dzikowski et al. (2004) stated *Clinostomum complanatum* and *Clinostomum marginatum* are distinct species based on differences in ribosomal DNA.

Table 26, continued.

Cryptogonimidae (Ward, 1917) Ciurea, 1933

Centrovarium lobotes (MacCallum, 1895) Stafford, 1904

Synonym: None

Site of Infection: Muscle

Host: *Percopsis omiscomaycus*: Dechtiar and Christie 1988; 1961-1971; 10%; M; lns; Ontario; llnk

Diplostomidae Poirier, 1886

Crassiphiala bulboglossa Poirier, 1886

Synonym: *Neascus bulboglossa* (Van Haitsma, 1925)

Site of Infection: Fins, skin

Host:

Notemigonus crysoleucas: Dechtiar and Christie 1988; 1961-1971; 43%; M; lns; Ontario; llnk

Pimephales notatus: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Pimephales promelas: Dechtiar and Christie 1988; 27%; L; lns; Ontario

Perca flavescens: Dechtiar and Christie 1988; 11%; M; lns; Ontario

Diplostomum adamsi Lester and Huizinga, 1977

Synonym: None

Site of Infection: Eye

Host:

Perca flavescens: Lester 1977; May-November 1974; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Lester and Huizinga 1977; cdnp; 86%; 53; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Diplostomum huronense (La Rue, 1927) Hughes and Hall, 1929

Synonym: ?

Site of Infection: vitreous humor

Host:

Morone americana: Tedla and Fernando 1969c; 1967 and 1968; 3%; 2; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; 89%; 26; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Remarks: Some investigators believe *Diplostomum huronense* is a synonym of *Diplostomum spathaceum*.

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Synonym: *Diplostomulum spathaceum* (Rudolphi, 1819), *Diplostomum volvens* Nordmann, 1832;

Diplostomum volvens Nordmann, 1833 of Cooper (1915); probably *Diplostomum emarginatae* Olivier, 1942; *Diplostomum flexicaudum* (Cort and Brooks, 1928); *Diplostomum indistinctum*; *Diplostomum gigas*

Site of Infection: Eye

Table 26, continued.

Host:

Acipenser fulvescens: Dechtiar and Christie 1988; 1961-1971; 50%; L; upper St. Lawrence River, Ontario; llnk

Lepisosteus osseus: Dechtiar and Christie 1988; 1961-1971; 50%; L; lns; Ontario; llnk

Amia calva: Dechtiar and Christie 1988; 25%; L; lns; Ontario

Anguilla rostrata: Dechtiar and Christie 1988; 33%; L; lns; Ontario

Alosa pseudoharengus: Dechtiar and Christie 1988; 66%; L; lns; Ontario

Dorosoma cepedianum: Dechtiar and Christie 1988; 42%; L; lns; Ontario

Couesius plumbeus: Dechtiar and Christie 1988; 100%; L; lns; Ontario

Cyprinus carpio: Dechtiar and Christie 1988; 17%; L; lns; Ontario

Notemigonus crysoleucas: Dechtiar and Christie 1988; 13%; L; lns; Ontario

Notropis atherinoides: Dechtiar and Christie 1988; 23%; L; lns; Ontario

Notropis hudsonius: Dechtiar and Christie 1988; 76%; L; lns; Ontario

Pimephales promelas: Dechtiar and Christie 1988; 91%; L; lns; Ontario

Semotilus atromaculatus: Dechtiar and Christie 1988; 30%; L; lns; Ontario

Catostomus commersonii: Dechtiar and Christie 1988; 11%; L; lns; Ontario

Noturus gyrinus: Dechtiar and Christie 1988; 100%; L; lns; Ontario

Esox lucius: Dechtiar and Christie 1988; 8%; L; lns; Ontario

Umbra limi: Dechtiar and Christie 1988; 6%; L; lns; Ontario

Osmerus mordax: Dechtiar and Christie 1988; 18%; L; lns; Ontario

Coregonus artedii: Dechtiar and Christie 1988; 12%; L; lns; Ontario

Coregonus clupeaformis: Dechtiar and Christie 1988; 8%; L; lns; Ontario

Oncorhynchus mykiss: Dechtiar and Christie 1988; 71%; L; lns; Ontario

Salvelinus fontinalis: Dechtiar and Christie 1988; 1961-1971; 20%; L; Credit River; 43°33'0"/-79°34'59"; and Shelter Valley Creek, Ontario; llnk

Salvelinus namaycush: Dechtiar and Christie 1988; 10%; L; lns; Ontario

Percopsis omiscomaycus: Dechtiar and Christie 1988; 13%; L; lns; Ontario

Fundulus diaphanus: Dechtiar and Christie 1988; 15%; L; lns; Ontario

Labidesthes sicculus: Dechtiar and Christie 1988; 20%; L; lns; Ontario

Gasterosteus aculeatus: Dechtiar and Christie 1988; 39%; L; lns; Ontario

Morone americana: Dechtiar and Christie 1988; 21%; L; lns; Ontario

Morone chrysops: Dechtiar and Christie 1988; 33%; L; lns; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 24%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 11%; L; lns; Ontario

Micropterus salmoides: Dechtiar and Christie 1988; 21%; L; lns; Ontario

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 10%; L; lns; Ontario

Etheostoma caeruleum: Dechtiar and Christie 1988; 40%; L; lns; Ontario

Table 26, continued.

Etheostoma exile: Dechtiar and Christie 1988; 20%; L; Ins; Ontario

Etheostoma nigrum: Dechtiar and Christie 1988; 9%; L; Ins; Ontario

Sander vitreus: Dechtiar and Christie 1988; 27%; L; Ins; Ontario

Aplodinotus grunniens: Dechtiar and Christie 1988; 21%; L; Ins; Ontario

Diplostomum spathaceum huronense (La Rue, 1927) Hughes, 1929

Synonym: ?

Site of Infection: Eye

Host: *Perca flavescens*: Dechtiar and Christie 1988; 1961-1971; 5%; L; Ins; Ontario; llnk

Diplostomum sp.

Site of Infection: Brain

Host: *Pimephales promelas*: Dechtiar and Christie 1988; 1961-1971; 36%; M; Ins; Ontario; llnk

Diplostomum sp.

Site of Infection: Eye

Host: *Pimephales notatus*: Dechtiar and Christie 1988; 1961-1971; 16%; L; Ins; Ontario; llnk

Neascus sp.

Site of Infection: Muscle

Host:

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; 2%; 3; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Posthodiplostomum minimum (MacCallum, 1921) Dubois, 1936

Synonym: *Neascus vancleavi* (Agersborg, 1926); *Diplostomum cuticola* (Nordmann, 1832) Diesing, 1850 of Stafford (1904) and Cooper (1915); *Posthodiplostomum cuticola* (Nordmann, 1832) Dubois, 1936 of Margolis and Arthur (1979)

Site of Infection: Gills, liver, mesentery, internal organs

Table 26, continued.

Host:

Alosa pseudoharengus: Dechtiar and Christie 1988; 1961-1971; 3%; L; Ins; Ontario; lnk

Notemigonus crysoleucas: Dechtiar and Christie 1988; 13%; M; Ins; Ontario

Pimephales notatus: Dechtiar and Christie 1988; 16%; L; Ins; Ontario

Fundulus diaphanus: Dechtiar and Christie 1988; 40%; L; Ins; Ontario

Labidesthes sicculus: Dechtiar and Christie 1988; 20%; M; Ins; Ontario

Morone americana: Dechtiar and Christie 1988; 1961-1971 3%; M; Ins; Ontario; lnk

Ambloplites rupestris: Dechtiar and Christie 1988; 25%; M; Ins; Ontario

Posthodiplostomum minimum centrarchi Hoffman, 1958

Synonym: ?

Site of Infection: Liver, mesentery

Host:

Lepomis gibbosus: Dechtiar and Christie 1988; 1961-1971; 35%; M; Ins; Ontario; lnk

Lepomis macrochirus: Dechtiar and Christie 1988; 24%; H; Ins; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 3%; M; Ins; Ontario

Uvulifer ambloplitis (Hughes, 1927) Dubois, 1938

Synonym: *Neascus ambloplitis* Hughes, 1927; *Crassiphiala ambloplitis* (Hughes, 1927) Hunter and Hunter, 1931; *Neascus wardi* Hunter, 1928

Site of Infection: Fins, skin

Host:

Esox lucius: Dechtiar and Christie 1988; 1961-1971; 16%; M; Ins; Ontario; lnk

Ambloplites rupestris: Dechtiar and Christie 1988; 13%; L; Ins; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 9%; L; Ins; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 19%; L; Ins; Ontario

Sander vitreus: Dechtiar and Christie 1988; 14%; M; Ins; Ontario

Heterophyidae Leiper, 1909

Apophallus brevis Ransom, 1920

Synonym: *Apophallus americanus* Van Cleave and Mueller, 1932; *Apophallus itascaensis* Warren, 1953; *Distomum* sp. larva of Cooper (1915)

Site of infection: Muscle

Host:

Notemigonus crysoleucas: Dechtiar and Christie 1988; 1961-1971; 11%; L; Ins; Ontario; lnk

Morone americana: Tedla and Fernando 1969d; 1958-1964, October 1967, July 1968; 10%; 1; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Etheostoma exile: Dechtiar and Christie 1988; 30%; L; Ins; Ontario

Etheostoma nigrum: Dechtiar and Christie 1988; 11%; L; Ins; Ontario

Perca flavescens: Dechtiar and Christie 1988; 5%; M; Ins; Ontario

Table 26, continued.

Apophallus venustus (Ransom, 1920)

Synonym: *Cotylophallus venustus*

Site of Infection: Muscle

Host:

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Strigeidae Railliet, 1919

Ichthyocotylurus diminuta (Hughes, 1928)

Synonym: *Tetracotyle diminuta* Hughes, 1928

Site of Infection: Kidney, mesentery

Host:

Percopsis omiscomaycus: Dechtiar and Christie 1988; 1961-1971; 54%; L; lns; Ontario; llnk

Perca flavescens: Dechtiar and Christie 1988; 27%; L; lns; Ontario

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ichthyocotylurus intermedia (Hughes, 1928)

Synonym: *Tetracotyle intermedia* Hughes, 1928

Site of Infection: Heart, kidney

Host:

Coregonus artedii: Dechtiar and Christie 1988; 1961-1971; 40%; L; lns; Ontario; llnk

Coregonus chupeaformis: Dechtiar and Christie 1988; 60%; L; lns; Ontario

Salvelinus fontinalis: Dechtiar and Christie 1988; 20%; L; Credit River; 43°33'0"/-79°34'59"; Shelter Valley Creek, Ontario; llnk

Ichthyocotylurus sp.

Site of Infection: Heart, kidney, mesentery

Host:

Couesius plumbeus: Dechtiar and Christie 1988; 1961-1971; 100%; L; lns; Ontario; llnk

Notropis hudsonius: Dechtiar and Christie 1988; 15%; L; lns; Ontario

Ameiurus nebulosus: Dechtiar and Christie 1988; 9%; L; lns; Ontario

Esox lucius: Dechtiar and Christie 1988; 24%; L; lns; Ontario

Umbra limi: Dechtiar and Christie 1988; 29%; L; lns; Ontario

Osmerus mordax: Dechtiar and Christie 1988; 18%; L; lns; Ontario

Cottus bairdii: Dechtiar and Christie 1988; 70%; M; lns; Ontario

Cottus cognatus: Dechtiar and Christie 1988; 50%; L; lns; Ontario

Morone americana: Dechtiar and Christie 1988; 4%; L; lns; Ontario

Table 26, continued.

Morone chrysops: Dechtiar and Christie 1988; 20%; L; lns; Ontario
Lepomis gibbosus: Dechtiar and Christie 1988; 21%; L; lns; Ontario
Lepomis macrochirus: Dechtiar and Christie 1988; 4%; L; lns; Ontario
Micropterus dolomieu: Dechtiar and Christie 1988; 6%; L; lns; Ontario
Pomoxis nigromaculatus: Dechtiar and Christie 1988; 29%; L; lns; Ontario
Etheostoma exile: Dechtiar and Christie 1988; 40%; L; lns; Ontario
Sander vitreus: Dechtiar and Christie 1988; 49%; L; lns; Ontario
Aplodinotus grunniens: Dechtiar and Christie 1988; 46%; L; lns; Ontario

Tylodelphys scheuringi (Hughes, 1929) Dubois, 1938

Synonym: *Diplostomulum scheuringi* Hughes, 1929

Site of Infection: Eye, vitreous humor

Host:

Morone americana: Dechtiar and Christie 1988; 1961-1971; 24%; L; lns; Ontario; llnk

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario, 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; 15%; 3; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Percina caprodes: Dechtiar and Christie 1988; 60%; L; lns; Ontario

Aspidobothrea (Aspidobothreans)

Aspidogasteridae Poche, 1907

Cotylogaster occidentalis Nickerson, 1902

Synonym: *Cotylogasteroides occidentalis* Yamaguti, 1963

Site of Infection: Intestine

Host: *Aplodinotus grunniens*: Dechtiar and Christie 1988; 1961-1971; 8%; L; lns; Ontario; llnk

Monogenea (Monogeneans)

Ancyrocephalidae Bykhovski and Nagibina, 1978

Actinocleidus brevicirrus Mizelle and Jaskoski, 1942

Synonym: None

Site of Infection: Gills

Host: *Lepomis macrochirus*: Dechtiar and Christie 1988; 1961-1971; 4%; L; lns; Ontario; llnk

Actinocleidus gibbosus Mizelle and Donahue 1944

Synonym: None

Site of Infection: Gills

Host: *Lepomis gibbosus*: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Actinocleidus mizellei Hanek and Fernando 1972a

Synonym: None

Site of Infection: Gills

Host: *Micropterus salmoides*: Hanek and Fernando 1972a; May-September 1970; pnp; minp; West Lake, Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Actinocleidus recurvatus Mizelle and Donahue, 1944

Synonym: None

Site of Infection: Gills

Host:

Lepomis gibbosus: Dechtiar and Christie 1988; 1961-1971; 35%; L; lns; Ontario; llnk

Lepomis gibbosus: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario 44°9'0"/-77°15'0"

Lepomis gibbosus: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Actinocleidus sp.

Site of Infection: Gills

Host:

Lepomis macrochirus: Dechtiar and Christie 1988; 1961-1971; 40%; L; lns; Ontario; llnk

Micropterus salmoides: Dechtiar and Christie 1988; 50%; L; lns; Ontario

Aethycteron hargisi (Hanek and Fernando, 1972a) Suriano and Beverley-Burton, 1982

Synonym: *Urocleidus hargisi* Hanek and Fernando, 1982

Site of Infection: Gills

Host: *Etheostoma nigrum*: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"); Dechtiar and Christie 1988; 1961-1971; 33%; L; lns; Ontario; llnk

Aethycteron malleus (Mueller, 1938) Suriano and Beverley-Burton, 1982

Synonym: *Cleidodiscus malleus* Mueller, 1938

Site of Infection: Gills

Host: *Percina caprodes*: Dechtiar and Christie 1988; 1961-1971; 100%; L; lns; Ontario; llnk

Aethycteron sp.

Site of Infection: Gills

Host:

Etheostoma caeruleum: Dechtiar and Christie 1988; 1961-1971; 60%; L; lns; Ontario; llnk

Etheostoma exile: Dechtiar and Christie 1988; 50%; L; lns; Ontario

Table 26, continued.

Anchorodiscus triangularis (Summers, 1937) Mizelle, 1941a

Synonym: *Actinocleidus triangularis* Summers, 1937; *Actinocleidus anchoradiscus* (Mizelle, 1941)

Site of Infection: Gills

Host: *Lepomis macrochirus*: Dechtiar and Christie 1988; 1961-1971; 4%; L; lns; Ontario; llnk

Cleidodiscus baldwini (Dechtiar, 1974) Beverley-Burton, 1984

Synonym: *Urocleidus baldwini* Dechtiar, 1974

Site of Infection: Gills

Host:

Percopsis omiscomaycus: Dechtiar 1974a; 1969; pnp; minp; lns; Ontario; llnk

Percopsis omiscomaycus: Dechtiar and Christie 1988; 1961-1971; 90%; L; lns; Ontario; llnk

Cleidodiscus brachus (Mueller, 1938), Price, 1968

Synonym: ?*Urocleidus brachus*

Site of Infection: Gills

Host: *Semotilus atromaculatus*: Dechtiar and Christie 1988; 1961-1971; 100%; L; lns; Ontario; llnk

Cleidodiscus robustus Mueller, 1934

Synonym: *Cleidodiscus incisor*, *Actinocleidus incisor*

Site of Infection: Gills

Host:

Lepomis gibbosus: Dechtiar and Christie 1988; 1961-1971; 3%; L; lns; Ontario; llnk

Lepomis gibbosus: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Lepomis gibbosus: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Lepomis macrochirus: Dechtiar and Christie 1988; 24%; M; lns; Ontario

Cleidodiscus vancleavi Mizelle, 1936

Synonym: None

Site of infection: Gills

Host: *Pomoxis nigromaculatus*: Hanek and Fernando 1972a; May-September 1970; pnp; minp; West Lake, Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Cleidodiscus venardi Mizelle and Jaskoski, 1942

Synonym: None

Site of Infection: Fins

Host: *Lepomis macrochirus*: Dechtiar and Christie 1988; 1961-1971; 24%; L; lns; Ontario; llnk

Table 26, continued.

Cleidodiscus sp.

Site of Infection: Gills

Host: *Morone americana*: Tedla and Fernando 1969d; 1958-1964; October 1967; July 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ligictaluridus floridanus (Mueller, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus floridanus* Mueller, 1936; *Cleidodiscus mirabilis* Mueller, 1937 (partim)

Site of Infection: Gills

Host: *Ictalurus punctatus*: Dechtiar and Christie 1988; 1961-1971; 67%; M; lns; Ontario; llnk

Ligictaluridus monticelli (Cognetti de Martiis, 1924), Klassen and Beverley and Burton, 1985

Synonym: None

Site of Infection: Nares

Host: *Ameiurus nebulosus*: Dechtiar and Christie 1988; 1961-1971; 21%; L; lns; Ontario; llnk

Ligictaluridus pricei (Mueller, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus pricei* Mueller, 1936

Site of Infection: Gills

Host:

Ameiurus nebulosus: Dechtiar and Christie 1988; 1961-1971; 44%; M; lns; Ontario; llnk

Ameiurus nebulosus: Hanek and Fernando 1972a; May-September 1970; pnp; minp; West Lake, Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Noturus flavus: Dechtiar and Christie 1988; 33%; L; lns; Ontario

Noturus gyrinus: Dechtiar and Christie 1988; 40%; L; lns; Ontario

Lyrodiscus longibasus Rogers, 1967

Synonym: None

Site of Infection: Fins, skin

Host:

Lepomis macrochirus: Dechtiar and Christie 1988; 1961-1971; 40%; L; lns; Ontario; llnk

Pomoxis annularis: Dechtiar 1973; cdp; pnp; minp; lns; llnk

Pomoxis nigromaculatus: Dechtiar 1973; pnp; minp; lns

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 48%; L; lns; Ontario

Table 26, continued.

Lyrodiscus minimus Kritsky and Hathaway, 1969

Synonym: None

Site of Infection: Fins

Host:

Ambloplites rupestris: Dechtiar 1973; cdnp; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Dechtiar and Christie 1988; 1961-1971; 5%; L; lns; Ontario; llnk

Lyrodiscus rupestris Dechtiar, 1973

Synonym: None

Site of Infection: Fins, nares, skin

Host:

Ambloplites rupestris: Dechtiar 1973; cdnp; pnp; minp; lns; llnk

Ambloplites rupestris: Dechtiar and Christie 1988; 1961-1971; 16%; L; lns; Ontario; llnk

Lyrodiscus seminolensis Rogers, 1967

Synonym: None

Site of Infection: Fins, skin

Host:

Lepomis gibbosus: Dechtiar and Christie 1988; 1961-1971; 12%; L; lns; Ontario; llnk

Lepomis macrochirus: Dechtiar 1973; cdnp; pnp; minp; Trenton, Ontario; 44°6'0"/-77°34'59"

Lepomis macrochirus: Dechtiar and Christie 1988; 24%; L; lns; Ontario

Onchocleidus acer Mueller, 1936

Synonym: *Pterocleidus acer* (Mueller, 1936) Mueller, 1937; *Urocleidus acer* (Mueller, 1936) Mizelle and Hughes, 1938

Site of Infection: Gills

Host:

Lepomis gibbosus: Beverley-Burton and Suriano 1980; cdnp; pnp; minp; Hamilton, Ontario; 43°15'0"/-79°35'59"

Lepomis gibbosus: Dechtiar and Christie 1988; 1961-1971; 3%; L; lns; Ontario; llnk

Lepomis gibbosus: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Lepomis gibbosus: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Remarks: Wheeler and Beverley-Burton (1989) list this as *Cleidodiscus acer* (Mueller, 1936) Price and Mura, 1969; *Haplocleidus acer* (Mueller, 1936) Yamaguti, 1963; *Onchocleidus acer* Mueller, 1936 (Synonym: *Pterocleidus acer* (Mueller, 1936) Mueller, 1937; *Urocleidus acer* (Mueller, 1936) Mizelle and Hughes, 1938.

Table 26, continued.

Onchocleidus attenuatus (Mizelle, 1941) Beverley-Burton, 1984

Synonym: *Urocleidus attenuatus* Mizelle, 1941

Site of Infection: Gills

Host:

Lepomis gibbosus: Hanek and Fernando 1973; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Lepomis gibbosus: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Onchocleidus chautauquaensis (Mueller, 1938) Murith and Beverley-Burton, 1984

Synonym: *Cleidodiscus chautauquaensis* (Mueller, 1938) Yamaguti, 1963; *Tetracleidus chautauquaensis* (Mueller, 1938) Mizelle and Hughes, 1938

Site of Infection: Gills

Host:

Ambloplites rupestris: Dechtiar and Christie 1988; 1961-1971; 44%; L; lns; Ontario; llnk

Ambloplites rupestris: Hanek and Fernando 1973; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978b; November 1971-October 1971; pnp; minp; Glenora; llnk; West Lake, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978c; May 1970-October 1972; pnp; minp; Glenora; llnk; West Lake, Ontario; 44°9'0"/-77°15'0"

Onchocleidus chrysops (Mizelle and Klucka, 1953) Beverley-Burton, 1984

Synonym: *Cleidodiscus chrysops* (Mizelle and Klucka, 1953) Price and Mura, 1969; *Urocleidus chrysops* Mizelle and Klucka, 1953

Site of Infection: Gills

Host: *Morone chrysops*: Dechtiar and Christie 1988; 1961-1971; 100%; L; lns; Ontario; llnk

Onchocleidus dispar Mueller, 1936

Synonym: *Haplocleidus dispar* (Mueller, 1936) Mueller, 1937; *Urocleidus dispar* (Mueller, 1936) Mizelle and Hughes, 1938; *Cleidodiscus dispar* (Mueller, 1936) Price and Mura, 1969

Site of Infection: Gills

Host:

Lepomis gibbosus: Beverley-Burton and Suriano 1980; cdnp; pnp; minp; Hamilton, Ontario; 43°15'0"/-79°49'59"

Lepomis gibbosus: Dechtiar and Christie 1988; 1961-1971; 38%; M; lns; Ontario; llnk

Table 26, continued.

Onchocleidus ferox (Mueller, 1934) Mueller, 1936

Synonym: *Urocleidus ferox* Mueller, 1934; *Onchocleidus nucronatus* Mizelle, 1936; *Cleidodiscus ferox* (Mueller, 1934) Price and Mura, 1969

Site of Infection: Gills

Host:

Lepomis gibbosus: Beverley-Burton and Suriano 1981; cdnp; pnp; minp; Hamilton, Ontario; 43°15'0"/-79°49'59"

Lepomis gibbosus: Dechtiar and Christie 1988; 1961-1971; 35%; L; Ins; Ontario; llnk

Lepomis gibbosus: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Lepomis gibbosus: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Lepomis macrochirus: Dechtiar and Christie 1988; 24%; M; Ins; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 19%; M; Ins; Ontario

Micropterus dolomieu: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Onchocleidus furcatus (Mueller, 1937)

Synonym: *Haplocleidus furcatus* Mueller, 1937; *Urocleidus furcatus* (Mueller, 1937) Mizelle and Hughes, 1938; *Cleidodiscus furcatus* (Mueller, 1937) Price and Mura, 1969

Site of Infection: Gills

Host:

Lepomis gibbosus: Dechtiar and Christie 1988; 1961-1971; 3%; L; Ins; Ontario; llnk

Micropterus salmoides: Dechtiar and Christie 1988; 64%; M; Ins; Ontario

Onchocleidus helicus Mueller, 1936

Synonym: *Cleidodiscus helicus* (Mueller, 1936) Price and Mura, 1969; *Urocleidus helicus* (Mueller, 1936) Mizelle and Hughes, 1938

Site of Infection: Gills

Host: *Micropterus salmoides*: Dechtiar and Christie 1988; 1961-1971; 71%; L; Ins; Ontario; llnk

Remarks: This species is considered a *species inquirendae* by Wheeler and Beverly-Burton (1989).

Onchocleidus principalis Mizelle, 1936

Synonym: *Cleidodiscus principalis* (Mizelle, 1936) Price and Mura, 1969; *Onchocleidus contortus* Mueller, 1937; *Urocleidus principalis* (Mizelle, 1936) Mizelle and Hughes 1938

Site of Infection: Gills

Host:

Micropterus dolomieu: Dechtiar and Christie 1988; 1961-1971; 14%; M; Ins; Ontario; llnk

Micropterus dolomieu: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Micropterus salmoides: Hanek and Fernando 1972a; pnp; minp; Bay of Quinte, Ontario

Table 26, continued.

Onchocleidus similis Mueller, 1936

Synonym: *Cleidodiscus similis* (Mueller, 1936) Price and Mura, 1969; not *Cleidodiscus similis* Allison, 1967; *Onchocleidus procax* (Mizelle and Donahue, 1944) Yamaguti, 1963; *Urocleidus procax* Mizelle and Donahue, 1944; *Urocleidus similis* (Mueller, 1936) Mizelle and Hughes, 1938

Site of Infection: Gills

Host: *Lepomis gibbosus*: Beverley-Burton and Suriano 1981; cdnp; pnp; minp; Hamilton, Ontario; 43°15'0"/-79°49'59"

Salsuginus fundulus (Mizelle, 1940) Murith and Beverley-Burton, 1985

Synonym: *Urocleidus fundulus* Mizelle, 1940

Site of Infection: Gills

Host: *Fundulus diaphanus*: Dechtiar and Christie 1988; 1961-1971; 40%; L; lns; Ontario; llnk

Syncleithrium fusiformis (Mueller, 1934) Price, 1967

Synonym: *Actinocleidus fusiformis* (Mueller, 1934) Mueller, 1937; *Ancyrocephalus cruciatus* (Cooper, 1915) Mueller, 1936; *Cleidodiscus fusiformis* Mueller, 1934

Site of Infection: Gills

Host:

Micropterus dolomieu: Dechtiar and Christie 1988; 1961-1971; 14%; M; lns; Ontario; llnk

Micropterus salmoides: Hanek and Fernando 1972a; May-September 1970; pnp; minp; West Lake, Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Micropterus salmoides: Dechtiar and Christie 1988; 71%; M; lns; Ontario

Tetracleidus banghami Mueller, 1936

Synonym: *Cleidodiscus banghami* (Mueller, 1936) Mizelle, 1940

Site of infection: Gills

Host: *Micropterus dolomieu*: Dechtiar and Christie 1988; 1961-1971; 64%; M; lns; Ontario; llnk

Tetracleidus capax (Mizelle, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus capax* Mizelle, 1936

Site of Infection: Gills

Host:

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 1961-1971; 57%; M; lns; Ontario; llnk

Pomoxis nigromaculatus: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Tetracleidus glenorensis (Hanek and Fernando 1972) Beverley-Burton, 1984

Synonym: *Cleidodiscus glenorensis* (Hanek and Fernando, 1972)

Site of Infection: Gills

Host:

Ambloplites rupestris: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978b; November 1971-October 1972; pnp; minp; Glenora; lnk; West Lake, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978c; May 1970-October 1972; pnp; minp; Glenora; lnk; West Lake, Ontario; 44°9'0"/-77°15'0"

Micropterus dolomieu: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Tetracleidus longus (Mizelle, 1936) Beverley-Burton, 1984

Synonym: *Cleidodiscus longus* Mizelle, 1936

Site of Infection: Gills

Host: *Pomoxis nigromaculatus*: Dechtiar and Christie 1988; 1961-1971; 57%; L; lns; Ontario; lnk

Tetracleidus stentor (Mueller, 1937) Beverley-Burton, 1984

Synonym: *Cleidodiscus stentor* Mueller, 1937

Site of Infection: Gills

Host:

Ambloplites rupestris: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978b; November 1971-October 1972; pnp; minp; Glenora; lnk; West Lake, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978c; May 1970-October 1972; pnp; minp; Glenora; lnk; West Lake, Ontario; 44°9'0"/-77°15'0"

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 1961-1971; 5%; L; lns; Ontario; lnk

Remarks: Dechtiar and Christie (1988) state that infection of *Pomoxis nigromaculatus* may be an accidental infection from *Ambloplites rupestris*.

Urocleidus aculeatus (Van Cleave and Mueller, 1932) Mueller, 1934

Synonym: *Ancyrocephalus aculeatus* Van Cleave and Mueller, 1932; *Cleidodiscus aculeatus* (Van Cleave and Mueller, 1932) Mizelle and Regensberger, 1945

Site of Infection: Gills

Host: *Sander vitreus*: Dechtiar and Christie 1988; 1961-1971; 41%; M; lns; Ontario; lnk

Table 26, continued.

Urocleidus adspectus (Mueller, 1936) Beverley-Burton, 1984

Synonym: None

Site of Infection: Gills

Host:

Perca flavescens: Dechtiar and Christie 1988; 1961-1971; 25%; L; lns; Ontario; llnk

Perca flavescens: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970a; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; 57%; 3; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Urocleidus alatus (Mueller, 1938) Price, 1968

Synonym: *Cleidodiscus alatus* Mueller, 1938

Site of Infection: Gills

Host:

Ambloplites rupestris: Dechtiar and Christie 1988; 1961-1971; 57%; M; lns; Ontario; llnk

Ambloplites rupestris: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978b; November 1971-October 1972; pnp; minp; Glenora; llnk; West Lake, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978c; May 1970-October 1972; pnp; minp; Glenora; llnk; West Lake, Ontario; 44°9'0"/-77°15'0"

Remarks: This species is considered an incertae sedis until further living material is studied.

Urocleidus dispar (Mueller, 1936) Mizelle and Hughes, 1938

Synonym: None

Site of Infection: Gills

Host:

Lepomis gibbosus: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte; Ontario; 44°9'0"/-77°15'0"

Lepomis macrochirus: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Micropterus dolomieu: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Urocleidus fundulus Mizelle, 1940

Synonym: None

Site of Infection: Gills

Host: *Fundulus diaphanus*: Hanek and Fernando 1972a; May-September 1970; pnp; minp; West Lake; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Urocleidus furcatus (Mueller, 1937) Mizelle and Hughes, 1938

Synonym: None

Site of Infection: Gills

Host: *Micropterus salmoides*: Hanek and Fernando 1972a; May-September 1970; pnp; minp; West Lake, Bay of Quinte; Ontario; 44°9'0"/-77°15'0"

Urocleidus rogersi (Hanek and Fernando 1972) Beverley-Burton, 1984

Synonym: *Onchocleidus rogersi* Hanek and Fernando, 1972

Site of Infection: Gills

Host:

Morone americana: Dechtiar and Christie 1988; 1961-1971; 37%; L; lns; Ontario; llnk

Morone americana: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Dactylogyridae Bykhovski, 1933

Acolpenteron catostomi Fischthal and Allison, 1942

Synonym: None

Site of infection: Ureters

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 4%; M; lns; Ontario; llnk

Dactylogyryrus aureus Seamster, 1948

Synonym: None

Site of infection: Gills

Host:

Notemigonus crysoleucas: Dechtiar and Christie 1988; 1961-1971; 25%; L; lns; Ontario; llnk

Notemigonus crysoleucas: Hanek and Fernando 1972b; May-September 1970; pnp; minp; Bay of Quinte, 44°9'0"/-77°15'0"

Dactylogyryrus banghami Mizelle and Donahue, 1944

Synonym: None

Site of Infection: Gills

Host:

Luxilus cornutus: Dechtiar and Christie 1988; 1961-1971; 33%; M; lns; Ontario; llnk

Rhinichthys cataractae: Dechtiar and Christie 1988; 31%; M; lns; Ontario

Rhinichthys obtusus: Dechtiar and Christie 1988; 67%; M; lns; Ontario

Table 26, continued.

Dactylogyrus buddi Dechtiar, 1974

Synonym: None

Site of Infection: Gills

Host:

Cottus bairdii: Dechtiar and Christie 1988; 1961-1971; 70%; L; lns; Ontario; llnk

Cottus cognatus: Dechtiar and Christie 1988; 67%; L; lns; Ontario

Dactylogyrus bulbus Mueller, 1938

Synonym: *Neodactylogyrus bulbus* Price, 1938

Site of Infection: Gills

Host: *Luxilus cornutus*: Dechtiar and Christie 1988; 1961-1971; 20%; M; lns; Ontario; llnk

Dactylogyrus cornutus Mueller, 1938

Synonym: *Neodactylogyrus cornutus* Price, 1938

Site of Infection: Gills

Host: *Luxilus cornutus*: Dechtiar and Christie 1988; 1961-1971; 33%; M; lns; Ontario; llnk

Dactylogyrus eucalius Mizelle and Regensberger, 1945

Synonym: None

Site of Infection: Gills

Host: *Culaea inconstans*: Dechtiar and Christie 1988; 1961-1971; 59%; L; lns; Ontario; llnk

Dactylogyrus extensus Mueller and Van Cleave, 1932

Synonym: *Dactylogyrus solidus* Akhmerov, 1948; *Dactylogyrus hovorkai* Kastak, 1957

Site of Infection: Gills

Host: *Cyprinus carpio*: Dechtiar and Christie 1988; 1961-1971; 75%; M; lns; Ontario; llnk

Dactylogyrus luxili Rogers, 1967

Synonym: None

Site of Infection: Gills

Host: *Notemigonus crysoleucas*: Dechtiar and Christie 1988; 1961-1971; 3%; L; lns; Ontario; llnk

Dactylogyrus ursus Mueller, 1938

Synonym: *Neodactylogyrus ursus* Price, 1938

Site of Infection: Gills

Host: *Moxostoma macrolepidotum*: Dechtiar and Christie 1988; 1961-1971; 27%; M; lns; Ontario; llnk

Dactylogyrus sp.

Site of Infection: Gills

Table 26, continued.

Host:

Notropis atherinoides: Dechtiar and Christie 1988; 1961-1971; 12%; L; Ins; Ontario; llnk

Notropis hudsonius: Dechtiar and Christie 1988; 45%; M; Ins; Ontario

Phoxinus neogaeus: Dechtiar and Christie 1988; 67%; M; Ins; Ontario

Pimephales notatus: Dechtiar and Christie 1988; 5%; L; Ins; Ontario

Pimephales promelas: Dechtiar and Christie 1988; 45%; M; Ins; Ontario

Pseudocolpenteron pavlovskii Bykhovski and Gussev, 1955

Synonym: None

Site of Infection: Body surface, fins

Host:

Cyprinus carpio: Dechtiar 1971b; August-November 1969; pnp; minp; Ins; llnk

Cyprinus carpio: Dechtiar and Christie 1988; 1961-1971; 42%; M; Ins; Ontario; llnk

Diclybothriidae Bykhovskii and Gusev, 1950

Diclybothrium armatum Leuckart, 1835

Synonym: *Diplobothrium armatum* (Leuckart, 1835)

Site of Infection: Gills

Host: *Acipenser fulvescens*: Dechtiar and Christie 1988; 1961-1971; 100%; L; upper St. Lawrence River, Ontario; llnk

Discocotylidae Price, 1936

Octomacrum lanceatum Mueller, 1934

Synonym: *Octobothrium sagittatum* Wright, 1879

Site of Infection: Gills

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 24%; L; Ins; Ontario; llnk

Octomacrum microconfibula Hargis, 1952

Synonym: None

Site of Infection: Gills

Host: *Luxilus cornutus*: Dechtiar and Christie 1988; 1961-1971; 20%; L; Ins; Ontario; llnk

Octomacrum semotili Dechtiar, 1966

Synonym: None

Site of Infection: Gills

Host:

Couesius plumbeus: Dechtiar and Christie 1988; 1961-1971; 50%; L; Ins; Ontario; llnk

Phoxinus neogaeus: Dechtiar and Christie 1988; 67%; L; Ins; Ontario

Semotilus atromaculatus: Dechtiar and Christie 1988; 40%; L; Ins; Ontario

Table 26, continued.

Gyrodactylidae Cobbold, 1864

Gyrodactylus avalonia Hanek and Threlfall, 1969

Synonym: None

Site of Infection: Fins

Host:

Rhinichthys obtusus: Hanek and Fernando 1971b; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Fundulus diaphanus: Dechtiar and Christie 1988; 1961-1971; 15%; L; lns; Ontario; llnk

Fundulus diaphanus: Hanek and Fernando 1971b; pnp; minp; Bay of Quinte, Ontario

Gasterosteus aculeatus: Dechtiar and Christie 1988; 17%; L; lns; Ontario

Gasterosteus aculeatus: Hanek and Fernando 1971b; pnp; minp; Bay of Quinte, Ontario

Lepomis gibbosus: Hanek and Fernando 1971b; pnp; minp; Bay of Quinte, Ontario

Remarks: Hanek and Fernando (1971b) consider infection of *Lepomis gibbosus* to be accidental.

Gyrodactylus dechtiari Hanek and Fernando, 1971

Synonym: None

Site of Infection: Fins

Host: *Rhinichthys obtusus*: Dechtiar and Christie 1988; 1961-1971; 78%; L; lns; Ontario; llnk

Gyrodactylus etheostomae Wellborn and Rogers, 1967

Synonym: None

Site of Infection: Fins

Host: *Etheostoma nigrum*: Dechtiar and Christie 1988; 1961-1971; 38%; L; lns; Ontario; llnk

Gyrodactylus eucaliae Ikezaki and Hoffman, 1957

Synonym: None

Site of Infection: Fins

Host: *Culaea inconstans*: Dechtiar and Christie 1988; 1961-1971; 88%; L; lns; Ontario; llnk

Gyrodactylus freemani Hanek and Fernando, 1971

Synonym: None

Site of Infection: Fins

Host:

Perca flavescens: Dechtiar and Christie 1988; 1961-1971; 5%; M; lns; Ontario; llnk

Perca flavescens: Hanek and Fernando 1971b; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Gyrodactylus georani Hanek and Fernando, 1971

Synonym: None

Site of Infection: Fins

Host:

Ambloplites rupestris: Dechtiar and Christie 1988; 1961-1971; 11%; L; Ins; Ontario; llnk

Ambloplites rupestris: Hanek and Fernando 1971b; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Gyrodactylus limi Wood and Mizelle, 1957

Synonym: None

Site of Infection: Body surface

Host: *Umbra limi*: Dechtiar and Christie 1988; 1961-1971; 29%; M; Ins; Ontario; llnk

Gyrodactylus macrochiri Hoffman and Putz, 1964

Synonym: *Gyrodactylus elegans* of Hargis, 1953

Site of Infection: Fins

Host:

Lepomis gibbosus: Dechtiar and Christie 1988; 1961-1971; 18%; M; Ins; Ontario; llnk

Lepomis macrochirus: Dechtiar and Christie 1988; 72%; M; Ins; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 3%; L; Ins; Ontario

Micropterus dolomieu: Hanek and Fernando 1971b; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Micropterus salmoides: Dechtiar and Christie 1988; 7%; L; Ins; Ontario

Micropterus salmoides: Hanek and Fernando 1971b; pnp; minp; Bay of Quinte, Ontario

Gyrodactylus medius Kathariner, 1895

Synonym: ?*Gyrodactylus carpio*

Site of infection: Body surface, fins

Host: *Cyprinus carpio*: Dechtiar and Christie 1988; 1961-1971; 25%; L; Ins; Ontario; llnk

Gyrodactylus nebulosus Kritsky and Mizelle, 1968

Synonym: None

Site of Infection: Fins

Host:

Ameiurus nebulosus: Dechtiar and Christie 1988; 1961-1971; 6%; M; Ins; Ontario; llnk

Ameiurus nebulosus: Hanek and Fernando 1971b; May-September 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Gyrodactylus prolongus Hargis, 1955

Synonym: None

Site of Infection: Fins

Host: *Fundulus diaphanus*: Dechtiar and Christie 1988; 1961-1971; 20%; L; lns; Ontario; llnk

Gyrodactylus spathulatus Mueller, 1936

Synonym: None

Site of Infection: Fins, gills

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 37%; M; lns; Ontario; llnk

Gyrodactylus stableri Hathaway and Herlevich, 1973

Synonym: None

Site of Infection: Fins

Host: *Fundulus diaphanus*: Dechtiar and Christie 1988; 1961-1971; 20%; L; lns; Ontario; llnk

Gyrodactylus stunkardi Kritsky and Mizelle, 1968

Synonym: None

Site of Infection: Fins

Host: *Rhinichthys cataractae*: Dechtiar and Christie 1988; 1961-1971; 38%; L; lns; Ontario; llnk

Gyrodactylus sp.

Site of Infection: Fins, gills, skin

Host:

Luxilus cornutus: Dechtiar and Christie 1988; 1961-1971; 67%; M; lns; Ontario; llnk

Notemigonus crysoleucas: Dechtiar and Christie 1988; 13%; M; lns; Ontario

Notropis hudsonius: Dechtiar and Christie 1988; 30%; M; lns; Ontario

Phoxinus neogaeus: Dechtiar and Christie 1988; 28%; M; lns; Ontario

Pimephales promelas: Dechtiar and Christie 1988; 45%; M; lns; Ontario

Catostomus commersonii: Dechtiar and Christie 1988; 46%; M; lns; Ontario

Moxostoma macrolepidotum: Dechtiar and Christie 1988; 13%; M; lns; Ontario

Esox masquinongy: Dechtiar and Christie 1988; 100%; M; lns; Ontario

Percopsis omiscomaycus: Dechtiar and Christie 1988; 18%; L; lns; Ontario

Gasterosteus aculeatus: Dechtiar and Christie 1988; 17%; L; lns; Ontario

Morone americana: Dechtiar and Christie 1988; 3%; M; lns; Ontario

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 29%; L; lns; Ontario

Table 26, continued.

Heteraxinidae Price, 1962

Lintaxine cokeri (Linton, 1946) Sproston, 1946

Synonym: *Heteraxine cokeri* Linton, 1940

Site of infection: Gills

Host: *Aplodinotus grunniens*: Dechtiar and Christie 1988; 1961-1971; 63%; L; Ins; Ontario; llnk

Mazocraeoidae Price, 1936

Mazocraeoides olentangiensis Sroufe, 1958

Synonym: *Mazocraeoides similis* Price, 1959

Site of Infection: Gills

Host: *Dorosoma cepedianum*: Dechtiar and Christie 1988; 1961-1971; 46%; L; Ins; Ontario; llnk

Pseudomazocraeoides ontariensis Hanek and Fernando, 1971a

Synonym: None

Site of Infection: Gills

Host:

Dorosoma cepedianum: Dechtiar and Christie 1988; 1961-1971; 21%; L; Ins; Ontario; llnk

Dorosoma cepedianum: Hanek and Fernando 1971a; July 1970; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Microcotylidae van Beneden and Hesse, 1863

Microcotyle spinicirrus (MacCallum, 1918)

Synonym: None

Site of Infection: Gills

Host: *Aplodinotus grunniens*: Dechtiar and Christie 1988; 1961-1971; 96%; L; Ins; Ontario; llnk

Pseudomurraytrematidae (Kritsky, Mizelle, and Bilquees, 1978) Beverley-Burton, 1984

Anonchohaptor anomalus Mueller, 1938a

Synonym: None

Site of Infection: Gills

Host:

Catostomus commersonii: Dechtiar and Christie 1988; 1961-1971; 15%; L; Ins; Ontario; llnk

Moxostoma macrolepidotum: Dechtiar and Christie 1988; 20%; M; Ins; Ontario

Pseudomurraytrema copulatum (Mueller, 1938) Bykhovski, 1957

Synonym: None

Site of Infection: Gills

Host:

Catostomus commersonii: Dechtiar and Christie 1988; 1961-1971; 19%; L; Ins; Ontario; llnk

Moxostoma macrolepidotum: Dechtiar and Christie 1988; 27%; M; Ins; Ontario

Table 26, continued.

Tetraonchidae Bykhovski, 1937

Tetraonchus monenteron (Wagener, 1857) Diesing, 1858

Synonym: None

Site of infection: Gills

Host:

Esox lucius: Dechtiar and Christie 1988; 1961-1971; 88%; M-H; Ins; Ontario; llnk

Esox lucius: Hanek and Fernando 1972a; May-September 1970; pnp; minp; Picton, Ontario; 44°1'0"/-77°9'0"

Adult Cestoda (Cestodes)

Caryophyllaeidae Leuckhart, 1878

Glaridacris catostomi (Cooper, 1920) Mackiewicz, 1965

Synonym: *Caryophyllaeus terebrans* of Bangham and Adams, 1954 (partim), *Glaridacris laruei* of Bangham and Venard, 1946

Site of Infection: Intestine

Host:

Catostomus commersonii: Dechtiar and Christie 1988; 1961-1971; 26%; L; Ins; Ontario; llnk

Moxostoma macrolepidotum: Dechtiar and Christie 1988; 80%; M; Ins; Ontario

Glaridacris sp.

Site of Infection: Intestine

Host: *Notropis hudsonius*: Dechtiar and Christie 1988; 1961-1971; 6%; L; Ins; Ontario; llnk

Hunterella nodulosa Mackiewicz and McCrae, 1962

Synonym: None

Site of Infection: Intestine

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 4%; M; Ins; Ontario; llnk

Pliovitellaria wisconsinensis Fischthal, 1951

Synonym: None

Site of Infection: Intestine

Host: *Notemigonus crysoleucas*: Dechtiar and Christie 1988; 1961-1971; 8%; L; Ins; Ontario; llnk

Amphicotyliidae Ariola, 1899

Eubothrium crassum (Bloch, 1779) Nybelin, 1922

Synonym: *Abothrium crassum* (Bloch, 1779); *Eubothrium oncorhynchi* Wardle, 1932

Site of Infection: Intestine

Host: *Morone americana*: Tedla and Fernando 1969d; 1958-1964, October 1967, July 1968; 12%; 1; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Eubothrium salvelini (Schrank, 1790) Nybelin, 1922

Synonym: None

Site of Infection: Intestine

Host:

Salvelinus namaycush: Dechtiar and Christie 1988; 1961-1971; 50%; L; lns; Ontario; llnk

Salvelinus namaycush: Wardle 1933; cdnp; pnp; minp; lns; llnk

Bothriocephalidae Blanchard, 1849

Bothriocephalus claviceps (Goeze, 1782) Rudolphi, 1810

Synonym: None

Site of Infection: Intestine

Host: *Anguilla rostrata*: Dechtiar and Christie 1988; 1961-1971; 5%; L; lns; Ontario; llnk

Bothriocephalus cuspidatus Cooper, 1917

Synonym: *Bothriocephalus cuspidatus luciopercae* Wardle, 1932; *Bothriocephalus cuspidatus hiodontos* Wardle, 1932; *Bothriocephalus cuspidatus cuspidatus* Cooper, 1917

Site of Infection: Intestine

Host:

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Sander vitreus: Dechtiar and Christie 1988; 1961-1971; 81%; M; lns; Ontario; llnk

Cyathocephalidae Nybelin, 1922

Cyathocephalus truncatus (Pallas, 1781), Kessler, 1868

Synonym: *Cyathocephalus americanus* Cooper, 1917

Site of Infection: Pyloric ceca, intestine

Host:

Coregonus clupeaformis: Dechtiar and Christie 1988; 1961-1971; 16%; M; lns; Ontario; llnk

Coregonus clupeaformis: Hart 1931; 1926; 96%; minp; lns; Ontario; llnk

Coregonus clupeaformis: Wardle 1933; cdnp; pnp; minp; lns; llnk

Perca flavescens: Dechtiar and Christie 1988; 2%; L; lns; Ontario

Haplobothriidae Meggitt, 1924

Haplobothrium globuliforme Cooper, 1914

Synonym: None

Site of Infection: Intestine

Host: *Amia calva*: Dechtiar and Christie 1988; 1961-1971; 50%; M; lns; Ontario; llnk

Table 26, continued.

Proteocephalidae La Rue, 1911

Corallobothrium fimbriatum Essex, 1928

Synonym: None

Site of Infection: Intestine

Host: *Ameiurus nebulosus*: Dechtiar and Christie 1988; 1961-1971; 29%; M; lns; Ontario; llnk

Megathylacoides giganteum (Essex, 1928) Freze, 1963

Synonym: *Corallobothrium giganteum* Essex, 1928

Site of Infection: Intestine

Host: *Ictalurus punctatus*: Dechtiar and Christie 1988; 1961-1971; 40%; M; lns; Ontario; llnk

Proteocephalus ambloplitis (Leidy, 1887) Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Intestine

Host:

Micropterus dolomieu: Dechtiar and Christie 1988; 1961-1971; 6%; lns; Ontario; llnk

Micropterus dolomieu: Wardle 1933; cdnp; pnp; minp; Georgian Bay; 45°30'0"/-81°0'0"

Micropterus salmoides: Dechtiar and Christie 1988; 21%; M; lns; Ontario

Proteocephalus exiguus La Rue, 1911

Synonym: *Ichthyotaenia laruei* (Faust, 1920)

Site of Infection: Intestine

Host:

Coregonus artedi: Dechtiar and Christie 1988; 1961-1971; 12%; M; lns; Ontario; llnk

Coregonus clupeaformis: Dechtiar and Christie 1988; 12%; M; lns; Ontario

Proteocephalus fluviatilis Bangham, 1925

Synonym: None

Site of Infection: Intestine

Host:

Micropterus dolomieu: Dechtiar and Christie 1988; 1961-1971; 6%; L; lns; Ontario; llnk

Micropterus salmoides: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Proteocephalus laruei Faust, 1920

Synonym: None

Site of Infection: Pyloric ceca, intestine

Host:

Coregonus artedi: Dechtiar and Christie 1988; 1961-1971; 80%; M; lns; Ontario; llnk

Coregonus clupeaformis: Hart 1931; 1926; 96%; minp; lns; Ontario; llnk

Coregonus clupeaformis: Wardle 1933; cdnp; pnp; minp; lns; llnk

Table 26, continued.

Proteocephalus macrocephalus (Creplin, 1825) Nufer, 1905

Synonym: None

Site of Infection: Intestine

Host: *Anguilla rostrata*: Dechtiar and Christie 1988; 1961-1971; 10%; L; lns; Ontario; llnk

Proteocephalus pearsei La Rue, 1914

Synonym: None

Site of Infection: Intestine

Host:

Morone chrysops: Dechtiar and Christie 1988; 1961-1971; 13%; L; lns; Ontario; llnk

Perca flavescens: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Perca flavescens: Tedla and Fernando 1969e; May 1967- April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; 15%; 3; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Sander vitreus: Dechtiar and Christie 1988; 21%; L; lns; Ontario

Proteocephalus perplexus La Rue, 1911

Synonym: None

Site of Infection: Intestine

Host: *Amia calva*: Dechtiar and Christie 1988; 1961-1971; 75%; M; lns; Ontario; llnk

Proteocephalus pinguis La Rue, 1911

Synonym: None

Site of Infection: Intestine

Host:

Esox lucius: Dechtiar and Christie 1988; 1961-1971; 80%; M-H; lns; Ontario; llnk

Esox masquinongy: Dechtiar and Christie 1988; 100%; M; lns; Ontario

Proteocephalus pugitensis Hoff and Hoff, 1929

Synonym: None

Site of Infection: Intestine

Host:

Culaea inconstans: Dechtiar and Christie 1988; 1961-1971; 29%; L; lns; Ontario; llnk

Gasterosteus aculeatus: Dechtiar and Christie 1988; 13%; L; lns; Ontario

Table 26, continued.

Triaenophoridae Loennberg, 1889

Triaenophorus nodulosus (Pallas, 1760) Rudolphi, 1819

Synonym: *Triaenophorus* sp. type *nodulosus* of Cooper, 1919 (partim)

Site of Infection: Intestine

Host:

Esox lucius: Dechtiar and Christie 1988; 1961-1971; 8%; L; lns; Ontario

Esox masquinongy: Dechtiar and Christie 1988; 100%; M; lns; Ontario

Triaenophorus stizostedionis Miller, 1945

Synonym: None

Site of Infection: Intestine

Host: *Sander vitreus*: Dechtiar and Christie 1988; 1961-1971; 5%; M; lns; Ontario; llnk

Larval/Immature Cestoda (Cestodes)

Bothriocephalidae Blanchard, 1949

Bothriocephalus cuspidatus Cooper, 1917

Synonym: *Bothriocephalus cuspidatus luciopercae* Wardle, 1932; *Bothriocephalus cuspidatus hiodontos* Wardle, 1932; *Bothriocephalus cuspidatus cuspidatus* Cooper, 1917

Site of Infection: Intestine

Host:

Morone chrysops: Dechtiar and Christie 1988; 1961-1971; 33%; M; lns; Ontario; llnk

Perca flavescens: Dechtiar and Christie 1988; 7%; M; lns; Ontario

Bothriocephalid plerocercoids

Synonym: None

Site of Infection: Cysts connected to the wall of the stomach

Host:

Coregonus artedi: Pritchard 1931; February; March; and November of 1926, 1927, and 1928; 21%; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"; pnp; minp; Port Credit; 43°33'0"/-79°34'59"

Coregonus hoyi: Pritchard 1931; pnp; minp; Bay of Quinte or Port Credit, Ontario

Coregonus kiyi: Pritchard 1931; pnp; minp; Bay of Quinte or Port Credit, Ontario

Dilepididae Raillet and Henry, 1909

Dilepis sp.

Site of Infection: Mesentery

Host: *Lepomis gibbosus*: Dechtiar and Christie 1988; 1961-1971; 6%; L; lns; Ontario; llnk

Table 26, continued.

Diphyllobothriidae Luhe, 1910

Diphyllobothrium ditremum (Creplin, 1825) Luhe, 1910

Synonym: *Diphyllobothrium osmeri* (von Linstow, 1878)

Site of Infection: Stomach wall

Host: *Coregonus artedii*: Dechtiar and Christie 1988; 1961-1971; 16%; L; lns; Ontario; llnk

Diphyllobothrium laruei Vergeer, 1942

Synonym: None

Site of Infection: [Viscera]

Host: *Coregonus kiyi*: Vergeer 1942; cdnp; pnp; minp; lns; Ontario; llnk

Diphyllobothrium sp.

Site of Infection: Encysted in stomach wall

Host:

Anguilla rostrata: Dechtiar and Christie 1988; 1961-1971; 5%; L; lns; Ontario; llnk

Coregonus clupeaformis: Dechtiar and Christie 1988; 28%; L; lns; Ontario

Coregonus clupeaformis: Mueller 1940; cdnp; pnp; minp; lns; llnk

Ligula intestinalis (Linnaeus, 1758) Gmelin, 1790

Synonym: None

Site of Infection: Body cavity

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 13%; L; lns; Ontario; llnk

Proteocephalidae La Rue, 1911

Proteocephalus ambloplitis (Leidy, 1887), Benedict, 1900

Synonym: *Proteocephalus micropteri* (Leidy, 1891)

Site of Infection: Encysted in liver, mesentery, ovary

Host:

Lepisosteus osseus: Dechtiar and Christie 1988; 1961-1971; 50%; L; lns; Ontario; llnk

Luxilus cornutus: Dechtiar and Christie 1988; 20%; L; lns; Ontario

Fundulus diaphanus: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Morone americana: Dechtiar and Christie 1988; 28%; L; lns; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 13%; M; lns; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 35%; L; lns; Ontario

Lepomis macrochirus: Dechtiar and Christie 1988; 8%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 6%; L; lns; Ontario

Micropterus dolomieu: Wardle 1933; cdnp; pnp; minp; Georgian Bay; 45°30'0"/-81°0'0"

Micropterus salmoides: Dechtiar and Christie 1988; 21%; L; lns; Ontario

Table 26, continued.

Proteocephalus sp.

Site of Infection: Intestine

Host:

Noturus flavus: Dechtiar and Christie 1988; 17%; L; lns; Ontario

Umbra limi: Dechtiar and Christie 1988; 1961-1971; 6%; L; lns; Ontario; llnk

Triaenophoridae Loennberg, 1889

Triaenophorus crassus Forel, 1868

Synonym: *Triaenophorus robustus* Olsson, 1893; *Triaenophorus tricuspидatus morpha megadentatus* Wardle, 1932; *Triaenophorus tricuspидatus* of Newton, 1932 (partim); *Triaenophorus* sp. type *robustus* of Cooper, 1919

Site of Infection: Muscle

Host: *Coregonus clupeaformis*: Dechtiar and Christie 1988; 1961-1971; 8%; L; lns; Ontario; llnk

Triaenophorus nodulosus (Pallas, 1760) Rudolphi, 1819

Synonym: *Triaenophorus* sp. type *nodulosus* of Cooper, 1919 (partim)

Site of Infection: Encysted in liver, mesentery

Host:

Acipenser fulvescens: Dechtiar and Christie 1988; 1961-1971; 50%; L; upper St. Lawrence River, Ontario; llnk

Catostomus commersonii: Dechtiar and Christie 1988; 22%; L; lns; Ontario

Notropis hudsonius: Dechtiar and Christie 1988; 1961-1971; 24%; L; lns; Ontario; llnk

Morone americana: Tedla and Fernando 1969c; 1967 and 1978; 22%; 2; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Morone americana: Dechtiar and Christie 1988; 39%; L; lns; Ontario

Morone americana: Tedla and Fernando 1969d; 1958-1964; October 1967, July 1968; 22%; 2; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Morone chrysops: Dechtiar and Christie 1988; 67%; L; lns; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 27%; L; lns; Ontario

Lepomis macrochirus: Dechtiar and Christie 1988; 8%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 3%; lns; Ontario

Perca flavescens: Dechtiar and Christie 1988; 1%; L; lns; Ontario

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Triaenophorus stizostedionis Miller, 1945

Synonym: *Triaenophorus* sp. of Miller, 1943

Site of Infection: Liver

Host: *Percopsis omiscomaycus*: Dechtiar and Christie 1988; 1961-1971; 8%; L; Ins; Ontario; lnk

Unknown Family

“Rhyncobothrid cestode”

Synonym: ?

Site of Infection: outside of intestine

Host: *Coregonus artedii*: Pritchard 1931; February, March, and November of 1926, 1927, and 1928; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Adult Nematoda (Nematodes)

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Hysterothylacium brachyurum Ward and Magath, 1917

Synonym: *Contracecum brachyurum* Van Cleave and Mueller, 1934; *Thynnascaris brachyurum* Margolis and Arthur, 1979

Site of Infection: Intestine

Host:

Esox lucius: Dechtiar and Christie 1988; 1961-1971; 40%; M; Ins; Ontario; lnk

Esox masquinongy: Dechtiar and Christie 1988; 100%; L; Ins; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 25%; L; Ins; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 8%; M; Ins; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 6%; M; Ins; Ontario

Sander vitreus: Dechtiar and Christie 1988; 5%; M; Ins; Ontario

Raphidascaris acus (Bloch, 1779), Railliet and Henry, 1915

Synonym: *Ascaris acus* Bloch, 1779; *Ascaris seta* (Goeze in Muller, 1780); *Ascaris adiposa* Schrank, 1790;

Ascaris anguillae Schrank, 1790; *Ascaris boa* Schrank, 1790; *Ascaris capillaris* Schrank, 1790; *Ascaris*

mucronata Schrank, 1790 nec Froel., 1791; *Fusaria acus* (Bloch, 1779) Zeder, 1800; *Fusaria dentata*

Zeder, 1800; *Fusaria mucronata* (Schrank, 1790) Zeder, 1800; *Fusaria redii* Zeder, 1800; *Ascaris dentata*

(Zeder, 1800) Rudolphi, 1809; *Ascaris labiata* Rudolphi 1809; *Agamonema leucisci rutili* Diesing, 1851;

Trichina cyprinorum Diesing, 1851; *Ascaris cristata* Linstow, 1872; *Ascaris piscicola* Linstow; *Ascaris*

gracillima Linstow, 1890; *Ascaris lucii* Pearse, 1924a; *Hysterothylacium cayugensis* Wigdor, 1918;

Raphidascaris canadense Smedley, 1933; *Raphidascaris cristata* (Linstow, 1872) Baylis, 1928;

Raphidascaris cayugensis (Wigdor, 1918) Yorke and Maplestone, 1926; *Raphidascaris gracillima*

(Linstow, 1890) Markowski, 1933; *Neogoezia magna* Kreis, 1937; *Paranisakis parva* Kreis, 1937;

Raphidascaris laurentianus Richardson, 1937; *Raphidascaris alius* Lyster, 1940

Site of Infection: Intestine

Host: *Esox masquinongy*: Dechtiar and Christie 1988; 1961-1971; 100%; L; Ins; Ontario; lnk

Table 26, continued.

Camallanidae Railliet and Henry, 1913

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host:

Lepomis gibbosus: Dechtiar and Christie 1988; 1961-1971; 12%; L; lns; Ontario; llnk

Lepomis macrochirus: Dechtiar and Christie 1988; 40%; L; lns; Ontario

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 48%; L; lns; Ontario

Camallanus sp.

Site of Infection: Intestine

Host: *Perca flavescens*: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Capillariidae Neuve-Lemaire, 1936

Capillaria salvelini Polyansky, 1952

Synonym: *Capillaria baicalensis* Ryzhikov and Sudarikov, 1953; *Capillaria coregoni* Shulman-Albova, 1953; *Capillaria curilica* Zhukov, 1960; *Capillaria brevispicula* sensu Moravec and Ergens, 1970 nec Linstow, 1873; *Capillaria bakeri* sensu Meyer, 1954 nec Mueller and Van Cleave, 1932

Site of Infection: Intestine

Host: *Oncorhynchus kisutch*: Dechtiar and Christie 1988; 1961-1971; 14%; L; lns; Ontario; llnk

Cucullanidae Cobbold, 1864

Dichelyne cotylophora Ward and Magath 1916

Synonym: *Cucullanelus cotylophora* (Ward and Magath, 1916) Petter, 1974; *Dacnitooides cotylophora* (Ward and Magath, 1916)

Site of Infection: Intestine

Host:

Morone americana: Dechtiar and Christie 1988; 1961-1971; 30%; L; lns; Ontario; llnk

Morone americana: Tedla and Fernando 1969d; 1958-1964; October 1967; July 1968; 5%; l; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Lepomis gibbosus: Dechtiar and Christie 1988; 12%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 19%; L; lns; Ontario

Perca flavescens: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Sander vitreus: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Table 26, continued.

Truttaedacnitis clitellarius (Ward and Magath, 1916) Petter, 1974

Synonym: *Cucullanus clitellarius* Ward and Magath, 1916

Site of Infection: Intestine

Host: *Acipenser fulvescens*: Dechtiar and Christie 1988; 1961-1971; 50%; L; upper St. Lawrence River, Ontario, llnk)

Cystidicolidae (as in Anderson et al. 1975)

Cystidicola farionis Fischer, 1798

Synonym: *Cystidicola canadensis* Skinker, 1930; *Cystidicola stigmatura* of Skinker, 1931 *not* (Leidy, 1886), *Cystidicola stigmatura* of Ko and Anderson 1969 *not* (Leidy, 1886)

Site of Infection: Air bladder

Host:

Osmerus mordax: Dechtiar and Christie 1988; 2%; L; lns; Ontario

Coregonus artedi: Skinker 1930; July 1929; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Coregonus artedi: Skinker 1931; cdnp; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Coregonus clupeaformis: Dechtiar and Christie 1988; 1961-1971; 52%; M; lns; Ontario; llnk

Coregonus hoyi: Skinker 1930; pnp; minp; Bay of Quinte, Ontario

Coregonus hoyi: Skinker 1931; pnp; minp; Bay of Quinte, Ontario

Coregonus reighardi: Skinker 1930; pnp; minp; Bay of Quinte, Ontario

Coregonus reighardi: Skinker 1931; pnp; minp; Bay of Quinte, Ontario

Cystidicola sp.

Site of Infection: Swim bladder

Host:

Coregonus artedi: Pritchard 1931; February, March; and November of 1926, 1927, and 1928; 41%; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Coregonus clupeaformis: Hart 1931; 1926; pnp; minp; lns; Ontario; llnk

Coregonus hoyi: Pritchard 1931; 40%; minp; Bay of Quinte; Ontario

Coregonus kiyi: Pritchard 1931; 20%; minp; Bay of Quinte; Ontario

Coregonus reighardi: Pritchard 1931; 45%; minp; Bay of Quinte, Ontario

Cystidicoloides ephemeridarum (Linstow, 1872) Moravec, 1981

Synonym: *Filaria ephemeridarum* Leidy, 1872; *Cystidicoloides tenuissima* (Zeder, 1800) Rasheed, 1965; *Sterliadochona tenuissima* (Zeder, 1800); *Metabronema salvelini* (Fujita, 1920), *Metabronema canadense* Skinker, 1931; *Cystidicoloides harwoodi* (Chandler, 1931)

Site of Infection: Intestine

Table 26, continued.

Host:

Coregonus clupeaformis: Dechtiar and Christie 1988; 1961-1971; 56%; L; lns; Ontario; llnk

Oncorhynchus mykiss: Dechtiar and Christie 1988; 36%; L; lns; Ontario

Salvelinus fontinalis: Dechtiar and Christie 1988; 20%; L; Credit River; 43°33'0"/-79°34'59"; Shelter Valley Creek, Ontario; llnk

Spinitectus carolini Holl, 1928

Synonym: None

Site of Infection: Intestine

Host:

Morone americana: Dechtiar and Christie 1988; 1961-1971; 4%; L; lns; Ontario; llnk

Lepomis gibbosus: Dechtiar and Christie 1988; 6%; L; lns; Ontario

Lepomis macrochirus: Dechtiar and Christie 1988; 12%; L; lns; Ontario

Spinitectus gracilis Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host:

Acipenser fulvescens: Dechtiar and Christie 1988; 1961-1971; 50%; L; upper St. Lawrence River, Ontario; llnk

Osmerus mordax: Dechtiar and Christie 1988; 1961-1971; 2%; L; lns; Ontario; llnk

Percopsis omiscomaycus: Dechtiar and Christie 1988; 13%; L; lns; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 9%; L; lns; Ontario

Perca flavescens: Dechtiar and Christie 1988; 1%; L; lns; Ontario

Spinitectus sp.

Site of Infection: Intestine

Host: *Perca flavescens*: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Philometridae Baylis and Daubney, 1926

Philometra cylindracea (Ward and Magath, 1916) Van Cleave and Mueller, 1934

Synonym: *Ichthyonema cylindraceum* Ward and Magath

Site of Infection: Body cavity

Host:

Perca flavescens: Dechtiar and Christie 1988; 1961-1971; 5%; L; lns; Ontario; llnk

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Philometra sp.

Site of Infection: Gills, blood vessel

Host: *Micropterus salmoides*: Dechtiar and Christie 1988; 1961-1971; 7%; M; lns; Ontario; llnk

Philometroides nodulosa (Thomas, 1929) Dailey, 1967

Synonym: *Philometra nodulosa* (Thomas, 1929)

Site of Infection: Under skin in the fins

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 4%; L; lns; Ontario; llnk

Rhabdochonidae Skrjabin, 1946

Rhabdochona canadensis Moravec and Arai, 1971

Synonym: None

Site of Infection: Intestine

Host: *Rhinichthys cataractae*: Dechtiar and Christie 1988; 1961-1971; 77%; L; lns; Ontario; llnk

Rhabdochona decaturensis Gustafson, 1949

Synonym: None

Site of Infection: Intestine

Host:

Notropis hudsonius: Dechtiar and Christie 1988; 1961-1971; 18%; L; lns; Ontario; llnk

Noturus gyrinus: Dechtiar and Christie 1988; 40%; L; lns; Ontario

Noturus flavus: Dechtiar and Christie 1988; 17%; L; lns; Ontario

Rhabdochona milleri Choquette, 1951

Synonym: None

Site of Infection: Intestine

Host: *Moxostoma macrolepidotum*: Dechtiar and Christie 1988; 1961-1971; 13%; L; lns; Ontario; llnk

Rhabdochona ovifilamenta Weller 1938

Synonym: *Rhabdochona laurentiana* Lyster, 1940; *Rhabdochona fortunatowi* of Kussat, 1969;

Rhabdochona sp. of Arai and Kussat, 1967

Site of infection: Intestine, body cavity

Host:

Catostomus commersonii: Dechtiar and Christie 1988; 1961-1971; 13%; L; lns; Ontario; llnk

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Remarks: Tedla and Fernando (1969e) list body cavity as site of infection.

Table 26, continued.

Rhabdochona sp.

Site of Infection: Intestine

Host:

Notemigonus crysoleucas: Dechtiar and Christie 1988; 1961-1971; 11%; L; Ins; Ontario; llnk

Ambloplites rupestris: Dechtiar and Christie 1988; 9%; L; Ins; Ontario

Etheostoma caeruleum: Dechtiar and Christie 1988; 40%; L; Ins; Ontario

Larval/Immature Nematoda (Nematodes)

Acuariidae Seurat, 1913

Cosmocephalus obvelatus (Creplin, 1825)

Synonym: None

Site of Infection: Mesentery

Host:

Notropis hudsonius: Wong and Anderson 1982; 1980; 33%; 2; Leslie Spit; llnk; Outer Toronto Harbor, Ontario; llnk

Semotilus atromaculatus: Wong and Anderson 1982; 100%; 24; Leslie Spit, Outer Toronto Harbor, Ontario

Osmerus mordax: Wong and Anderson 1982; 3%; 1; Leslie Spit, Outer Toronto Harbor, Ontario

Gasterosteus aculeatus: Wong and Anderson 1982; 60%; pnp; minp; Leslie Spit, Outer Toronto Harbor, Ontario

Cottus sp.: Wong and Anderson 1982; 100%; 4; Leslie Spit, Outer Toronto Harbor, Ontario

Remarks: This is the only report of *Cosmocephalus obvelatus* in fish from the Great Lakes.

Paracuaria adunca (Creplin, 1846) Anderson and Wong, 1981

Synonym: None

Site of Infection: Mesentery

Host:

Notropis hudsonius: Anderson and Wong 1982; October 1981; 33%; 1; Leslie Spit; llnk; Outer Toronto Harbor, Ontario; llnk

Semotilus atromaculatus: Anderson and Wong 1982; 100%; 4; Leslie Spit, Outer Toronto Harbor, Ontario

Gasterosteus aculeatus: Anderson and Wong 1982; 60%; pnp; minp; Leslie Spit, Outer Toronto Harbor, Ontario

Cottus sp.: Anderson and Wong 1982; 100%; 5; Leslie Spit; Outer Toronto Harbor, Ontario

Remarks: This is the only report of *Paracuaria adunca* in fish from the Great Lakes.

Anisakidae Skrjabin and Karokhin, 1945

Synonym: Heterocheilidae Railliet and Henry, 1905 (partim)

Contracaecum spiculigerum (Rudolphi, 1809)

Synonym: None

Site of Infection: Liver and intestinal mesentery

Table 26, continued.

Host:

Morone americana: Tedla and Fernando 1969d; 1958-1964; October 1967; July 1968; 9%; 1; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; 52%; 5; Bay of Quinte, Ontario

Hysterothylacium brachyurum Ward and Magath, 1917

Synonym: *Contracecum brachyurum* Van Cleave and Mueller, 1934; *Thynnascaris brachyurum* Margolis and Arthur, 1979

Site of Infection: Liver, mesentery

Host:

Ambloplites rupestris: Dechtiar and Christie 1988; 1961-1971; 21%; L; lns; Ontario; llnk

Perca flavescens: Dechtiar and Christie 1988; 5%; M; lns; Ontario

Sander vitreus: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Hysterothylacium sp.

Site of Infection: Liver, mesentery

Host:

Fundulus diaphanus: Dechtiar and Christie 1988; 1961-1971; 10%; L; lns; Ontario; llnk

Gasterosteus aculeatus: Dechtiar and Christie 1988; 13%; L; lns; Ontario

Morone americana: Dechtiar and Christie 1988; 3%; L; lns; Ontario

Lepomis macrochirus: Dechtiar and Christie 1988; 28%; L; lns; Ontario

Camallanidae Railliet and Henry, 1913

Camallanus oxycephalus Ward and Magath, 1916

Synonym: None

Site of Infection: Intestine

Host:

Notemigonus crysoleucas: Dechtiar and Christie 1988; 1961-1971; 3%; L; lns; Ontario; llnk

Esox lucius: Dechtiar and Christie 1988; 8%; L; lns; Ontario

Oncorhynchus kisutch: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Fundulus diaphanus: Dechtiar and Christie 1988; 10%; L; lns; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 9%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 56%; L; lns; Ontario

Etheostoma exile: Dechtiar and Christie 1988; 20%; L; lns; Ontario

Percina caprodes: Dechtiar and Christie 1988; 40%; L; lns; Ontario

Table 26, continued.

Cystidicolidae (as in Anderson et al. 1975)

Spinitectus sp.

Site of Infection: Intestine

Host: *Anguilla rostrata*: Dechtiar and Christie 1988; 1961-1971; 7%; L; lns; Ontario; llnk

Diectophymidae Railliet, 1915

Eustrongylides tubifex (Nitzsch, 1819) Jagerskiold, 1909

Synonym: None

Site of Infection: Mesentery

Host:

Ameiurus nebulosus: Dechtiar and Christie 1988; 1961-1971; 9%; L; lns; Ontario; llnk

Morone americana: Dechtiar and Christie 1988; 4%; L; lns; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 15%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 6%; L; lns; Ontario

Perca flavescens: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Sander vitreus: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Aplodinotus grunniens: Dechtiar and Christie 1988; 21%; L; lns; Ontario

Gnathostomatidae Lane, 1923

Spiroxys sp.

Site of Infection: Encysted in mesentery

Host:

Lepisosteus osseus: Dechtiar and Christie 1988; 1961-1971; 50%; L; lns; Ontario; llnk

Ameiurus nebulosus: Dechtiar and Christie 1988; 21%; L; lns; Ontario

Umbra limi: Dechtiar and Christie 1988; 18%; L; lns; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Philometridae Baylis and Daubney, 1926

Philometra cylindracea (Ward and Magath, 1916) Van Cleave and Mueller, 1934

Synonym: *Ichthyonema cylindraceum* Ward and Magath

Site of Infection: Body cavity

Host: *Perca flavescens*: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Rhabdochonidae Skrjabin, 1946

Rhabdochona sp.

Site of Infection: Intestine

Host: *Perca flavescens*: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Unknown Family

Agamospirura sp.

Synonym: ?

Site of Infection: Mesentery

Host:

Perca flavescens: Dechtiar and Christie 1988; 1961-1971; 1%; L; Ins; Ontario; llnk

Aplodinotus grunniens: Dechtiar and Christie 1988; 42%; M; Ins; Ontario

Remarks: Yorke and Maplestone (1926) refer to *Agamospirura* as a collective group for immature Spiruroidea.

Adult Acanthocephala (Acanthocephalans)

Echinorhynchidae Cobbold, 1876

Acanthocephalus dirus (Van Cleave, 1931) Van Cleave and Townsend, 1936

Synonym: *Echinorhynchus dirus* Van Cleave, 1931; *Acanthocephalus jacksoni* Bullock, 1962;

Acanthocephalus parksidei Amin, 1975, 1977

Site of Infection: Intestine

Host:

Alosa pseudoharengus: Dechtiar and Christie 1988; 1961-1971; 13%; L; Ins; Ontario; llnk

Osmerus mordax: Dechtiar and Christie 1988; 8%; L; Ins; Ontario

Coregonus clupeaformis: Dechtiar and Christie 1988; 28%; L; Ins; Ontario

Oncorhynchus kisutch: Dechtiar and Christie 1988; 43%; M; Ins; Ontario

Salvelinus fontinalis: Dechtiar and Christie 1988; 1961-1971; 20%; M; Credit River; 43°33'0"/-79°34'59"; and Shelter Valley Creek, Ontario; llnk

Cottus bairdii: Dechtiar and Christie 1988; 50%; L; Ins; Ontario

Cottus cognatus: Dechtiar and Christie 1988; 25%; L; Ins; Ontario

Morone chrysops: Dechtiar and Christie 1988; 33%; L; Ins; Ontario

Perca flavescens: Dechtiar and Christie 1988; 13%; L; Ins; Ontario

Table 26, continued.

Echinorhynchus salmonis (Muller, 1784) Petrochenko, 1956

Synonym: *Echinorhynchus coregoni* Linkins in Van Cleave, 1919; *Echinorhynchus pachysomus*, *Echinorhynchus phoenix*, *Echinorhynchus inflatus*, *Echinorhynchus maraenae*, *Echinorhynchus murenae*, *Metechinorhynchus alpinus*, *Metechinorhynchus salmonis*

Site of Infection: Intestine

Host:

Acipenser fulvescens: Dechtiar and Christie 1988; 1961-1971; 100%; M; upper St. Lawrence River, Ontario; llnk

Anguilla rostrata: Dechtiar and Christie 1988; 12%; M; lns; Ontario

Ictalurus punctatus: Dechtiar and Christie 1988; 20%; L; lns; Ontario

Esox lucius: Dechtiar and Christie 1988; 16%; L; lns; Ontario

Osmerus mordax: Dechtiar and Christie 1988; 46%; L; lns; Ontario

Coregonus artedii: Dechtiar and Christie 1988; 92%; M; lns; Ontario

Coregonus clupeaformis: Dechtiar and Christie 1988; 100%; M; lns; Ontario

Coregonus clupeaformis: Hart 1931; 1926; 96%; minp; lns; Ontario; llnk

Oncorhynchus kisutch: Dechtiar and Christie 1988; 86%; M; lns; Ontario

Oncorhynchus mykiss: Dechtiar and Christie 1988; 86%; M; lns; Ontario

Salvelinus fontinalis: Dechtiar and Christie 1988; 20%; L; Credit River and Shelter Valley Creek, Ontario

Salvelinus namaycush: Dechtiar and Christie 1988; 100%; M; lns; Ontario

Percopsis omiscomaycus: Dechtiar and Christie 1988; 13%; L; lns; Ontario

Gasterosteus aculeatus: Dechtiar and Christie 1988; 43%; L; lns; Ontario

Cottus bairdii: Dechtiar and Christie 1988; 70%; L; lns; Ontario

Morone chrysops: Dechtiar and Christie 1988; 53%; L; lns; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 23%; L; lns; Ontario

Lepomis macrochirus: Dechtiar and Christie 1988; 12%; L; lns; Ontario

Perca flavescens: Dechtiar and Christie 1988; 13%; L; lns; Ontario

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970a; May 1967-April 1968; May 1968-September 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970b; May 1967-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Sander vitreus: Dechtiar and Christie 1988; 24%; M; lns; Ontario

Echinorhynchus sp.

Site of Infection: Intestine

Host: *Coregonus reighardi*: Pritchard 1931; February, March, and November of 1926, 1927, and 1928; 45%; minp; Main Duck Island, eastern end; llnk

Table 26, continued.

Neoechinorhynchidae Ward, 1917

Synonym: Hebesomidae Van Cleave, 1928; Hebesomatidae Yamaguti, 1963

Neoechinorhynchus crassus Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host:

Catostomus commersonii: Dechtiar and Christie 1988; 1961-1971; 22%; L; Ins; Ontario; llnk

Moxostoma macrolepidotum: Dechtiar and Christie 1988; 27%; L; Ins; Ontario

Neoechinorhynchus cristatus Lynch, 1936

Synonym: None

Site of Infection: Intestine

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 22%; L; Ins; Ontario; llnk

Neoechinorhynchus cylindratus (Van Cleave, 1913) Van Cleave, 1919

Synonym: *Neorhynchus cylindratus* Van Cleave, 1913; *Eorhynchus cylindratus* (Van Cleave, 1913) Van Cleave, 1914

Site of Infection: Intestine

Host:

Morone americana: Dechtiar and Christie 1988; 1961-1971; 12%; L; Ins; Ontario; llnk

Ambloplites rupestris: Dechtiar and Christie 1988; 16%; L; Ins; Ontario

Micropterus salmoides: Dechtiar and Christie 1988; 57%; M; Ins; Ontario

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Neoechinorhynchus notemigoni Dechtiar, 1967

Synonym: None

Site of Infection: Intestine

Host:

Notemigonus crysoleucas: Dechtiar 1967a; 1965; 56%; 8; Ins; Ontario; llnk

Notemigonus crysoleucas: Dechtiar and Christie 1988; 1961-1971; 11%; M; Ins; Ontario; llnk

Neoechinorhynchus rutili (Muller, 1780) Hamann, 1892

Synonym: *Echinorhynchus tuberosus* Zider, 1803

Site of Infection: Intestine

Table 26, continued.

Host:

Acipenser fulvescens: Dechtiar and Christie 1988; 1961-1971; 50%; L; upper St. Lawrence River, Ontario; llnk

Amia calva: Dechtiar and Christie 1988; 1961-1971; 50%; M; lns; Ontario; llnk

Notemigonus crysoleucas: Dechtiar and Christie 1988; 11%; L; lns; Ontario

Notropis hudsonius: Dechtiar and Christie 1988; 61%; L; lns; Ontario

Culaea inconstans: Dechtiar and Christie 1988; 18%; L; lns; Ontario

Sander vitreus: Dechtiar and Christie 1988; 24%; L; lns; Ontario

Neoechinorhynchus saginatus Van Cleave and Bangham, 1949

Synonym: None

Site of Infection: Intestine

Host: *Semotilus atromaculatus*: Dechtiar and Christie 1988; 1961-1971; 90%; L; lns; Ontario; llnk

Neoechinorhynchus tenellus (Van Cleave, 1913) Van Cleave, 1919

Synonym: None

Site of Infection: Liver, intestine

Host:

Esox lucius: Dechtiar and Christie 1988; 1961-1971; 28%; M; lns; Ontario; llnk

Sander vitreus: Dechtiar and Christie 1988; 54%; M; lns; Ontario

Neoechinorhynchus tumidus Van Cleave and Bangham, 1941

Synonym: None

Site of Infection: Intestine

Host: *Coregonus clupeaformis*: Dechtiar and Christie 1988; 1961-1971; 16%; L; lns; Ontario; llnk

Neoechinorhynchus sp.

Site of Infection: Intestine

Host:

Pimephales notatus: Dechtiar and Christie 1988; 1961-1971; 5%; L; lns; Ontario; llnk

Coregonus artedi: Pritchard 1931; February, March, and November of 1926, 1927, 1928; 22%; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Morone chrysops: Dechtiar and Christie 1988; 67%; L; lns; Ontario

Octospinifer macilentus Van Cleave, 1919

Synonym: *Octospinifer* sp. of Mudry and Arai, 1973; *Octospinifer* sp. of Mudry and Anderson, 1976

Site of Infection: Intestine

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 15%; L; lns; Ontario; llnk

Table 26, continued.

Pomphorhynchidae Yamaguti, 1939

Pomphorhynchus bulbocolli Linkins in Van Cleave, 1919

Synonym: None

Site of Infection: Intestine

Host:

Catostomus commersonii: Dechtiar and Christie 1988; 1961-1971; 19%; M; lns; Ontario; llnk

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901

Site of Infection: Intestine

Host:

Lepisosteus osseus: Dechtiar and Christie 1988; 1961-1971; 100%; L; lns; Ontario; llnk

Anguilla rostrata: Dechtiar and Christie 1988; 5%; L; lns; Ontario

Ameiurus nebulosus: Dechtiar and Christie 1988; 6%; H; lns; Ontario

Esox lucius: Dechtiar and Christie 1988; 16%; L; lns; Ontario

Morone americana: Dechtiar and Christie 1988; 30%; L; lns; Ontario

Morone chrysops: Dechtiar and Christie 1988; 67%; L; lns; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 16%; L; lns; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 23%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 56%; M; lns; Ontario

Micropterus salmoides: Dechtiar and Christie 1988; 57%; M; lns; Ontario

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 29%; L; lns; Ontario

Etheostoma nigrum: Dechtiar and Christie 1988; 11%; L; lns; Ontario

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; 17%; 3; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Dechtiar and Christie 1988; 3%; L; lns; Ontario

Sander vitreus: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Aplodinotus grunniens: Dechtiar and Christie 1988; 29%; L; lns; Ontario

Immature Acanthocephala (Acanthocephalans)

Rhadinorhynchidae Travassos, 1923

Leptorhynchoides thecatus (Linton, 1891) Kostylew, 1924

Synonym: *Echinorhynchus thecatus* Linton, 1891; *Echinorhynchus aricola* Linstow, 1901

Site of Infection: Mesentery

Host: *Fundulus diaphanus*: Dechtiar and Christie 1988; 1961-1971; 10%; L; lns; Ontario; llnk

Table 26, continued.

Hirudinea (Leeches)

Glossiphoniidae Vaillant, 1890

Actinobdella inequiannulata Moore, 1901

Synonym: *Actinobdella triannulata* Moore, 1924; *Actinobdella triannulata* Daniels and Freeman, 1976

Site of infection: Gill cover

Host: *Catostomus commersonii*: Dechtiar and Christie 1988; 1961-1971; 6%; L; lns; Ontario; llnk

Actinobdella pediculata (Hemmingway, 1908)

Synonym: ?*Placobdella pediculata* Hemmingway, 1912; ?*Haementaria pediculata* Autrum, 1936

Site of Infection: Inner wall of operculum

Host: *Aplodinotus grunniens*: Wolf et al. 2008; May 2005; 100%; 4; May 2006; 25%; 3; Hay Bay, Ontario; 44°10'N; 77°56' W

Piscicolidae Johnston, 1865

Myzobdella lugubris Leidy, 1851

Synonym: *Cystobranchus virginicus* Paperna and Zwerner, 1974; *Ichthyobdella funduli* Verrill, 1872; *Ichthyobdella rapax* Wass, 1972; *Ichthyobdella richardsoni* Meyer, 1940; *Iobdellallin alba* Meyer, 1940; *Myzobdella alba* Meyer, 1940; *Illinobdella elongata* Meyer, 1940; *Illinobdella moorei* Meyer, 1940; *Myzobdella lugubris* Pearse, 1940; *Myzobdella moorei* (Meyer, 1940) Meyer and Moore, 1954

Site of infection: Fins

Host:

Ameiurus nebulosus: Appy and Cone 1982; 1981; 30%; minp; Hamilton Harbor, Ontario; 43°15'N, 79°51'W

Ameiurus nebulosus: Dechtiar and Christie 1988; 1961-1971; 6%; L; lns; Ontario; llnk

Ictalurus punctatus: Dechtiar and Christie 1988; 33%; L; lns; Ontario

Ambloplites rupestris: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 12%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 6%; L; lns; Ontario

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 48%; L; lns; Ontario

Myzobdella sp.

Site of infection: Fins

Host: *Perca flavescens*: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Piscicola sp.

Site of Infection: Body surface

Host:

Notemigonus crysoleucas: Dechtiar and Christie 1988; 1961-1971; 3%; L; Ins; Ontario; llnk

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Copepoda (Copepods)

Argulidae Yamaguti, 1963

Argulus catostomi Dana and Herrick, 1837

Synonym: None

Site of Infection: Body surface

Host:

Catostomus commersonii: Dechtiar and Christie 1988; 1961-1971; 19%; L; Ins; Ontario; llnk

Lepomis gibbosus: Dechtiar and Christie 1988; 3%; L; Ins; Ontario

Ergasilidae Nordmann, 1832

Ergasilus caeruleus Wilson, 1911

Synonym: *Ergasilus confusus* Bere, 1931; *Ergasilus skrjabin* Mueller, 1936

Site of Infection: Gills, gill filaments

Host:

Cyprinus carpio: Dechtiar and Christie 1988; 1961-1971; 17%; L; Ins; Ontario; llnk

Catostomus commersonii: Dechtiar and Christie 1988; 19%; L; Ins; Ontario

Ambloplites rupestris: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978b; November 1971-October 1972; pnp; minp; Glenora; llnk; West Lake, Ontario; llnk

Ambloplites rupestris: Hanek and Fernando 1978c; May 1970-October 1972; pnp; minp; Glenora; llnk; West Lake, Ontario; llnk

Lepomis gibbosus: Dechtiar and Christie 1988; 27%; L; Ins; Ontario

Lepomis gibbosus: Hanek and Fernando 1978a; pnp; minp; Bay of Quinte, Ontario

Lepomis gibbosus: Tedla and Fernando 1969a; August 1968; 66%; 24; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Lepomis macrochirus: Dechtiar and Christie 1988; 24%; L; Ins; Ontario

Pomoxis nigromaculatus: Dechtiar and Christie 1988; 14%; L; Ins; Ontario

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Perca flavescens: Tedla and Fernando 1970a; May 1967-April 1968 and May 1968-September 1968; 59%; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970c; 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; 54%; 6; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Sander vitreus: Dechtiar and Christie 1988; 73%; L; lns; Ontario

Remark: Records of *Ergasilus caeruleus* on fish hosts before Roberts (1970) should be treated with caution.

Ergasilus centrarchidarum (Wright, 1882) Wilson, 1932

Synonym: None

Site of Infection: Gills

Host:

Ambloplites rupestris: Dechtiar and Christie 1988; 25%; M; lns; Ontario

Ambloplites rupestris: Tedla and Fernando 1969a; August 1968; 93%; 58; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978b; November 1971-October 1972; pnp; minp; Glenora; llnk; West Lake, Ontario; llnk

Ambloplites rupestris: Hanek and Fernando 1978c; May 1970-October 1972; pnp; minp; Glenora; llnk; West Lake, Ontario; llnk

Morone chrysops: Dechtiar and Christie 1988; 1961-1971; 20%; L; lns; Ontario; llnk

Lepomis gibbosus: Tedla and Fernando 1969a; 6%; 1; Bay of Quinte, Ontario

Lepomis gibbosus: Hanek and Fernando 1978a; pnp; minp; Bay of Quinte, Ontario

Micropterus dolomieu: Tedla and Fernando 1969a; 93%; 45; Bay of Quinte, Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Micropterus salmoides: Dechtiar and Christie 1988; 43%; L; lns; Ontario

Ergasilus luciopercarum Henderson, 1926

Synonym: *Ergasilus confusus* Bere, 1931; *Ergasilus skrjabini* Mueller, 1936; *Ergasilus caeruleus* Wilson in Mueller, 1936

Site of Infection: Gills

Host:

Morone americana: Tedla and Fernando 1969d; 1958-1964, October 1967, July 1968; 4%; 1; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Dechtiar and Christie 1988; 1961-1971; 5%; M; lns; Ontario; llnk

Perca flavescens: Tedla and Fernando 1969a; August 1968; 92%; 3; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1969b; May, July, August 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970c; 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Table 26, continued.

Perca flavescens: Tedla and Fernando 1970a; May 1967-April 1968 and May 1968-September 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; 54%; 6; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Sander vitreus: Dechtiar and Christie 1988; 95%; M; Ins; Ontario

Ergasilus versicolor Wilson, 1911

Synonym: *Ergasilus elegans* Wilson, 1916

Site of Infection: Gills

Host:

Anguilla rostrata: Dechtiar and Christie 1988; 1961-1971; 31%; L; Ins; Ontario; llnk

Ameiurus nebulosus: Dechtiar and Christie 1988; 21%; L; Ins; Ontario

Ictalurus punctatus: Dechtiar and Christie 1988; 80%; M; Ins; Ontario

Ergasilus sp.

Site of Infection: Gills

Host: *Gasterosteus aculeatus*: Dechtiar and Christie 1988; 1961-1971; 17%; L; Ins; Ontario; llnk

Lernaeopodidae Olsson, 1869

Achtheres coregoni (Smith, 1874) Wilson, 1915

Synonym: None

Site of Infection: Fins, body

Host: *Coregonus clupeaformis*: Hart 1931; 1926; pnp; minp; Ins; Ontario; llnk

Achtheres pimelodi Kroyer, 1863

Synonym: *Achtheres ambloplitis* Kellicot, 1880; *Achtheres micropteri* Wright, 1882

Site of Infection: Gills, gill arches

Host:

Ambloplites rupestris: Dechtiar and Christie 1988; 1961-1971; 4%; L; Ins; Ontario; llnk

Ambloplites rupestris: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978b; November 1971-October 1972; pnp; minp; Glenora, West Lake, Ontario; llnk

Ambloplites rupestris: Hanek and Fernando 1978c; May 1970-October 1972; pnp; minp; Glenora, West Lake, Ontario; llnk

Lepomis gibbosus: Dechtiar and Christie 1988; 6%; L; Ins; Ontario

Lepomis gibbosus: Hanek and Fernando 1978a; pnp; minp; Bay of Quinte, Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 6%; L; Ins; Ontario

Micropterus salmoides: Dechtiar and Christie 1988; 14%; L; Ins; Ontario

Table 26, continued.

Salmincola extumescens (Gadd, 1901) Wilson, 1915

Synonym: *Achtheres corpulentus* Kellicott, 1882; *Salmincola corpulentus* (Kellicott, 1880); *Lernaeopoda extumescens* Gadd, 1901; *Lernaeopoda inermis* Wilson, 1911; *Salmincola inermis* (Wilson, 1911) Wilson, 1915; *Salmincola omuli* Messjatzeff, 1926

Site of infection: Gills, gill arches

Host:

Coregonus artedi: Pritchard 1931; February, March, and November of 1926, 1927, 1928; 15%; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Coregonus clupeaformis: Dechtiar and Christie 1988; 1961-1971; 8%; L; lns; Ontario; llnk

Coregonus clupeaformis: Hart 1931; 1926; <1%; minp; lns; Ontario; llnk

Coregonus hoyi: Pritchard 1931; 20%; minp; Bay of Quinte, Ontario

Coregonus kiyi: Pritchard 1931; pnp; minp; Bay of Quinte, Ontario

Coregonus reighardi: Pritchard 1931; 5%; minp; Bay of Quinte, Ontario

Mollusca (Molluscs)

Unionidae Rafinesque, 1820

Glochidia of *Anodonta* sp.

Site of Infection: Gills

Host:

Perca flavescens: Tedla and Fernando 1969b; May, July, August, 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Glochidia of *Elliptio complanatus* (Solander)

Synonym: None

Site of Infection: Gill filaments

Host:

Perca flavescens: Tedla and Fernando 1969b, 1969e; May, July, and August 1968 (b) and May 1967-April 1968 (e); pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970a; May 1967-April 1968 and May 1968-September 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Glochidia of *Lampsilis radiata siliquoidea* (Barnes)

Synonym: None

Site of Infection: Gill filaments

Table 26, continued.

Host:

Ambloplites rupestris: Hanek and Fernando 1978a; November 1971-October 1972; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Ambloplites rupestris: Hanek and Fernando 1978b; November 1971-October 1972; pnp; minp; Glenora; lnk Westlake, Ontario; lnk

Ambloplites rupestris: Hanek and Fernando 1978c; May 1970-October 1972; pnp; minp; Glenora; lnk; Westlake, Ontario; lnk

Morone americana: Tedla and Fernando 1969d; 1958-1964; October 1967, July 1968; 31%; 6; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Lepomis gibbosus: Hanek and Fernando 1978a; pnp; minp; Bay of Quinte, Ontario

Perca flavescens: Tedla and Fernando 1969b, 1969e; May, July, and August 1968 (b) and May 1967-April 1968 (e); pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970a; May 1967-April 1968, and May-September 1968; 91%; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Perca flavescens: Tedla and Fernando 1970d; October 1966-February 1969; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Unknown Family

Unidentified glochidia

Synonym: ?

Site of Infection: Fins and gill filaments

Host:

Anguilla rostrata: Dechtiar and Christie 1988; 1961-1971; 14%; L; lns; Ontario; lnk

Catostomus commersonii: Dechtiar and Christie 1988; 15%; L; lns; Ontario

Ameiurus nebulosus: Dechtiar and Christie 1988; 18%; L; lns; Ontario

Esox lucius: Dechtiar and Christie 1988; 8%; L; lns; Ontario

Percopsis omiscomaycus: Dechtiar and Christie 1988; 38%; L; lns; Ontario

Gasterosteus aculeatus: Dechtiar and Christie 1988; 22%; L; lns; Ontario

Lepomis gibbosus: Dechtiar and Christie 1988; 27%; L; lns; Ontario

Lepomis macrochirus: Dechtiar and Christie 1988; 12%; L; lns; Ontario

Micropterus dolomieu: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Perca flavescens: Dechtiar and Christie 1988; 13%; L; lns; Ontario

Perca flavescens: Tedla and Fernando 1969e; May 1967-April 1968; pnp; minp; Bay of Quinte, Ontario; 44°9'0"/-77°15'0"

Sander vitreus: Dechtiar and Christie 1988; 14%; L; lns; Ontario

Table 27. Fishes by family from Lake Ontario from which parasites have been reported during 1930-2010 using parasite data in Table 26. References in parentheses following parasites refer to reference for host records.

Acipenseridae

***Acipenser fulvescens* (lake sturgeon)**

Adult Digenea: *Skrjabinopsolus manteri*, (Dechtiar and Christie 1988); *Crepidostomum lintoni*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Monogenea: *Diclybothrium armatum*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Dechtiar and Christie 1988)

Adult Nematoda: *Truttaedacnitis clitellarius*, (Dechtiar and Christie 1988); *Spinitectus gracilis*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988); *Neoechinorhynchus rutili*, (Dechtiar and Christie 1988)

Lepisosteidae

***Lepisosteus osseus* (longnose gar)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Spiroxys* sp., (Dechtiar and Christie 1988)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Amiidae

***Amia calva* (bowfin)**

Adult Digenea: *Azygia longa*, (Dechtiar and Christie 1988); *Macroderoides typicus*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Adult Cestoda: *Haplobothrium globuliforme*, (Dechtiar and Christie 1988); *Proteocephalus perplexus*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Neoechinorhynchus rutili*, (Dechtiar and Christie 1988)

Anguillidae

***Anguilla rostrata* (American eel)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar and Christie 1988); *Trichodina* sp., (Dechtiar and Christie 1988)

Myxozoa: *Myxidium illinoisense*, (Dechtiar and Christie 1988)

Adult Digenea: *Azygia longa*, (Dechtiar and Christie 1988)

Table 27, continued.

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)
Adult Cestoda: *Bothriocephalus claviceps*, (Dechtiar and Christie 1988); *Proteocephalus macrocephalus*, (Dechtiar and Christie 1988)
Larval/Immature Cestoda: *Diphyllobothrium* sp., (Dechtiar and Christie 1988)
Larval/Immature Nematoda: *Spinitectus* sp., (Dechtiar and Christie 1988)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988); *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)
Mollusca: Unidentified glochidia, (Dechtiar and Christie 1988)
Copepoda: *Ergasilus versicolor*, (Dechtiar and Christie 1988)

Clupeidae

***Alosa pseudoharengus* (alewife)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)
Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Christie 1988)

***Dorosoma cepedianum* (gizzard shad)**

Microspora: *Glugea cepedianae*, (Dechtiar and Christie 1988)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)
Monogenea: *Mazocraeoides olentangiensis*, (Dechtiar and Christie 1988); *Pseudomazocraeoides ontariensis*, (Dechtiar and Christie 1988; Hanek and Fernando 1971a)

Cyprinidae

***Couesius plumbeus* (lake chub)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)
Monogenea: *Octomacrum semotili*, (Dechtiar and Christie 1988)

***Cyprinus carpio* (common carp)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)
Monogenea: *Dactylogyrus extensus*, (Dechtiar and Christie 1988); *Pseudocolpenteron pavlovskii*, (Dechtiar 1971b; Dechtiar and Christie 1988); *Gyrodactylus medius*, (Dechtiar and Christie 1988)
Copepoda: *Ergasilus caeruleus*, (Dechtiar and Christie 1988)

***Luxilus cornutus* (common shiner)**

Myxozoa: *Henneguya* sp., (Dechtiar and Christie 1988)
Adult Digenea: *Plagioporus sinitsini*, (Dechtiar and Christie 1988); *Prototransversotrema* sp., (Dechtiar and Christie 1988)
Larval/Immature Digenea: *Clinostomum complanatum*, (Dechtiar and Christie 1988)

Table 27, continued.

Monogenea: *Dactylogyrus banghami*, (Dechtiar and Christie 1988); *Dactylogyrus bulbosus*, (Dechtiar and Christie 1988); *Dactylogyrus cornutus*, (Dechtiar and Christie 1988); *Gyrodactylus* sp., (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Dechtiar and Christie 1988)

***Notemigonus crysoleucas* (golden shiner)**

Ciliophora: *Trichodina* sp., (Dechtiar and Christie 1988)

Myxozoa: *Myxobolus* sp., (Dechtiar and Christie 1988)

Adult Digenea: *Plagiocirrus primus*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar and Christie 1988); *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Apophallus brevis*, (Dechtiar and Christie 1988); *Posthodiplostomum minimum*, (Dechtiar and Christie 1988)

Monogenea: *Dactylogyrus aureus*, (Hanek and Fernando 1972b); *Dactylogyrus luxili*, (Dechtiar and Christie 1988); *Gyrodactylus* sp., (Dechtiar and Christie 1988)

Adult Cestoda: *Pliovitellaria wisconsinensis*, (Dechtiar and Christie 1988)

Adult Nematoda: *Rhabdochona* sp., (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Neoechinorhynchus notemigoni*, (Dechtiar 1967a; Dechtiar and Christie 1988); *Neoechinorhynchus rutili*, (Dechtiar and Christie 1988)

Hirudinea: *Piscicola* sp., (Dechtiar and Christie 1988)

***Notropis atherinoides* (emerald shiner)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Monogenea: *Dactylogyrus* sp., (Dechtiar and Christie 1988)

***Notropis hudsonius* (spottail shiner)**

Ciliophora: *Trichodina* sp., (Dechtiar and Christie 1988)

Myxozoa: *Myxobolus bartai*, (Cone et al. 2004); *Myxobolus burti*, (Cone et al. 2004; Cone and Marcogliese 2010); *Myxobolus fanthami*, (Cone et al. 2004); *Myxobolus hendrickson*, (Cone et al. 2004); *Myxobolus xiaoi*, (Cone et al. 2004); *Thenohanellus notatus*, (Cone et al. 2004); *Zschokkella* sp., (Cone et al. 2004)

Adult Digenea: *Plagioporus sinitsini*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Monogenea: *Dactylogyrus* sp., (Dechtiar and Christie 1988); *Gyrodactylus* sp., (Dechtiar and Christie 1988)

Adult Cestoda: *Glaridacris* sp., (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Triaenophorus nodulosus*, (Dechtiar and Christie 1988)

Adult Nematoda: *Rhabdochona decaturensis*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Cosmocephalus obvelatus*, (Wong and Anderson 1982); *Paracuaria adunca*, (Anderson and Wong 1982)

Adult Acanthocephala: *Neoechinorhynchus rutili*, (Dechtiar and Christie 1988)

Table 27, continued.

***Phoxinus neogaeus* (finscale dace)**

Ciliophora: *Trichodina* sp., (Dechtiar and Christie 1988)

Monogenea: *Dactylogyru* sp., (Dechtiar and Christie 1988); *Octomacrum semotili*, (Dechtiar and Christie 1988); *Gyrodactylus* sp., (Dechtiar and Christie 1988)

***Pimephales notatus* (bluntnose minnow)**

Microspora: *Glugea pimephales*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar and Christie 1988); *Diplostomum* sp., (Dechtiar and Christie 1988); *Posthodiplostomum minimum*, (Dechtiar and Christie 1988)

Monogenea: *Dactylogyru* sp., (Dechtiar and Christie 1988)

Adult Acanthocephala: *Neoechinorhynchus* sp., (Dechtiar and Christie 1988)

***Pimephales promelas* (fathead minnow)**

Microspora: *Glugea pimephales*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar and Christie 1988); *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Diplostomum* sp., (Dechtiar and Christie 1988)

Monogenea: *Dactylogyru* sp., (Dechtiar and Christie 1988); *Gyrodactylus* sp., (Dechtiar and Christie 1988)

***Rhinichthys cataractae* (longnose dace)**

Myxozoa: *Myxobolus* sp., (Dechtiar and Christie 1988)

Monogenea: *Dactylogyru banghami*, (Dechtiar and Christie 1988); *Gyrodactylus stunkardi*, (Dechtiar and Christie 1988)

Adult Nematoda: *Rhabdochona canadensis*, (Dechtiar and Christie 1988)

***Rhinichthys obtusus* (western blacknose dace)**

Monogenea: *Gyrodactylus avalonia*, (Hanek and Fernando 1971b); *Dactylogyru banghami*, (Dechtiar and Christie 1988); *Gyrodactylus dechtiara*, (Dechtiar and Christie 1988)

***Semotilus atromaculatus* (creek chub)**

Myxozoa: *Myxobolus pendula*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Monogenea: *Urocleidus brachus*, (Dechtiar and Christie 1988); *Octomacrum semotili*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Cosmocephalus obvelatus*, (Wong and Anderson 1982); *Paracuaria adunca*, (Anderson and Wong 1982)

Adult Acanthocephala: *Neoechinorhynchus saginatus*, (Dechtiar and Christie 1988)

Table 27, continued.

Catostomidae

***Catostomus commersonii* (white sucker)**

Myxozoa: *Myxobolus bibullatum*, (Dechtiar and Christie 1988)

Adult Digenea: *Phyllodistomum lysteri*, (Dechtiar and Christie 1988); *Lissorchis attenuatus*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Monogenea: *Acolpenteron catostomi*, (Dechtiar and Christie 1988); *Octomacrum lanceatum*, (Dechtiar and Christie 1988); *Gyrodactylus spathulatus*, (Dechtiar and Christie 1988); *Gyrodactylus* sp., (Dechtiar and Christie 1988); *Anonchohaptor anomalus*, (Dechtiar and Christie 1988); *Pseudomurraytrema copulatum*, (Dechtiar and Christie 1988)

Adult Cestoda: *Glaridacris catostomi*, (Dechtiar and Christie 1988); *Hunterella nodulosa*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Ligula intestinalis*, (Dechtiar and Christie 1988); *Trienophorus nodulosus*, (Dechtiar and Christie 1988)

Adult Nematoda: *Philometroides nodulosa*, (Dechtiar and Christie 1988); *Rhabdochona ovifilamenta*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Neoechinorhynchus crassus*, (Dechtiar and Christie 1988); *Neoechinorhynchus cristatus*, (Dechtiar and Christie 1988); *Octospinifer macilentus*, (Dechtiar and Christie 1988); *Pomphorhynchus bulbocolli*, (Dechtiar and Christie 1988)

Hirudinea: *Actinobdella inequiannulata*, (Dechtiar and Christie 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Christie 1988)

Copepoda: *Argulus catostomi*, (Dechtiar and Christie 1988); *Ergasilus caeruleus*, (Dechtiar and Christie 1988)

***Moxostoma macrolepidotum* (shorthead redhorse)**

Myxozoa: *Myxobolus* sp., (Dechtiar and Christie 1988)

Monogenea: *Dactylogyrus urus*, (Dechtiar and Christie 1988); *Gyrodactylus* sp., (Dechtiar and Christie 1988); *Anonchohaptor anomalus*, (Dechtiar and Christie 1988); *Pseudomurraytrema copulatum*, (Dechtiar and Christie 1988)

Adult Cestoda: *Glaridacris catostomi*, (Dechtiar and Christie 1988)

Adult Nematoda: *Rhabdochona milleri*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Neoechinorhynchus crassus*, (Dechtiar and Christie 1988)

Ictaluridae

***Ameiurus nebulosus* (brown bullhead)**

Myxozoa: *Henneguya exilis*, (Dechtiar and Christie 1988)

Adult Digenea: *Megalonia ictaluri*, (Dechtiar and Christie 1988); *Acetodextra amiuri*, (Dechtiar and Christie 1988); *Phyllodistomum staffordi*, (Dechtiar and Christie 1988); *Alloglossidium geminus*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Table 27, continued.

Monogenea: *Ligictaluridus monticelli*, (Dechtiar and Christie 1988); *Ligictaluridus pricei*, (Hanek and Fernando 1972a; Dechtiar and Christie 1988); *Gyrodactylus nebulosus*, (Hanek and Fernando 1971b; Dechtiar and Christie 1988)

Adult Cestoda: *Corallobothrium fimbriatum*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Spiroxys* sp., (Dechtiar and Christie 1988); *Eustrongylides tubifex*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Hirudinea: *Myzobdella lugubris*, (Appy and Cone 1982; Dechtiar and Christie 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Christie 1988)

Copepoda: *Ergasilus versicolor*, (Dechtiar and Christie 1988)

***Ictalurus punctatus* (channel catfish)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar and Christie 1988)

Myxozoa: *Henneguya exilis*, (Dechtiar and Christie 1988)

Adult Digenea: *Alloglossidium corti*, (Dechtiar and Christie 1988); *Microphallus opacus*, (Dechtiar and Christie 1988)

Monogenea: *Ligictaluridus floridanus*, (Dechtiar and Christie 1988)

Adult Cestoda: *Megathylacoides giganteum*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988)

Hirudinea: *Myzobdella lugubris*, (Dechtiar and Christie 1988)

Copepoda: *Ergasilus versicolor*, (Dechtiar and Christie 1988)

***Noturus flavus* (stonecat)**

Adult Digenea: *Megalonia ictaluri*, (Dechtiar and Christie 1988); *Alloglossidium corti*, (Dechtiar and Christie 1988); *Alloglossidium geminus*, (Dechtiar and Christie 1988)

Monogenea: *Ligictaluridus pricei*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Proteocephalus* sp., (Dechtiar and Christie 1988)

Adult Nematoda: *Rhabdochona decaturensis*, (Dechtiar and Christie 1988)

***Noturus gyrinus* (tadpole madtom)**

Adult Digenea: *Megalonia ictaluri*, (Dechtiar and Christie 1988); *Alloglossidium corti*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Monogenea: *Ligictaluridus pricei*, (Dechtiar and Christie 1988)

Adult Nematoda: *Rhabdochona decaturensis*, (Dechtiar and Christie 1988)

Table 27, continued.

Esocidae

***Esox lucius* (northern pike)**

Adult Digenea: *Azygia angusticauda*, (Dechtiar and Christie 1988); *Phyllodistomum* sp., (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Uvulifer ambloplitis*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Monogenea: *Tetraonchus monenteron*, (Dechtiar and Christie 1988; Hanek and Fernando 1972a)

Adult Cestoda: *Proteocephalus pinguis*, (Dechtiar and Christie 1988); *Triaenophorus nodulosus*, (Dechtiar and Christie 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988); *Neoechinorhynchus tenellus*, (Dechtiar and Christie 1988); *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Christie 1988)

***Esox masquinongy* (muskellunge)**

Myxozoa: *Henneguya acutua*, (Dechtiar and Christie 1988); *Myxobolus dentium*, (Dechtiar and Christie 1988)

Adult Digenea: *Azygia longa*, (Dechtiar and Christie 1988)

Adult Monogenea: *Gyrodactylus* sp., (Dechtiar and Christie 1988)

Adult Cestoda: *Proteocephalus pinguis*, (Dechtiar and Christie 1988); *Triaenophorus nodulosus*, (Dechtiar and Christie 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Christie 1988); *Raphidascaris acus*, (Dechtiar and Christie 1988)

Umbridae

***Umbra limi* (central mudminnow)**

Adult Digenea: *Creptotrema funduli*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Monogenea: *Gyrodactylus limi*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Proteocephalus* sp., (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Spiroxys* sp., (Dechtiar and Christie 1988)

Table 27, continued.

Osmeridae

***Osmerus mordax* (rainbow smelt)**

Microspora: *Glugea hertwigi*, (Chen and Power 1972; Dechtiar and Christie 1988; Ehlinger 1966)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)
Adult Nematoda: *Cystidicola farionis*, (Dechtiar and Christie 1988)
Larval/Immature Nematoda: *Cosmocephalus obvelatus*, (Wong and Anderson 1982)
Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Christie 1988); *Echinorhynchus salmonis*, (Dechtiar and Christie 1988)

Salmonidae

***Coregonus artedii* (lake herring/cisco)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Ichthyocotylurus intermedia*, (Dechtiar and Christie 1988)
Adult Cestoda: *Proteocephalus exiguus*, (Dechtiar and Christie 1988); *Proteocephalus laruei*, (Dechtiar and Christie 1988)
Larval/Immature Cestoda: Bothriocephalid larvae, (Pritchard 1931); rhyncobothrid cestode, (Pritchard 1931); *Diphyllobothrium ditremum*, (Dechtiar and Christie 1988)
Adult Nematoda: *Cystidicola farionis*, (Skinker 1930, 1931); *Cystidicola* sp., (Pritchard 1931)
Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988); *Neoechinorhynchus* sp., (Pritchard 1931)
Copepoda: *Salmincola extumescens*, (Pritchard 1931)

***Coregonus clupeaformis* (lake whitefish)**

Adult Digenea: *Phyllodistomum coregoni*, (Dechtiar and Christie 1988)
Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)
Adult Cestoda: *Cyathocephalus truncatus*, (Dechtiar and Christie 1988; Hart 1931; Wardle 1933); *Proteocephalus exiguus*, (Dechtiar and Christie 1988); *Proteocephalus laruei*, (Hart 1931; Wardle 1933)
Larval/Immature Cestoda: *Diphyllobothrium* sp., (Dechtiar and Christie 1988; Mueller 1940); *Triaenophorus crassus*, (Dechtiar and Christie 1988)
Adult Nematoda: *Cystidicola farionis*, (Dechtiar and Christie 1988); *Cystidicola* sp., (Hart 1931); *Cystidicoloides ephemeridarum*, (Dechtiar and Christie 1988)
Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Christie 1988); *Echinorhynchus salmonis*, (Dechtiar and Christie 1988); *Echinorhynchus* sp., (Hart 1931); *Neoechinorhynchus tumidus*, (Dechtiar and Christie 1988)
Copepoda: *Achtheres coregoni*, (Hart 1931); *Salmincola extumescens*, (Dechtiar and Christie 1988; Hart 1931)

Table 27, continued.

***Coregonus hoyi* (bloater)**

Larval/Immature Cestoda: Bothriocephalid larvae, (Pritchard 1931)

Adult Nematoda: *Cystidicola farionis*, (Skinker 1930, 1931); *Cystidicola* sp., (Pritchard 1931)

Copepoda: *Salmincola extumescens*, (Pritchard 1931)

***Coregonus kiyi* (kiyi)**

Larval/Immature Cestoda: Bothriocephalid larvae, (Pritchard 1931); *Diphyllobothrium laruei*, (Vergeer 1942)

Adult Nematoda: *Cystidicola* sp., (Pritchard 1931)

Copepoda: *Salmincola extumescens*, (Pritchard 1931)

***Coregonus reighardi* (shortnose cisco)**

Adult Nematoda: *Cystidicola farionis*, (Skinker 1930, 1931); *Cystidicola* sp., (Pritchard 1931)

Adult Acanthocephala: *Echinorhynchus* sp., (Pritchard 1931)

Copepoda: *Salmincola extumescens*, (Pritchard 1931)

***Oncorhynchus kisutch* (coho salmon)**

Adult Nematoda: *Capillaria salvelini*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Christie 1988)

***Oncorhynchus mykiss* (rainbow trout)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Adult Nematoda: *Cystidicoloides ephemeridarum*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988)

***Salvelinus fontinalis* (brook trout)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Ichthyocotylurus intermedia*, (Dechtiar and Christie 1988)

Adult Nematoda: *Cystidicoloides ephemeridarum*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Christie 1988); *Echinorhynchus salmonis*, (Dechtiar and Christie 1988)

***Salvelinus namaycush* (lake trout)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Adult Cestoda: *Eubothrium salvelini*, (Wardle 1933; Dechtiar and Christie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988)

Table 27, continued.

Percopsidae

***Percopsis omiscomaycus* (trout-perch)**

Myxozoa: *Myxobolus procerum*, (Dechtiar and Christie 1988)

Adult Digenea: *Crepidostomum isostomum*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Bucephalus* sp., (Dechtiar and Christie 1988); *Centrovarium lobotes*, (Dechtiar and Christie 1988); *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Ichthyocotylurus diminuta*, (Dechtiar and Christie 1988)

Monogenea: *Urocleidus baldwini*, (Dechtiar 1974a; Dechtiar and Christie 1988); *Gyrodactylus* sp., (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Triaenophorus stizostedionis*, (Dechtiar and Christie 1988)

Adult Nematoda: *Spinitectus gracilis*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Christie 1988)

Fundulidae

***Fundulus diaphanus* (banded killifish)**

Ciliophora: *Trichodina* sp., (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Posthodiplostomum minimum*, (Dechtiar and Christie 1988)

Monogenea: *Urocleidus fundulus*, (Hanek and Fernando 1972a); *Salsuginus fundulus*, (Dechtiar and Christie 1988); *Gyrodactylus avalonia*, (Hanek and Fernando 1971b; Dechtiar and Christie 1988); *Gyrodactylus prolongus*, (Dechtiar and Christie 1988); *Gyrodactylus stableri*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Hysterothylacium* sp., (Dechtiar and Christie 1988); *Camallanus oxycephalus*, (Dechtiar and Christie 1988)

Immature Acanthocephala: *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Atherinopsidae

***Labidesthes sicculus* (brook silverside)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Posthodiplostomum minimum*, (Dechtiar and Christie 1988)

Table 27, continued.

Gasterosteidae

***Culaea inconstans* (brook stickleback)**

Adult Digenea: *Bunoderina eucaliae*, (Dechtiar and Christie 1988)

Monogenea: *Dactylogyrus eucalius*, (Dechtiar and Christie 1988); *Gyrodactylus eucaliae*, (Dechtiar and Christie 1988)

Adult Cestoda: *Proteocephalus pugitensis*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Neoechinorhynchus rutili*, (Dechtiar and Christie 1988)

***Gasterosteus aculeatus* (threespine stickleback)**

Ciliophora: *Trichophrya* sp., (Dechtiar and Christie 1988)

Adult Digenea: *Bunoderina eucaliae*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Monogenea: *Gyrodactylus avalonia*, (Dechtiar and Christie 1988; Hanek and Fernando 1971b);

Gyrodactylus sp., (Dechtiar and Christie 1988)

Adult Cestoda: *Proteocephalus pugitensis*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Cosmocephalus obvelatus*, (Wong and Anderson 1982); *Hysterothylacium* sp., (Dechtiar and Christie 1988); *Paracuaria adunca*, (Anderson and Wong 1982)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Christie 1988)

Copepoda: *Ergasilus* sp., (Dechtiar and Christie 1988)

Cottidae

***Cottus bairdii* (mottled sculpin)**

Larval/Immature Digenea: *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Monogenea: *Dactylogyrus buddi*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Christie 1988); *Echinorhynchus salmonis*, (Dechtiar and Christie 1988)

***Cottus cognatus* (slimy sculpin)**

Larval/Immature Digenea: *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Monogenea: *Dactylogyrus buddi*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Christie 1988)

***Cottus* sp. (sculpin)**

Larval/Immature Nematoda: *Cosmocephalus obvelatus*, (Wong and Anderson 1982); *Paracuaria adunca*, (Anderson and Wong 1982)

Table 27, continued.

Moronidae

***Morone americana* (white perch)**

Ciliophora: *Trichodina* sp., (Dechtiar and Christie 1988); *Scyphidia* sp., (Dechtiar and Christie 1988)

Myxozoa: *Henneguya* sp., (Tedla and Fernando 1969d)

Larval/Immature Digenea: *Apophallus brevis*, (Tedla and Fernando 1969d); *Clinostomum complanatum*, (Tedla and Fernando 1969d); *Diplostomum huronense*, (Tedla and Fernando 1969c); *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Tylodelphys scheuringi*, (Dechtiar and Christie 1988); *Posthodiplostomum minimum*, (Dechtiar and Christie 1988)

Monogenea: *Onchocleidus rogersi*, (Dechtiar and Christie 1988); *Gyrodactylus* sp., (Dechtiar and Christie 1988); *Urocleidus rogersi*, (Hanek and Fernando 1972a)

Adult Cestoda: *Eubothrium crassum*, (Tedla and Fernando 1969d)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Dechtiar and Christie 1988); *Triaenophorus nodulosus*, (Tedla and Fernando 1969c; Tedla and Fernando 1969d; Dechtiar and Christie 1988)

Adult Nematoda: *Dichelyne cotylophora*, (Dechtiar and Christie 1988; Tedla and Fernando 1969d); *Spinitectus carolini*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Contraecum spiculigerum*, (Tedla and Fernando 1969d); *Hysterothylacium* sp., (Dechtiar and Christie 1988); *Eustrongylides tubifex*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Dechtiar and Christie 1988); *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Mollusca: glochidia of *Lampsilis radiata siliquoidea*, (Tedla and Fernando 1969d)

Copepoda: *Ergasilus confusus*, (Tedla and Fernando 1969d)

***Morone chrysops* (white bass)**

Ciliophora: *Capriniana piscium*, (Dechtiar and Christie 1988)

Adult Digenea: *Neochasmus umbellus*, (Dechtiar and Christie 1988); *Allacanthochasmus artus*, (Dechtiar and Christie 1988); *Allacanthochasmus varius*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Monogenea: *Onchocleidus chrysops*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Bothriocephalus cuspidatus*, (Dechtiar and Christie 1988); *Triaenophorus nodulosus*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Christie 1988); *Echinorhynchus salmonis*, (Dechtiar and Christie 1988); *Neoechinorhynchus* sp., (Dechtiar and Christie 1988); *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Copepoda: *Ergasilus centrarchidarum*, (Dechtiar and Christie 1988)

Table 27, continued.

Centrarchidae

***Ambloplites rupestris* (rock bass)**

Ciliophora: *Trichodina* sp., (Dechtiar and Christie 1988)

Myxozoa: *Myxobolus* sp., (Dechtiar and Christie 1988)

Adult Digenea: *Crepidostomum cornutum*, (Dechtiar and Christie 1988); *Crepidostomum* sp., (Hopkins 1931); *Proterometra macrostoma*, (Dechtiar and Christie 1988); *Phyllodistomum lohrenzi*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Uvulifer ambloplitis*, (Dechtiar and Christie 1988); *Posthodiplostomum minimum*, (Dechtiar and Christie 1988)

Monogenea: *Cleidodiscus alatus*, (Hanek and Fernando 1972a, 1978a, 1978b, 1978c); *Cleidodiscus glenorensis*, (Hanek and Fernando 1972a, 1978a, 1978b, 1978c); *Lyrodiscus minimus*, (Dechtiar 1973; Dechtiar and Christie 1988); *Lyrodiscus rupestris*, (Dechtiar 1973; Dechtiar and Christie 1988); *Onchocleidus chautauquaensis*, (Dechtiar and Christie 1988; Hanek and Fernando 1973, 1978a, 1978b, 1978c); *Tetracleidus stentor*, (Dechtiar and Christie 1988; Hanek and Fernando 1972a, 1978a, 1978b, 1978c); *Urocleidus alatus*, (Dechtiar and Christie 1988); *Gyrodactylus georani*, (Hanek and Fernando 1971b; Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Dechtiar and Christie 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Christie 1988); *Rhabdochona* sp., (Dechtiar and Christie 1988); *Spinitectus gracilis*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Christie 1988); *Spiroxys* sp., (Dechtiar and Christie 1988); *Camallanus oxycephalus*, (Dechtiar and Christie 1988); *Eustrongylides tubifex*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988); *Neoechinorhynchus cylindratus*, (Dechtiar and Christie 1988); *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Hirudinea: *Myzobdella lugubris*, (Dechtiar and Christie 1988)

Mollusca: Glochidia of *Lampsilis radiata siliquoidea*, (Hanek and Fernando 1978a, 1978b, 1978c)

Copepoda: *Ergasilus caeruleus*, (Hanek and Fernando 1978a, 1978b, 1978c); *Ergasilus centrarchidarum*, (Dechtiar and Christie 1988; Hanek and Fernando 1978a, 1978b, 1978c; Tedla and Fernando 1969a); *Achtheres pimelodi*, (Dechtiar and Christie 1988; Hanek and Fernando 1978a, 1978b, 1978c)

***Lepomis gibbosus* (pumpkinseed)**

Ciliophora: *Trichodina* sp., (Dechtiar and Christie 1988)

Myxozoa: *Myxobolus* sp., (Dechtiar and Christie 1988)

Adult Digenea: *Azygia angusticauda*, (Dechtiar and Christie 1988); *Proterometra macrostoma*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Uvulifer ambloplitis*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Table 27, continued.

Monogenea: *Actinocleidus gibbosus*, (Hanek and Fernando 1978a); *Actinocleidus recurvatus*, (Dechtiar and Christie 1988; Hanek and Fernando 1972a; Hanek and Fernando 1978a); *Cleidodiscus robustus*, (Dechtiar and Christie 1988; Hanek and Fernando 1978a; Hanek and Fernando 1972a); *Haploleidus dispar*, (Beverley-Burton and Suriano 1980; Dechtiar and Christie 1988); *Haploleidus furcatus*, (Dechtiar and Christie 1988); *Lyrodiscus seminolensis*, (Dechtiar and Christie 1988); *Gyrodactylus avalonia*, (Hanek and Fernando 1971b); *Onchocleidus acer*, (Beverley-Burton and Suriano 1980; Dechtiar and Christie 1988; Hanek and Fernando 1972a; Hanek and Fernando 1978a); *Urocleidus attenuatus*, (Hanek and Fernando 1973; Hanek and Fernando 1978a); *Urocleidus aculeatus*, (Hanek and Fernando 1973); *Urocleidus dispar*, (Hanek and Fernando 1978a); *Onchocleidus ferox*, (Beverley-Burton and Suriano 1981; Hanek and Fernando 1972a; Hanek and Fernando 1978a; Dechtiar and Christie 1988); *Onchocleidus similis*, (Beverley-Burton and Suriano 1981); *Gyrodactylus macrochiri*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Dechtiar and Christie 1988); *Triaenophorus nodulosus*, (Dechtiar and Christie 1988); *Dilepis* sp., (Dechtiar and Christie 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Christie 1988); *Camallanus oxycephalus*, (Dechtiar and Christie 1988); *Dichelyne cotylophora*, (Dechtiar and Christie 1988); *Spinitectus carolini*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Eustrongylides tubifex*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988); *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Hirudinea: *Myzobdella lugubris*, (Dechtiar and Christie 1988)

Mollusca: glochidia of *Lampsilis radiata siliquoidea*, (Hanek and Fernando 1978a); unidentified glochidia, (Dechtiar and Christie 1988)

Copepoda: *Ergasilus caeruleus*, (Dechtiar and Christie 1988; Hanek and Fernando 1978a; Tedla and Fernando 1969a); *Ergasilus centrarchidarum*, (Hanek and Fernando 1978a; Tedla and Fernando 1969a); *Achtheres pimelodi*, (Dechtiar and Christie 1988; Hanek and Fernando 1978a); *Argulus catostomi*, (Dechtiar and Christie 1988)

***Lepomis macrochirus* (bluegill)**

Adult Digenea: *Bunodera sacculata*, (Dechtiar and Christie 1988); *Crepidostomum cornutum*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Ichthyocotylurus* sp., (Dechtiar and Christie 1988); *Posthodiplostomum minimum centrarchi*, (Dechtiar and Christie 1988)

Monogenea: *Actinocleidus brevicirrus*, (Dechtiar and Christie 1988); *Actinocleidus gibbosus*, (Hanek and Fernando 1972a); *Actinocleidus* sp., (Dechtiar and Christie 1988); *Anchorodiscus triangularis*, (Dechtiar and Christie 1988); *Cleidodiscus robustus*, (Dechtiar and Christie 1988); *Cleidodiscus venardi*, (Dechtiar and Christie 1988); *Lyrodiscus longibasus*, (Dechtiar and Christie 1988); *Lyrodiscus seminolensis*, (Dechtiar 1973; Dechtiar and Christie 1988); *Urocleidus dispar*, (Hanek and Fernando 1972a); *Onchocleidus ferox*, (Dechtiar and Christie 1988); *Gyrodactylus macrochiri*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Dechtiar and Christie 1988); *Triaenophorus nodulosus*, (Dechtiar and Christie 1988)

Adult Nematoda: *Camallanus oxycephalus*, (Dechtiar and Christie 1988); *Spinitectus carolini*, (Dechtiar and Christie 1988)

Table 27, continued.

Larval/Immature Nematoda: *Hysterothylacium* sp., (Dechtiar and Christie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Christie 1988)

Copepoda: *Ergasilus caeruleus*, (Dechtiar and Christie 1988)

***Micropterus dolomeiu* (smallmouth bass)**

Ciliophora: *Scyphidia micropteri*, (Dechtiar and Christie 1988)

Adult Digenea: *Crepidostomum cornutum*, (Dechtiar and Christie 1988); *Azygia angusticauda*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Uvulifer ambloplitis*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988); *Posthodiplostomum minimum centrarchi*, (Dechtiar and Christie 1988)

Monogenea: *Actinocleidus mizellei*, (Hanek and Fernando 1972a); *Onchocleidus ferox*, (Dechtiar and Christie 1988; Hanek and Fernando 1972a); *Onchocleidus principalis*, (Dechtiar and Christie 1988; Hanek and Fernando 1972a); *Tetracleidus banghami*, (Dechtiar and Christie 1988); *Cleidodiscus glenorensis*, (Hanek and Fernando 1972a); *Urocleidus dispar*, (Hanek and Fernando 1972a); *Onchocleidus ferox*, (Hanek and Fernando 1972a); *Onchocleidus principalis*, (Hanek and Fernando 1972a); *Gyrodactylus macrochiri*, (Dechtiar and Christie 1988; Hanek and Fernando 1971b)

Adult Cestoda: *Proteocephalus ambloplitis*, (Wardle 1933; Dechtiar and Christie 1988); *Proteocephalus fluviatilis*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Dechtiar and Christie 1988; Wardle 1933); *Triaenophorus nodulosus*, (Dechtiar and Christie 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Christie 1988); *Dichelyne cotylophora*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Dechtiar and Christie 1988); *Eustrongylides tubifex*, (Dechtiar and Christie 1988)

Hirudinea: *Myzobdella lugubris*, (Dechtiar and Christie 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Christie 1988)

Copepoda: *Ergasilus centrarchidarum*, (Dechtiar and Christie 1988; Tedla and Fernando 1969a); *Achtheres pimelodi*, (Dechtiar and Christie 1988)

***Micropterus salmoides* (largemouth bass)**

Ciliophora: *Scyphidia micropteri*, (Dechtiar and Christie 1988)

Myxozoa: *Myxobolus* sp., (Dechtiar and Christie 1988)

Adult Digenea: *Crepidostomum cornutum*, (Dechtiar and Christie 1988); *Azygia angusticauda*, (Dechtiar and Christie 1988); *Leuceruthrus micropteri*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Monogenea: *Actinocleidus fusiformis*, (Hanek and Fernando 1972a); *Actinocleidus* sp., (Dechtiar and Christie 1988); *Onchocleidus furcatus*, (Hanek and Fernando 1972a; Dechtiar and Christie 1988); *Onchocleidus helicus*, (Dechtiar and Christie 1988); *Synclathrium fusiformis*, (Dechtiar and Christie 1988); *Onchocleidus principalis*, (Hanek and Fernando 1972a); *Gyrodactylus macrochiri*, (Dechtiar and Christie 1988; Hanek and Fernando 1971b)

Table 27, continued.

Adult Cestoda: *Proteocephalus ambloplitis*, (Dechtiar and Christie 1988); *Proteocephalus fluviatilis*, (Dechtiar and Christie 1988)

Larval/Immature Cestoda: *Proteocephalus ambloplitis*, (Dechtiar and Christie 1988)

Adult Nematoda: *Philometra* sp., (Dechtiar and Christie 1988)

Adult Acanthocephala: *Neoechinorhynchus cylindratus*, (Dechtiar and Christie 1988); *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Copepoda: *Ergasilus centrarchidarum*, (Dechtiar and Christie 1988); *Achtheres pimelodi*, (Dechtiar and Christie 1988)

***Pomoxis annularis* (white crappie)**

Monogenea: *Lyrodiscus longibasus*, (Dechtiar 1973)

***Pomoxis nigromaculatus* (black crappie)**

Ciliophora: *Trichodina* sp., (Dechtiar and Christie 1988)

Myxozoa: *Myxobolus* sp., (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Monogenea: *Cleidodiscus vancleavi*, (Hanek and Fernando 1972a); *Lyrodiscus longibasus*, (Dechtiar 1973; Dechtiar and Christie 1988); *Tetracleidus capax*, (Dechtiar and Christie 1988; Hanek and Fernando 1972a); *Tetracleidus longus*, (Dechtiar and Christie 1988); *Tetracleidus stentor*, (Dechtiar and Christie 1988)

Adult Nematoda: *Camallanus oxycephalus*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Hirudinea: *Myzobdella lugubris*, (Dechtiar and Christie 1988)

Copepoda: *Ergasilus caeruleus*, (Dechtiar and Christie 1988)

Percidae

***Etheostoma caeruleum* (rainbow darter)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988)

Monogenea: *Aethycteron* sp., (Dechtiar and Christie 1988)

Adult Nematoda: *Rhabdochona* sp., (Dechtiar and Christie 1988)

***Etheostoma exile* (Iowa darter)**

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Apophallus brevis*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Monogenea: *Aethycteron* sp., (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Dechtiar and Christie 1988)

Table 27, continued.

***Etheostoma nigrum* (Johnny darter)**

Adult Digenea: *Crepidostomum canadense*, (Hopkins 1931)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Apophallus brevis*, (Dechtiar and Christie 1988)

Monogenea: *Aethycteron hargisi*, (Hanek and Fernando 1972a; Dechtiar and Christie 1988); *Gyrodactylus etheostomae*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

***Perca flavescens* (yellow perch)**

Ciliophora: *Ichthyophthirius multifiliis*, (Dechtiar and Christie 1988); *Trichodina urinaria*, (Dechtiar and Christie 1988); *Trichodina* sp., (Dechtiar and Christie 1988)

Myxozoa: *Henneguya doori*, (Dechtiar and Christie 1988); *Henneguya* sp., (Tedla and Fernando 1970a)

Adult Digenea: *Bunodera luciopercae*, (Tedla and Fernando 1969e; Tedla and Fernando 1970d); *Bunodera sacculata*, (Dechtiar and Christie 1988; Tedla and Fernando 1969e, 1970d); *Crepidostomum cooperi*, (Dechtiar and Christie 1988; Hopkins 1931; Tedla and Fernando 1969e, 1970d); *Azygia angusticauda*, (Tedla and Fernando 1970d)

Larval/Immature Digenea: *Crassiphiala bulboglossa*, (Dechtiar and Christie 1988); *Diplostomum adamsi*, (Lester 1977; Lester and Huizinga 1977); *Diplostomum huronense*, (Tedla and Fernando 1969e, 1970d); *Diplostomum spathaceum huronense*, (Dechtiar and Christie 1988); *Clinostomum complanatum*, (Dechtiar and Christie 1988; Tedla and Fernando 1969e, 1970d); *Neascus* sp., (Tedla and Fernando 1969e, 1970d); *Apophallus brevis*, (Dechtiar and Christie 1988); *Apophallus venustus*, (Tedla and Fernando 1969e, 1970d); *Ichthyocotylurus diminuta*, (Dechtiar and Christie 1988; Tedla and Fernando 1970d); *Tylodelphys scheuringi*, (Tedla and Fernando 1969e, 1970d)

Monogenea: *Urocleidus adspectus*, (Dechtiar and Christie 1988; Hanek and Fernando 1972a; Tedla and Fernando 1969e, 1970d); *Gyrodactylus freemani*, (Dechtiar and Christie 1988; Hanek and Fernando 1971b)

Adult Cestoda: *Bothriocephalus cuspidatus*, (Tedla and Fernando 1969e, 1970d); *Cyathocephalus truncatus*, (Dechtiar and Christie 1988); *Proteocephalus pearsei*, (Dechtiar and Christie 1988; Tedla and Fernando 1969e, 1970d)

Larval/Immature Cestoda: *Bothriocephalus cuspidatus*, (Dechtiar and Christie 1988); *Proteocephalus ambloplitis*, (Tedla and Fernando 1970d); *Triaenophorus nodulosus*, (Dechtiar and Christie 1988; Tedla and Fernando 1969e, 1970d)

Adult Nematoda: *Camallanus* sp., (Tedla and Fernando 1970d); *Dichelyne cotylophora*, (Dechtiar and Christie 1988; Tedla and Fernando 1969e, 1970d); *Philometra cylindracea*, (Dechtiar and Christie 1988; Tedla and Fernando 1969e); *Rhabdochona ovifilamenta*, (Dechtiar and Christie 1988; Tedla and Fernando 1969e); *Spinitectus gracilis*, (Dechtiar and Christie 1988); *Spinitectus* sp., (Tedla and Fernando 1970d)

Larval/Immature Nematoda: *Contracaecum spiculigerum*, (Tedla and Fernando 1969e, 1970d); *Philometra cylindracea*, (Tedla and Fernando 1970d); *Rhabdochona* sp., (Tedla and Fernando 1970d); *Eustrongylides tubifex*, (Dechtiar and Christie 1988); *Agamospirura* sp., (Dechtiar and Christie 1988)

Adult Acanthocephala: *Acanthocephalus dirus*, (Dechtiar and Christie 1988); *Echinorhynchus salmonis*, (Dechtiar and Christie 1988; Tedla and Fernando 1969e, 1970a, 1970b, 1970d); *Neoechinorhynchus cylindratus*, (Tedla and Fernando 1969e, 1970d); *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988; Tedla and Fernando 1969e, 1970d); *Pomphorhynchus bulbocolli*, (Tedla and Fernando 1970d)

Hirudinea: *Myzobdella* sp., (Tedla and Fernando 1970d); *Piscicola* sp., (Tedla and Fernando 1969e, 1970d)

Table 27, continued.

Mollusca: glochidia of *Anodonta* sp., (Tedla and Fernando 1969b, 1970d); glochidia of *Elliptio complanatus*, (Tedla and Fernando 1969b, 1969e, 1970a, 1970d); glochidia of *Lampisilis radiata*, (Tedla and Fernando 1969b, 1969e, 1970a, 1970d); unidentified glochidia, (Dechtiar and Christie 1988; Tedla and Fernando 1969e)

Copepoda: *Ergasilus caeruleus*, (Tedla and Fernando 1969e); *Ergasilus confusus*, (Tedla and Fernando 1969a, 1969b, 1970a, 1970c, 1970d); *Ergasilus luciopercarum*, (Dechtiar and Christie 1988)

***Percina caprodes* (logperch)**

Adult Digenea: *Crepidostomum isostomum*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Tylodelphys scheuringi*, (Dechtiar and Christie 1988)

Monogenea: *Aethycteron malleus*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Camallanus oxycephalus*, (Dechtiar and Christie 1988)

***Sander vitreus* (walleye)**

Myxozoa: *Myxobolus* sp., (Dechtiar and Christie 1988)

Adult Digenea: *Azygia angusticauda*, (Dechtiar and Christie 1988); *Bucephalopsis pusilla*, (Dechtiar and Christie 1988); *Sanguinicola occidentalis*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Uvulifer ambloplitis*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Adult Cestoda: *Bothriocephalus cuspidatus*, (Dechtiar and Christie 1988); *Proteocephalus pearsei*, (Dechtiar and Christie 1988); *Triaenophorus stizostedionis*, (Dechtiar and Christie 1988)

Adult Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Christie 1988); *Dichelyne cotylophora*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Hysterothylacium brachyurum*, (Dechtiar and Christie 1988); *Eustrongylides tubifex*, (Dechtiar and Christie 1988)

Adult Acanthocephala: *Echinorhynchus salmonis*, (Dechtiar and Christie 1988); *Neoechinorhynchus rutili*, (Dechtiar and Christie 1988); *Neoechinorhynchus tenellus*, (Dechtiar and Christie 1988); *Leptorhynchoides thecatus*, (Dechtiar and Christie 1988)

Mollusca: Unidentified glochidia, (Dechtiar and Christie 1988)

Copepoda: *Ergasilus caeruleus*, (Dechtiar and Christie 1988); *Ergasilus luciopercarum*, (Dechtiar and Christie 1988)

Table 27, continued.

Sciaenidae

***Aplodinotus grunniens* (freshwater drum)**

Adult Digenea: *Homalometron armatum*, (Dechtiar and Christie 1988)

Larval/Immature Digenea: *Diplostomum spathaceum*, (Dechtiar and Christie 1988); *Ichthyocotylurus* sp., (Dechtiar and Christie 1988)

Monogenea: *Lintaxine cokeri*, (Dechtiar and Christie 1988); *Microcotyle spinicirrus*, (Dechtiar and Christie 1988)

Aspidobothrea: *Cotylogaster occidentalis*, (Dechtiar and Christie 1988)

Larval/Immature Nematoda: *Eustrongylides tubifex*, (Dechtiar and Christie 1988); *Agamospirura* sp., (Dechtiar and Christie 1988)

Hirudinea: *Actinobdella pediculata*, (Wolf et al. 2008)

Table 28. Numbers and percentages (in parentheses) of parasite species in each major parasite group in five major fish families from Lake Ontario, 1930-2010. Parasite group abbreviations are Ci (Ciliophora), My (Myxozoa), Mi (Microspora), Dt (Digenea), Mo (Monogenea), Ce (Cestoda), Ne (Nematoda), Ac (Acanthocephala), Hi (Hirudinea), Co (Copepoda), and Mol (Mollusca). If a parasite in a group did not infect fish, the parasite group was not included in the table.

| Fish family | Parasite group | | | | | | | | | | Total | |
|---------------|----------------|-----------|----------|------------|------------|-----------|-----------|-----------|----------|-----------|----------|-----|
| | Ci | My | Mi | Dt | Mo | Ce | Ne | Ac | Hi | Co | | Mol |
| Cyprinidae | 1 (2) | 9 (19) | 1 (2) | 9 (19) | 13 (28) | 4 (8) | 5 (10) | 3 (6) | 1 (2) | 1 (2) | 0 | 47 |
| Catostomidae | 0 | 1 (4) | 0 | 3 (12) | 6 (24) | 4 (16) | 3 (12) | 4 (16) | 1 (4) | 2 (8) | 1 (4) | 25 |
| Centrarchidae | 2 (3) | 1 (1) | 0 | 10 (14) | 35 (51) | 4 (6) | 8 (11) | 3 (4) | 1 (1) | 4 (6) | 1 (1) | 69 |
| Percidae | 3 (5) | 2 (3) | 0 | 19 (33) | 5 (9) | 6 (10) | 8 (14) | 7 (12) | 2 (3) | 3 (5) | 3 (5) | 58 |
| Salmonidae | 0 | 0 | 0 | 3 (14) | 0 | 9 (43) | 4 (19) | 3 (14) | 0 | 2 (10) | 0 | 21 |

Table 29. Jaccard coefficients of parasite-community similarity based on the presence of parasites in species of five major fish families from Lake Ontario, 1930-2010.

| Fish family | Cyprinidae | Catostomidae | Salmonidae | Centrarchidae |
|---------------|------------|--------------|------------|---------------|
| Cyprinidae | 1.0000 | 0.0615 | 0.0344 | 0.0576 |
| Catostomidae | 0.0615 | 1.0000 | 0.0227 | 0.0555 |
| Salmonidae | 0.0344 | 0.0227 | 1.0000 | 0.0487 |
| Centrarchidae | 0.0576 | 0.0555 | 0.0487 | 1.0000 |
| Percidae | 0.1136 | 0.0921 | 0.0882 | 0.1158 |

OVERALL SUMMARY FOR ALL GREAT LAKES

Several factors affect the occurrence and distribution of parasites and the composition of parasite communities in fish. These factors include the physical features of the aquatic environment, such as its age and size, as well as the geographic range of the fish host, vagility of the fish host, the fish habitat use and age, the fish diet and position in the trophic relationships, the location of fish collections, and parasite-host specificity. The lack of information involving one or more of these factors makes recognition and interpretation of patterns in the parasite-community structure of fish in the Great Lakes difficult. Furthermore, the lack of information and of research on the parasites of fish in the Great Lakes demonstrated in this synopsis supports this statement.

Fish-Parasite Commonality in the Great Lakes

A total of 32 parasite species or distinct genera infected fish from all five Great Lakes. These parasites by major taxonomic group and fish species infected were protozoans—*Myxobolus burti* (*Notropis hudsonius*), *Thelohanellus notatus* (several cyprinid species), *Zschokkella* sp. (*Notropis hudsonius*); digenetic trematodes—*Bunodera sacculata* (primarily *Perca flavescens*), *Crepidostomum cooperi* (several species), *Phyllodistomum staffordi* (*Ameirus* spp.), *Lissorchis attenuatus* (catostomids), *Clinostomum complanatum* (several species), *Centrovarium lobotes* (several species), *Diplostomum spathaceum* (several species); monogenean—*Urocleidus adspectus* (*Perca flavescens*); cestodes—*Bothriocephalus cuspidatus* (several species), *Eubothrium crassum* (several species), *Glaridacris catostomi* (catostomids), *Proteocephalus exiguus* (primarily coregonids), *P. pearsei* (several species), *P. ambloplitis* (several species), *Triaenophorus nodulosus* (*Esox* spp.); nematodes—*Camallanus oxycephalus* (several species), *Dichelyne cotylophora* (several species), *Raphidascaris acus* (*Esox* spp. and *Micropterus dolomieu*), *Spinitectus gracilis* (several species); acanthocephalans—*Acanthocephalus dirus* (several species), *Echinorhynchus salmonis* (several species), *Leptorhynchoides thecatus* (several species).

species), *Neoechinorhynchus crassus* (primarily catostomids), *N. cylindratus* (several species), *Octospinifer macilentus* (catostomids), *Pomphorhynchus bulbocolli* (several species); copepods—*Achtheres pimelodi* (several species), *Ergasilus caeruleus* (several species), and *E. luciopercarum* (several species). Possible reasons why these parasites have been reported from all the lakes are that most parasites, except for *Zschokkella* sp. and *Urocleidus adspetus*, infected two or more fish species so they lack strict host specificity; and, if host specificity occurs, the specific fish host is present and has been examined from all the lakes. At least 23 of these parasite species have indirect life cycles, indicating that the necessary intermediate host species are present in all the lakes. All the helminth species listed above are autogenic species, except for two allogenic species, *Clinostomum complanatum* and *Diplostomum spathaceum*.

Diplostomum spathaceum or unidentified species of *Diplostomum* infected the most fish species in Lakes Huron, Erie, and Ontario, followed by *Echinorhynchus salmonis* in Lake Huron, *Camallanus oxycephalus* in Lake Erie, and *E. salmonis* in Lake Ontario. *Diplostomum* spp. are allogenic species as well as generalist parasites in that they can infect a large number of fish species as the second intermediate hosts and several piscivorous bird species as definitive hosts. Thus, they lack host specificity. *Echinorhynchus salmonis* infected the most fish species in Lakes Michigan and Superior followed by *Acanthocephalus dirus* in Lake Michigan, and *Diplostomum spathaceum* in Lake Superior. *Echinorhynchus salmonis*, an autogenic species, infected the most fish species in these lakes because of the various transmission pathways employed in its life cycle as well as it being a generalist parasite. Also, the first intermediate host, *Diporeia affinis* of *E. salmonis*, is probably numerous in these two lakes.

Camallanus oxycephalus, an autogenic species, was the second most-common parasite infecting fish species in Lake Erie. Stromberg and Crites (1975b) reported that the prevalence of *C. oxycephalus* in fish from the western basin of Lake Erie showed little change in fish surveys between 1927 and 1957. However between 1957 and 1972, the prevalence of *C. oxycephalus* increased in fish, with significant increases in 11 fish species. Stromberg and Crites (1975b) suggested that reasons for this increase were increased numbers of its copepod intermediate host and faster movement of this nematode through the forage fish to the predaceous fish portion of their life cycle. Furthermore, Crites (1976) demonstrated that *C. oxycephalus* could establish in many fish that ingested the encapsulated larvae.

A total of 49 parasite species or distinct genera were reported from four of the five Great Lakes. These parasites by major taxonomic group, fish species infected, and lake where the parasite species was not reported (in parentheses) were protozoans—*Ichthyophthirius multifiliis* (several fish species, Lake Michigan), *Henneguya doori* (*Perca flavescens*, Lake Superior), *H. exilis* (ictalurids, Lake Superior), *Myxobolus bartai* (*Notropis hudsonius*, Lake Superior), *M. bibullatum* (cyprinids and catostomids, Lake Superior); digenetic trematodes—*Acetodextra amiuri* (ictalurids, Lake Superior), *Azygia angusticauda* (several species, Lake Superior), *Crepidostomum cornutum* (several species, Lake Michigan), *C. isostomum* (*Percopsis omiscomaycus*, *Etheostoma nigrum*, *Percina caprodes*, Lake Michigan), *Crepidostomum lintoni* (*Acipenser fulvescens*, Lake Michigan), *Phyllodistomum superbum* (several species, Lake Ontario), *Proterometra macrostoma* (centrarchids, Lake Michigan), *Sanguinicola occidentalis*

(*Sander vitreus*, *Perca flavescens*, *Aplodinotus grunniens*, Lake Michigan), *Apophallus brevis* (several species, Lake Michigan), *Crassiphiala bulboglossa* (several species, Lake Michigan), *Posthodiplostomum minimum* (several species, Lake Michigan), *Tylodelphys scheuringi* (several species, Lake Michigan), *Uvulifer ambloplitis* (several species, Lake Michigan); monogeneans—*Acolpenteron catostomi* (catostomids, Lake Michigan), *Anonchohaptor anomalus* (catostomids, Lake Michigan), *Diclybothrium armatum* (*A. fulvescens*, Lake Michigan), *Lyrodiscus rupestris* (primarily *Ambloplites rupestris*, Lake Michigan), *Octomacrum lanceatum* (catostomids, Lake Michigan), *Pseudomurraytrema copulatum* (catostomids, Lake Michigan), *Tetracleidus banghami* (*Micropterus dolomieu*, Lake Michigan), *Tetraonchus monenteron* (*Esox lucius*, Lake Michigan), *Urocleidus aculeatus* (*Sander* spp., Lake Michigan); cestodes—*Corallobothrium fimbriatum* (ictalurids, Lake Michigan), *Cyathocephalus truncatus* (several species, Lake Erie), *Eubothrium salvelini* (coregonids and salmonids, Lake Erie), *Diphyllobothrium laruei* (*Coregonus* spp., Lake Michigan), *Ligula intestinalis* (several species, Lake Michigan); nematodes—*Capillaria salvelini* (coregonids and salmonids, Lake Erie), *Cystidicola farionis* (coregonids, salmonids, and *Osmerus mordax*, Lake Erie), *Cystidicola stigmatura* (coregonids, salmonids, and *Osmerus mordax*, Lake Ontario), *Cystidicoloides ephemeridarum* (coregonids and salmonids, Lake Michigan), *Hysterothylacium brachyurum* (several species, Lake Michigan), *Philometroides nodulosa* (primarily catostomids, Lake Michigan), *Spinitectus carolini* (several species, Lake Michigan), *Eustrongylides tubifex* (several species, Lake Superior), *Spiroxys* sp. (several species, Lake Michigan); acanthocephalans—*Neoechinorhynchus cristatus* (catostomids, Lake Michigan), *N. rutili* (several species, Lake Michigan), *N. tenellus* (several species, Lake Michigan); leeches—*Actinobdella inequiannulata* (catostomids, Lake Michigan), *Myzobdella lugubris* (several species, Lake Michigan), *Piscicola punctata* (several species, Lake Ontario); and copepods—*Ergasilus centrarchidarum* (centrarchids and *Sander* spp., Lake Huron), *Salmincola extumescens* (coregonids, Lake Erie). Of these 49 parasite species, 33 species (67%) have not been reported in fish from Lake Michigan possibly due to the lack of studies, including extensive surveys on the parasites of fish from this lake.

Fish-Transmitted Parasites of Public Health Importance

***Diphyllobothrium latum* Life Cycle and Human Infection**

Of the larval cestodes found in fish in the Great Lakes area with human health implications, the genus *Diphyllobothrium* deserves comments. Its life cycle involves copepods that serve as first intermediate hosts when they ingest the coracidium stage (free-swimming stage) in the water that emerges when the egg hatches. The larval parasite moves through the intestinal wall of the copepod to the hemocoel and develops into a stage called a proceroid. The infected copepod is then ingested by a large fish that then serves as a second intermediate host (which is probably not common) that includes several species of freshwater fishes, including fish from the genera *Esox*, *Perca*, *Sander*, and *Lota*, along with fish in the Salmonidae. When a fish eats an infected copepod, the proceroid is released and moves through the intestinal wall and into the viscera or body muscle and develops into a plerocercoid stage. Large fish also become infected by eating a smaller fish that is infected with the plerocercoid stage when it eats an infected copepod. Mature plerocercoids in fish vary in length (a few millimeters to several centimeters). Plerocercoids are

commonly found unencysted and coiled up in the musculature and encysted in the viscera. Endotherms (birds and mammals, including humans) become infected by eating raw or poorly cooked fish infected with plerocercoids. Cestodes then mature in the small intestine of the endotherm, undergo sexual reproduction, and produce eggs that are released with the feces into the aquatic environment. Plerocercoids can be seen as “white masses” in uncooked fish but when the flesh is cooked, some worms may not be noticed. Thorough cooking of the flesh kills the plerocercoids.

In the Great Lakes area, there are at least four species of *Diphyllobothrium* (*D. ditremum* from Lakes Superior, Huron, and Ontario; *D. laruei* from Lakes Superior, Huron, Erie, and Ontario; *D. latum* from Lake Superior; and *D. oblongatum* from Lakes Michigan and Superior) that have been identified infecting a variety of fishes in several families as plerocercoids. These species use the following animals as definitive hosts (in parentheses): *D. ditremum* (piscivorous birds), *D. laruei* (cats, dogs), *D. latum* (dogs, bears, humans), and *D. oblongatum* (gulls, terns). There are also many reports of unidentified plerocercoids of *Diphyllobothrium* infecting several species of salmonids. Species of *Diphyllobothrium* in the plerocercoid stage that infect fish are difficult to identify to species. Furthermore, a few researchers believe that *D. latum* plerocercoids occur only in the genera *Esox*, *Sander* and *Lota*.

Adams and Rausch (1997) listed 13 species of *Diphyllobothrium* that are infective to humans. Of these species, *Diphyllobothrium latum* is probably the only species in the Great Lakes that could infect humans, and all reports of human infections have been associated with Lake Superior and associated inland waters. The first report of *D. latum* infecting humans in this area is that of Nickerson (1906) who reported it from a child. Vergeer (1928) reported that *D. latum* was present in fish in the inland waters of the Keweenaw Peninsula of Michigan’s Upper Peninsula and nearby parts of Lake Superior. This information served as the basis for indicating that northern Michigan and the lake region of Michigan is an endemic area for *D. latum* mentioned in several older medical parasitology textbooks as well as in a nontechnical magazine (Porter 1978). Peters et al. (1978) specifically examined 62 *Esox lucius*, 35 *Sander canadense*, and 3 *Sander vitreus* from the same collection area of Vergeer (1928), as well as 38 *Lota lota* from the Portage waterway in Michigan’s Upper Peninsula and from the Otter River near Elo, Michigan for *Diphyllobothrium latum*. All fish examined by Peters et al. (1978) were negative for *D. latum*. Peters et al. (1978) reported that the most-recent record of human diphyllobothriasis diagnosed at the Houghton, MI laboratory of the Michigan Department of Health was in 1954. Peters et al. (1978) concluded “...the decline and probable disappearance of *D. latum* from this area is most likely due to culinary changes, resulting in few, if any, pike or other vector fish being eaten without thorough cooking.” We concur with the conclusion of Peters et al. (1978) and believe that, if *D. latum* is present in the Lake Superior area, it is very infrequent. Furthermore, Rogers (1975) did not find *D. latum* in a parasite survey of black bears (*Ursus americanus*) that included upper Michigan.

***Eustrongylides* and Human Infection**

Eustrongylides tubifex is a common larval parasite of several fish species in a variety of fish families from Lakes Huron, Erie, and Ontario. It is infrequent in Lake Michigan fish and has not been reported from fish in Lake Superior. Tubificid oligochaetes serve as intermediate hosts for *E. tubifex* (see Karmanova 1965; Measures 1988a, b). Its low numbers in Lake Michigan and its absence in Lake Superior may be due to low numbers or absence of its tubificid intermediate host.

In the life cycle of *Eustrongylides tubifex* and *Eustrongylides* sp., adult worms occur in the esophagus and proventriculus of piscivorous birds. After mating, the female produces eggs that are passed in the water with the bird's feces. Nematode larvae develop in aquatic tubificid oligochaetes (e.g. *Lumbriculus*, *Limnodrilus*, *Tubifex*). Several fish species and amphibians become infected by eating these infected oligochaetes. In fish, the large, red larvae may be encapsulated or free in the body cavity and other areas. Humans become infected by eating raw or poorly cooked infected fish and by the swallowing of infected live bait minnows (Gunby 1982; Eberhard et al. 1989). To date, we are not aware of any humans infected with *E. tubifex* by eating infected fish from the Great Lakes, but it is possible. Humans infected with *E. tubifex* or *Eustrongylides* sp. is called Eustrongylidiasis, which is reviewed by Eberhard (1997). In addition, if the fish infected with *Eustrongylides tubifex*, commonly *Perca flavescens*, is not cleaned quickly upon capture, the red larvae may move out of their capsules and be found free in the body cavity or in the flesh. The person cleaning the infected fish may find them unfit for food.

***Dioctophyma* and Human Infection**

One larval nematode in Lake Erie that may affect the health of humans is *Dioctophyma* sp. It has been reported from only one fish species, *Micropterus salmoides*, from Lake Erie by Bangham and Hunter (1939). It is not known if the identification of *Dioctophyma* sp. by Bangham and Hunter (1939) was correct since they did not report finding *Eustrongylides tubifex* in their survey of fish. Other investigators, examining fish after Bangham and Hunter (1939), reported *E. tubifex* to be a common parasite in Lake Erie fish. Eberhard (1997) reported that between 15 and 20 infections of *Dioctophyma renale* in humans have occurred and "that these patients most likely became infected by eating raw or poorly cooked fish or frog meat..." The normal definitive hosts are mink, and there are also reports of infected raccoons and skunks. The adult worms occur in the kidney. Gutierrez et al. (1989) reported a woman from Ohio was infected with a nematode larva undistinguishable from *D. renale*, and suggested that ingestion of infected raw fish was the probable source. Although we are not aware of any humans infected with *D. renale* by eating infected fish from the Great Lakes, the public should be aware of these possible infections by eating raw infected fish or amphibians or by swallowing infected live bait minnows. Infections of humans with *D. renale* are called Dioctophymiasis and, for a review, see Eberhard (1997).

Exotic Parasite Species

Mills et al. (1993) listed three exotic parasite species (the myxozoan, *Myxobolus cerebralis*; the microsporidian, *Glugea hertwigi*; and the copepod, *Argulus japonicus*) that have been introduced into the Great Lakes. However, since then, seven additional species have been reported (Cone et al. 1994; Pronin et al. 1997, 1998; Hudson and Bowen 2002; Marcogliese 2008). Exotic parasite species by body of water, taxonomic group, and study are: Lake Michigan—none, Lake Superior—the mastigophoran *Trypanosoma acerinae* infecting *Gymnocephalus cernuus* (see Pronin et al. 1998), the larval digenetic trematode *Neascus brevicaudatus* infecting *Gymnocephalus cernuus* (see Pronin et al. 1997), the monogeneans *Dactylogyrus amphibothrium* infecting *Gymnocephalus cernuus* (see Cone et al. 1994; Pronin et al. 1998), and *Dactylogyrus hemiamphibothrium* infecting *Gymnocephalus cernuus* (see Pronin et al. 1998); St. Marys River—none, Lake Huron—the copepod *Argulus japonicus* infecting *Perca flavescens*, the copepod *Neoergasilus japonicus* infecting several fish species (Hudson and Bowen 2002); St. Clair River and Lake St. Clair—the myxozoan *Sphaeromyxa sevastopoli* infecting *Apollonia melanostoma* (see Pronin et al. 1997); the larval cestode *Scolex pleuronectis* infecting *Apollonia melanostoma* (see Pronin et al. 1997); Detroit River—the cestode *Bothriocephalus acheilognathi* infecting *Pimephales notatus* (see Marcogliese 2008); Lake Erie— *Glugea hertwigi* infecting *Osmerus mordax* reported by several authors; and Lake Ontario— *Glugea hertwigi* infecting *Osmerus mordax* in three studies. Routes of invasion of non-endemic parasite species and their fish hosts into the Great Lakes are attributed mainly to ballast-water releases by foreign commercial vessels, and the effect of these parasite species on Great Lakes fish communities should be cause for concern (Krueger and May 1991; Mills et al. 1993; Ricciardi and MacIsaac 2000).

Voucher specimens of some of these exotic parasite species mentioned above were not placed in a depository, so the presence of these species cannot be verified by examining specimens. Furthermore, drawings (diagrams) and/or diagnostic characteristics of these exotic species were not included in the published articles. It is emphasized that, when exotic parasite species have been identified in fish from the Great Lakes, journals publishing articles of this nature must ensure that investigators deposit voucher specimens of all exotic species and other parasite species in depositories, such as the United States National Parasite Collection, Building 1180, 10300 Baltimore Blvd., Beltsville, MD 20705-2359. This specimen deposit is critical to the future analysis of these data and to ensure quality control of the identification process.

Major Parasite Groups Occurring in Fish in the Great Lakes

There was little variation in the percentage occurrence of the major parasite groups in fish among the Great Lakes (Table 2). The protozoans (mastigophorans, ciliophorans, myxozoans, microsporans) varied from 10% in Lake Ontario to 27% in Lake Michigan. The myxozoans were the most-common protozoan group infecting fish from each lake. The percentage of digenetic trematodes ranged from 18% in Lake Michigan to 25% in Lake Erie. If information on monogeneans from Lake Michigan is excluded since only two species have been reported, the percentage occurrence of this group varied from 18% in Lake Superior to 35% in Lake Ontario.

The percentages of cestodes varied from 12% in Lakes Huron, Erie, and Ontario to 17% in Lake Michigan. The percentages of nematodes ranged from 9% in Lake Ontario to 14% in Lakes Michigan and Superior. The percentages of acanthocephalans varied from 6% in Lakes Erie and Ontario to 9% in Lakes Michigan and Superior. Leeches varied from 1% in Lake Huron to 5% in Lake Michigan. Copepods varied from 4% in Lake Ontario to 8% in Lake Michigan. Mollusc species made up 1% or less of all the parasite groups in each lake.

The percentage occurrence of the major parasite groups in the five major fish families (Cyprinidae, Catostomidae, Centrarchidae, Percidae, Salmonidae) varied among the lakes (Tables 6, 10, 16, 22, 28). For the cyprinids, the digenetic trematodes were the dominant group in Lakes Superior and Erie, and the monogeneans were the dominant group in Lakes Huron and Ontario. Protozoans, specifically the myxozoans, were most-common group in Lake Michigan cyprinids. In the catostomids, the acanthocephalans dominated in Lake Michigan, the digenetic trematodes were most common in Lakes Superior (tied with cestodes) and Huron, and the monogeneans were most common in Lakes Erie and Ontario. The digenetic trematodes were the dominant parasites in the centrarchids in Lakes Michigan, Superior, Huron (tied with monogeneans), and Erie (tied with monogeneans), and were the second most-common group following the monogeneans in Lake Ontario. For the percids, digenetic trematodes were the most common group in Lakes Michigan (tied with the nematodes) Superior, Huron, Erie, and Ontario. Cestodes were the dominant group in salmonids from Lakes Superior, Erie, and Ontario. Copepods were most numerous in salmonids in Lake Michigan followed by cestodes and nematodes, and nematodes were most common from Lake Huron followed by cestodes, acanthocephalans, and copepods.

Rearranging the above parasite group information by lake, digenetic trematodes were the most-common group of parasites infecting centrarchids and percids in all the lakes, except they ranked second to monogeneans for the centrarchids in Lake Ontario. This information indicates that the centrarchids and percids more often than the other fish families use shallower and warmer habitats during warm-weather periods where and when the mollusc snail intermediate hosts are present. Furthermore, the digenetic trematodes or monogeneans were the most-common parasite groups in Lake Huron and in the cyprinids and catostomids from Lakes Erie and Ontario.

Fish in each of the five families from each Great Lake were characterized by their temperature preferences. A general trend is that warm- and cool-water fish have more digenetic trematodes and monogeneans than the cold-water fish. Also, digenetic trematodes are the most-common parasite group in centrarchids and percids in most of the Great Lakes, which indicates that fish in these families share similar habitats in the lakes where they are exposed to digenetic trematodes as well as with the mollusc intermediate hosts used by the digenetic trematodes.

Digenetic trematodes or monogeneans were never the most-common parasite group in salmonids because salmonids are cold-water species in all the lakes. The salmonid parasite community is instead dominated by cestodes, nematodes, or acanthocephalans. This infrequency of digenetic trematodes and monogeneans is due to the occurrence of salmonids in deep, cold-water habitat during warm-weather periods where mollusc intermediate hosts for digenetic trematode are absent or infrequent, and this habitat is not conducive for the occurrence of many monogeneans

that have direct life cycles. Cestodes infecting salmonids use copepods as intermediate hosts, and these copepods are common in the cold-water habitat. Acanthocephalans use isopods, amphipods, ostracods, and maybe copepods as intermediate hosts. Most of the nematode species have indirect life cycles using a variety of intermediate and paratenic hosts (invertebrates and vertebrates) that salmonids feed on, thereby becoming infected with these parasites. Many of these parasite species may use paratenic hosts. A paratenic host (also called a transport host) is an animal that the parasite occurs in but does not undergo any development that is necessary for it to infect the next organism in its life cycle. Furthermore, the parasite does not mature in the paratenic host. A paratenic host can be considered a “bridge” from the intermediate host to the definitive host. The number of fish-parasite species in the Great Lakes that utilize paratenic hosts is unknown, but this means of transmission is believed to be common.

The number of monogenean parasite species reported for the Great Lakes fish were: Lake Michigan (2), Lake Superior (26), Lake Huron (69), Lake Erie (55), Lake Ontario (79). The number of monogenean species increases as one moves downstream in the Great Lakes basin. However, the small number and nature of studies performed on Lake Michigan fish could play a role in this small number of monogenean species. Extensive surveys on the monogenean species have been done in the other Great Lakes but not Lake Michigan.

One aspidobothrean species, *Cotylogaster occidentalis*, was reported from the large intestine of one fish species, *Aplodinotus grunniens*, collected in 1961-1975 from Lakes Erie and Ontario. Freshwater mussels are the normal hosts of *C. occidentalis* where it matures and undergoes egg production. It also has been reported from turtles and *A. grunniens* that are believed to be infected when they eat infected mussels. The infrequency of *C. occidentalis* in Lake Erie and Lake Ontario fishes and its absence in the other lakes can be explained by the fact that *C. occidentalis* normally infects mussels and only a few fish such as *A. grunniens* prey on mussels, and that *A. grunniens* was not examined from Lakes Superior and Huron. Also, the infrequency or absence of the mussel host in these lakes probably plays a role in the infrequency or absence of *C. occidentalis* in the Great Lakes. *Aplodinotus grunniens* was only examined in one study (Pearse 1924a) in Lake Michigan and *C. occidentalis* was not reported.

It is not known whether this lack of or infrequent reports of glochidia (larval stages of freshwater mussels) on Great Lakes fishes is due to a low number of unionid mussel species or to the low number of parasite species in the Great Lakes. Furthermore, some species of glochidia are host-specific and it is possible that these fish species have not been examined for parasites.

Parasite Host Specificity

Host specificity plays a key role in the presence of parasite species in animals. The occurrence of a parasite species in an environment is made in association with the host species necessary for the completion and continuation of its life cycle. Specificity exists not only for the parasite to its host but also for the fish host to its environment. A parasite is dependent on the range of hosts in which it can occur and reproduce. The complexity of the life cycle of a parasite, the number of intermediate hosts required, and the specificity of the parasite at each stage of development will

affect its distribution. If the appropriate intermediate and/or fish hosts are absent, the parasite will be too.

The parasite community of a fish species is composed of the: 1) parasites specific to that species, or more commonly, a higher phylogenetic grouping of fish; 2) parasites whose specificity is determined by an intermediate stage in their life cycle; and 3) parasites that exhibit little host specificity. Fish are not only infected by parasites specific to them, but also by species secondarily acquired from prey. These latter parasite species will vary according to the environment inhabited by the specific fish species and the other fish species present.

Based on the occurrence of parasite species in fish in the Great Lakes, many parasite species show strict host specificity to a single host species (e.g., many protozoan species and most monogenean species), some species show host specificity to a fish family (e.g., *Thelohanellus notatus*, *Phyllodistomum staffordi*, *Lissorchis attenuatus*, *Glaridacris catostomi*, *Octospinifer macilentus*), while other parasite species show no host specificity infecting several fish species in different fish families (e.g., *Crepidostomum cooperi*, *Camallanus oxycephalus*, *Acanthocephalus dirus*, *Echinorhynchus salmonis*). Other examples of parasite species in each of these specificity groupings can be found in the tables for each of the Great Lakes.

Jaccard Coefficients of Similarity for Parasite Communities Among the Five Great Lakes

Jaccard coefficients of similarity for the parasite communities among the five major fish families (Centrarchidae, Cyprinidae, Catostomidae, Percidae, and Salmonidae) in each Great Lake were low, indicating that fish in these families do not share many parasite species, and as well, parasite communities in each family were not similar among the five Great Lakes (Tables 30-34). The centrarchids in Lake Michigan do not share many parasite species with centrarchids in the other Great Lakes, with the lowest coefficient involving Michigan and Superior (0.0689) (Table 30). The highest value involved centrarchids from Huron and Erie (0.4347), followed by Huron and Ontario (0.4090). Cyprinids in Lake Michigan share the smallest number of parasite species with cyprinids from the other lakes (Table 31). The lowest value (0.0588) involved cyprinids from Michigan and Erie. Parasite coefficients ranged from 0.1466 to 0.2941 involving cyprinids from Superior, Huron, Erie, and Ontario. For catostomids, the highest coefficients were between Superior and Ontario (0.4250) and between Erie and Ontario (0.4210) (Table 32). Overall, the parasite communities of percids in the Great Lakes were the most similar, with the highest coefficients between Lakes Huron and Ontario (0.5000) and between Lakes Huron and Erie (0.4938) and the lowest coefficient between Michigan and Erie (0.2714) (Table 33). The salmonids in Lake Superior shared the largest number of parasite species with salmonids in Lake Huron (0.4761), followed by salmonids in Superior and Ontario (0.3000) (Table 34). Parasite faunas of salmonids in Erie and Michigan are most dissimilar with a value of 0.1250. Lakes Michigan and Erie are very different in their physical habitat; however, the habitat used by salmonids in these lakes may not be so different.

Table 30. Jaccard coefficients of parasite-community similarity for fishes in the family Centrarchidae from Lakes Michigan, Superior, Huron, Erie, and Ontario, 1871-2010.

| Lake | Michigan | Superior | Huron | Erie |
|-------------|-----------------|-----------------|--------------|-------------|
| Michigan | 1.0000 | 0.0689 | 0.0806 | 0.1038 |
| Superior | 0.0689 | 1.0000 | 0.3000 | 0.2151 |
| Huron | 0.0806 | 0.3000 | 1.0000 | 0.4347 |
| Erie | 0.1038 | 0.2151 | 0.4347 | 1.0000 |
| Ontario | 0.0694 | 0.2571 | 0.4090 | 0.3523 |

Table 31. Jaccard coefficients of parasite-community similarity for fish in the family Cyprinidae from Lakes Michigan, Superior, Huron, Erie, and Ontario, 1871-2010.

| Lake | Michigan | Superior | Huron | Erie |
|-------------|-----------------|-----------------|--------------|-------------|
| Michigan | 1.0000 | 0.0967 | 0.0724 | 0.0588 |
| Superior | 0.0967 | 1.0000 | 0.2941 | 0.2142 |
| Huron | 0.0724 | 0.2941 | 1.0000 | 0.2705 |
| Erie | 0.0588 | 0.2142 | 0.2705 | 1.0000 |
| Ontario | 0.0833 | 0.2452 | 0.2619 | 0.1466 |

Table 32. Jaccard coefficients of parasite-community similarity for fish in the family Catostomidae from Lakes Michigan, Superior, Huron, Erie, and Ontario, 1871-2010.

| Lake | Michigan | Superior | Huron | Erie |
|-------------|-----------------|-----------------|--------------|-------------|
| Michigan | 1.0000 | 0.2500 | 0.1875 | 0.1311 |
| Superior | 0.2500 | 1.0000 | 0.3846 | 0.2727 |
| Huron | 0.1875 | 0.3846 | 1.0000 | 0.3913 |
| Erie | 0.1311 | 0.2727 | 0.3913 | 1.0000 |
| Ontario | 0.2000 | 0.4250 | 0.3800 | 0.4210 |

Table 33. Jaccard coefficients of parasite-community similarity for fish in the family Percidae from Lakes Michigan, Superior, Huron, Erie, and Ontario, 1871-2010.

| Lake | Michigan | Superior | Huron | Erie |
|----------|----------|----------|--------|--------|
| Michigan | 1.0000 | 0.3061 | 0.3731 | 0.2714 |
| Superior | 0.3061 | 1.0000 | 0.3150 | 0.3285 |
| Huron | 0.3731 | 0.3150 | 1.0000 | 0.4938 |
| Erie | 0.2714 | 0.3285 | 0.4938 | 1.0000 |
| Ontario | 0.3281 | 0.3088 | 0.5000 | 0.4250 |

Table 34. Jaccard coefficients of parasite-community similarity for fish in the family Salmonidae from Lakes Michigan, Superior, Huron, Erie, and Ontario, 1871-2010.

| Lake | Michigan | Superior | Huron | Erie |
|----------|----------|----------|--------|--------|
| Michigan | 1.0000 | 0.2777 | 0.2857 | 0.1250 |
| Superior | 0.2777 | 1.0000 | 0.4761 | 0.1400 |
| Huron | 0.2857 | 0.4761 | 1.0000 | 0.1538 |
| Erie | 0.1250 | 0.1400 | 0.1538 | 1.0000 |
| Ontario | 0.2222 | 0.3000 | 0.1525 | 0.1428 |

Parasite Species-Richness, Autogenic-Allogenic Helminth Species, and Jaccard Coefficients of Parasite-Community Similarity for Specific Fish Species

Parasite species-richness, percentages of autogenic-allogenic helminth species, and Jaccard coefficients for the parasite communities were used to describe and compare the parasite and helminth faunas of specific fish species. For each of the five major fish families previously discussed and Osmeridae, one or two fish species (Centrarchidae—*Ambloplites rupestris*, Cyprinidae—*Notropis hudsonius*, Catostomidae—*Catostomus commersonii*, Percidae—*Perca flavescens*, Salmonidae—*Coregonus clupeaformis*, *Salvelinus namaycush*, Osmeridae—*Osmerus mordax*) were chosen based on the number of studies performed and available data from each Great Lake. These baseline data on parasite species-richness as well as on the occurrence and percentages of autogenic and allogenic helminth species and the other parasite groups in these specific fish species in this synopsis are important because data generated in future studies can be compared to them. Temporal difference in these data may indicate that one or more abiotic or biotic characteristics playing a role in the occurrence of parasites in fishes are changing in one or more of these lakes.

Ambloplites rupestris harbored as few as 5 helminth species in Lake Michigan to as many as 27 species in Lake Huron. The percentage of autogenic species was higher than that of allogenic species in all lakes and ranged from 60% in Lake Superior to 80% in Lake Michigan. The dominant autogenic helminth groups were the digenetic trematodes in Lakes Michigan and Huron, the nematodes in Lakes Erie and Ontario, and the acanthocephalans in Lake Superior. *Ambloplites rupestris* from Lake Erie had the highest percentage of allogenic species (24%). The number of parasite species shared by *A. rupestris* (and Jaccard coefficients) in two lake comparisons varied dramatically from 0 (0.0000) for Lakes Michigan and Superior to 21 (0.4285) for Lakes Huron and Ontario.

The number of helminth species infecting *Notropis hudsonius* ranged from 3 species in Lake Michigan to 20 species in Lake Huron. The percentage of autogenic helminth species was higher than the allogenic species in Lake Michigan (100%), Lake Huron (72%), and Lake Erie (67%), the converse was true for the allogenic species in Lake Ontario (55%), and autogenic and allogenic species were equally abundant (50%) in Lake Superior. Overall, the dominant helminth group of the autogenic component was the digenetic trematodes; acanthocephalans were equally abundant in Lake Superior; and cestodes, nematodes, and acanthocephalans were equally abundant in Lake Ontario. The number of parasite species shared by *N. hudsonius* (and Jaccard coefficients) in two lake comparisons ranged from 3 (0.1200) for Lakes Michigan and Superior to 14 (0.4118) for Lakes Huron and Erie.

Catostomus commersonii harbored as few as 12 helminth species in Lake Michigan to as many as 22 in Lake Huron. In all lakes, the autogenic component was the dominant component varying from 67% in Lake Erie to 100% in Lake Michigan. The highest allogenic helminth species component (33%) was in Lake Erie. The acanthocephalans were the dominant helminth group of the autogenic component in each lake. The number of parasite species shared by *C. commersonii* in two lake comparisons ranged from 6 for Lakes Michigan and Ontario to 21 for both the Lakes Huron and Erie and Lakes Erie and Ontario comparisons. The concurrent Jaccard coefficients for the parasite-community similarity for these two lake comparisons were 0.1795, 0.4667, and 0.6176, respectively. This last coefficient (0.6176) for *C. commersonii* was the highest for the specific fish species compared.

The number of helminth species in *Perca flavescens* ranged from 12 in Lake Superior to 36 in Lake Huron. The autogenic component was higher than the allogenic component in *P. flavescens* from all the lakes and ranged from 62% in Lake Ontario to 80% in Lake Michigan. Of the autogenic helminth component, the digenetic trematodes dominated in Lakes Huron and Erie and the nematodes dominated in Lakes Michigan, Superior, and Ontario. The number of parasite species shared by *P. flavescens* in two lake comparisons (and Jaccard coefficients) ranged from 7 (0.1795) for Lakes Michigan and Superior to 27 (0.4821) for Lakes Huron and Ontario.

Coregonus clupeaformis were found to have as few as 4 helminth species in Lake Michigan to as many as 22 species in Lake Huron. The autogenic helminth component was dominant, ranging from 75% in Lake Erie to 100% in Lake Michigan. The autogenic helminth component makeup varied among the lakes with the cestodes dominating in Lakes Michigan and Ontario, cestodes

and nematodes were equally abundant in Lake Superior, cestodes and acanthocephalans were equally abundant in Lake Erie, and the nematodes were dominate in Lake Huron. The number of parasite species shared by *C. clupeaformis* in two lake comparisons ranged from 2 for Lakes Michigan and Erie to 13 for Lakes Huron and Ontario. Jaccard coefficients were 0.1428 for Lakes Michigan and Erie, 0.1379 for Lakes Huron and Erie, and 0.5000 for Lakes Superior and Ontario and for Lakes Huron and Ontario.

The number of helminth species in *Salvelinus namaycush* ranged from 2 in Lake Erie to 14 species in Lake Superior. The autogenic component dominated in all the lakes and ranged from 67% in Lake Ontario to 100% in Lakes Michigan and Erie. The acanthocephalans were the dominant helminth group in Lakes Michigan and Huron, acanthocephalans and cestodes were equally abundant in Lake Ontario, and the cestodes dominated in Lake Superior. The number of parasite species shared by *S. namaycush* in two lake comparisons (and Jaccard coefficients) ranged from 0 (0.0000) for Lakes Michigan and Erie and Lakes Erie and Ontario to 5 (0.2173) for Lakes Superior and Huron.

The number of helminth species in *Osmerus mordax* ranged from 5 in Lake Michigan to 15 in Lake Huron. The autogenic component dominated in four lakes, ranging from 70% in Lake Erie to 89% in Lake Superior, and was 50% in Lake Ontario. The acanthocephalans were the dominant helminth group (adult digeneans were not found) of the autogenic component in Lakes Michigan, Superior, Erie, and Ontario, and the nematodes were most common in Lake Huron. The number of parasite species shared by *O. mordax* in two lake comparisons were 3 for Lakes Michigan and Erie, Lakes Michigan and Ontario, and Lakes Superior and Erie, and 6 for Lakes Huron and Erie. The corresponding Jaccard coefficients were 0.2307, 0.3750, 0.1764, and 0.5000, respectively.

The variability in the helminth species-richness values in these specific fish species is dramatic, ranging from 2 in *Salvelinus namaycush* in Lake Erie to 36 in *Perca flavescens* in Lake Huron. Helminth species-richness for *Ambloplites rupestris*, *Notropis hudsonius*, *Catostomus commersonii*, *Coregonus clupeaformis*, and *Osmerus mordax* was lowest in Lake Michigan and highest in Lake Huron. The low species-richness in Lake Michigan is believed due to a lack of an extensive parasite survey as has been done in the other Great Lakes as well as fewer studies having been performed in this lake. Only 41 parasite studies have been done in Lake Michigan compared to 60 studies in Lake Huron. A possible reason why more parasite studies have been done in Lakes Superior, Huron, Erie, and Ontario is that researchers from both Canada and the United States share research and management of these waters, which is not the case for Lake Michigan.

The low Jaccard coefficients of *Ambloplites rupestris*, *Notropis hudsonius*, *Catostomus commersonii*, *Perca flavescens*, *Coregonus clupeaformis*, *Salvelinus namaycush*, and *Osmerus mordax* indicate that there is a low degree of similarity of the parasite communities among the lakes for each of these fish species. These low coefficients and the low number of shared helminth species among the lakes support the findings of Esch et al. (1988) for locations in the British Isles—that helminth communities in the same fish species show a low degree of similarity

in composition and numbers between locations and appear to be stochastic in nature. This variability in helminth (parasite) species-richness and low Jaccard coefficients for parasite-community similarity for these same fish species provides more evidence that the parasite faunas are different among the Great Lakes.

Comparisons of Jaccard coefficients were made for each fish species between lakes and its family between lakes to determine if differences existed in them in the lake pairs examined. The highest Jaccard coefficients for the parasite communities for each specific fish species and for the fish families each fish species is in among the lakes (first and second coefficients), and lowest coefficients for each specific fish species and for the fish families each species is in (third and fourth coefficients) (in parentheses) were: *Ambloplites rupestris* (0.4285, Lakes Huron and Ontario; 0.4347, Lakes Huron and Erie; and 0.0000, Lakes Michigan and Superior; 0.0689, Lakes Michigan and Superior); *Notropis hudsonius* (0.4138, Lakes Superior and Erie; 0.2941, Lakes Superior and Huron; and 0.1200, Lakes Michigan and Superior; 0.0588, Lakes Michigan and Erie); *Catostomus commersonii* (0.6176, Lakes Erie and Ontario; 0.4250, Lakes Superior and Ontario; and 0.1795, Lakes Michigan and Erie; 0.1311, Lakes Michigan and Erie); *Perca flavescens* (0.4821, Lakes Huron and Ontario; 0.5000, Lakes Huron and Ontario; and 0.1795, Lakes Michigan and Superior; 0.2714, Lakes Michigan and Erie); *Coregonus clupeaformis* (0.5000, Lakes Superior and Ontario; 0.4776, Lakes Superior and Huron; and 0.1379, Lakes Huron and Erie; 0.1250, Lakes Michigan and Erie); *Salvelinus namaycush* (0.2173, Lakes Superior and Huron; 0.4761, Lakes Superior and Huron; and 0.0000, Lakes Erie and Ontario; 0.1250, Lakes Michigan and Erie); *Osmerus mordax* (0.3750, Lakes Michigan and Ontario; 0.3750, Lakes Michigan and Ontario; and 0.1764, Lakes Superior and Erie; 0.1764, Lakes Superior and Erie). These coefficients indicate that: 1) the highest coefficients for a fish species and its family may not involve the same two lakes, demonstrating different coefficients may be obtained when one fish species or fish family is being compared; 2) there is variation between lakes in that a fish species may share very few species, or it may share a number of parasite species between lakes; and 3) variation in these coefficients indicates that some parasite species are host-specific or not host-specific to a certain fish species or fish family.

Each fish species occupies similar habitats in the different Great Lakes, and are therefore believed to be exposed to similar parasites and their intermediate and paratenic hosts. Also, fish in the Cyprinidae, Catostomidae, Centrarchidae, Percidae, and Salmonidae in the Great Lakes are similar to one another when the percentages of major parasite taxonomic groups are compared among lakes, but the specific parasite species making up each major parasite taxonomic group infecting fish are not that similar among the lakes. This finding indicates the factors involved in the occurrence of parasite species in the same fish species are different from Great Lake to Great Lake. Therefore, the Jaccard coefficients of parasite-community similarity are low among the lakes. Many protozoan and most monogenean species with their fish-host specificity are not shared by fish species or fish families, so these parasite groups play a major role in these low Jaccard coefficients.

Our analysis of the information and data from this synthesis of parasite studies conducted during 1871-2010 indicates that there is a close association between parasites and their specific fish hosts or fish families within each Great Lake but not among the lakes. Only 32 parasite species occurred in all the Great Lakes, and 49 parasite species infected fish from four of the five Great Lakes. Furthermore, each Great Lake with its fish examined in the Centrarchidae, Cyprinidae, Catostomidae, Percidae, and Salmonidae and their associated parasites “somewhat stand alone” and are different from each other. In other words, the same fish species among the lakes do not share many parasite species.

Lakes, Fish Faunas, and Parasite Communities

One approach to characterize the parasites of fish is to describe the helminth communities based on the aquatic environment the fish occur in. Wisniewski (1958) suggested that the abiotic and biotic characteristics of the body of water influence and determine the parasite fauna of fish, and Dogiel (1962) proposed that the parasites found in fish are related to the food eaten. Esch (1971) further developed these ideas by suggesting that the ecological succession of the aquatic environment and the trophic level occupied by fish species are important in determining the composition of their parasites. He proposed that as lentic environments undergo succession from oligotrophy to mesotrophy to eutrophy the parasites of fish also change through time. He collected data on only the helminth parasite species of centrarchids from oligotrophic Gull Lake and eutrophic Wintergreen and Duck Lakes in Michigan. He reported that fish from the oligotrophic system harbored a larger number of adult helminth species that complete their life cycle in fish (autogenic species) and a smaller number of larval helminths, whereas fish in the eutrophic lakes had a proportionately larger number of larval helminths which complete their life cycles in piscivorous birds and mammals (allogenic species).

That autogenic helminths predominate in oligotrophic lakes and allogenic helminths predominate in eutrophic lakes is based on a premise, accepted by some aquatic parasitologists, that cold-water lakes (oligotrophic systems) are relatively closed to the surrounding environment requiring that most parasites obtain maturity in fish. On the other hand, fish in warm-water lakes (eutrophic systems), where it has been suggested there is more aquatic-terrestrial or peripheral interaction among organisms, will have more parasite species that mature in piscivorous birds and mammals associated with the lake. If this is true, fish in cold-water lakes will have more autogenic helminth species than allogenic species and vice versa in warm-water lakes.

In North America, cold-water lakes usually have a dominant salmonid fish fauna, whereas warm-water lakes normally have a dominant centrarchid fish fauna. An intermediate lake type between these two may have a more mixed population with percids (cool-water species) often dominant. There is really a transition from cold-water to warm-water lakes. In theory, the maximum number of parasite species of salmonids will occur in cold-water conditions and maximum number of parasite species of centrarchids will occur in warm-water conditions.

In Lake Michigan, percids harbored the most parasite species (33) followed by the salmonids (27), catostomids (15), centrarchids (13), and cyprinids (12). Nine studies have been performed on the parasites of *Perca flavescens*. Parasite studies were done on 11 salmonid species with the most-studied species being *Salvelinus namaycush* (8 studies), *Oncorhynchus tshawytscha* (7 studies), and *Coregonus hoyi* (6 studies). A total of 90 parasite species have been reported from fish in this lake. Salmonids (cold-water species) and *P. flavescens* (cool-water species) and their autogenic helminth parasites are prominent in Lake Michigan, whereas the cyprinids and their parasites are a minor component.

In Lake Superior, salmonids harbored the most parasite species (45), followed by the percids (39), catostomids (32), cyprinids (29), and centrarchids (24). The most-studied species were the salmonids *Coregonus artedii* (13 studies) and *Salvelinus namaycush* (9 studies). Only one study was performed on the parasites of *Perca flavescens*. A total of 148 parasite species have been reported from fish in this lake. Salmonids and their autogenic helminths are prominent in this lake, followed by *P. flavescens* and its autogenic helminths. The percentages of autogenic and allogenic helminth species in the cyprinids were similar.

In Lake Huron, cyprinids harbored the most parasite species (66), followed by the percids (64), centrarchids (51), salmonids (50), and catostomids (43). Twenty cyprinid species and 14 salmonid species have been examined, whereas the number of species examined in the other families was eight or less. The most-studied species of cyprinids were *Cyprinus carpio* (5 studies), *Notropis hudsonius* (6 studies), and *Pimephales promelas* (4 studies). The most-studied salmonid species was *Coregonus clupeaformis* (10 studies). Ten studies have been performed on *Perca flavescens*. The largest number of parasite species (242) was reported from this lake. The cyprinids and their autogenic helminths are prominent in Lake Huron, closely followed by the percids and centrarchids and their autogenic helminths, and then by the salmonids and catostomids.

A total of 231 parasite species were reported from Lake Erie. The largest number of studies on the largest number of species representing the largest number of fish families was done in Lake Erie. Centrarchids harbored the most parasite species (76), followed by the percids (64), catostomids (54), cyprinids (47), and the salmonids (14). Parasite studies were done on 23 cyprinid species, 13 percid species, 9 catostomid species, and 9 centrarchid species. *Perca flavescens* was the most-studied species (18 studies) followed by *Micropterus dolomieu* (8 studies) and *Micropterus salmoides*, *Ambloplites rupestris*, and *Lepomis gibbosus* that had 5 studies each. Lake Erie is characterized by having a mixture of centrarchids, percids, catostomids, and cyprinids and their autogenic helminths. Salmonids and their parasites are a minor component in Lake Erie.

In Lake Ontario, 228 parasite species have been reported. Centrarchids harbored the most parasite species (69), followed by the percids (58), cyprinids (47), catostomids (25), and salmonids (21). Twelve cyprinid species, 7 centrarchid species, 9 salmonid species, and 6 percid species were examined for parasites. The most-studied species were *Perca flavescens* (14 studies) and *Ambloplites rupestris* (10 studies). Lake Ontario is characterized by having a mixture of mainly

centrarchids, percids, and cyprinids and their autogenic helminths, followed by the catostomids and salmonids and their autogenic parasites.

In general, fish species in the five major families examined for parasites were different among the Great Lakes. Percids were most commonly examined in Lake Michigan, salmonids in Lake Superior, cyprinids in Lake Huron, and centrarchids and percids in Lakes Erie and Ontario. The common thread among these lakes is that percid parasites were the most-dominant group or the second most-dominant group in each lake probably because of the large number of studies and/or extensive survey(s) performed on the parasites of *Perca flavescens*. *Perca flavescens* had the highest parasite species-richness in each Great Lake, except for *Coregonus artedii* in Lake Superior. Because there was variation in the fish species examined among the Great Lakes, the reported parasite communities in fish from each lake were different, and therefore the Jaccard coefficients are low for the parasite-community comparisons.

It is probable that, as the number of fish species examined and number of parasite studies performed increases, so will the number of parasite species found in each Great Lake, especially those parasite species that are host-specific to a fish species or fish family. Although not significant, correlations were high between the number of parasite species reported from each lake and number of fish species examined and number of parasite studies performed. Furthermore, some of these parasitological results summarized in this synopsis for each Great Lake may be artifacts of sample size, may be influenced by the number of individuals of various fish species examined, may be affected by the number or lack of studies performed on specific fish species, and may be biased by the lack of studies on other fish species.

Conceptual Framework to Study Fish Health in the Great Lakes

Riley et al. (2008) proposed a conceptual framework for conducting ecologically oriented fish health research in the Great Lakes. Their premise was that a dysfunctional ecosystem, one that has been disrupted to reduce vigor, organization, or resilience, may show a wider range of variability to factors that influence disease transmission, thereby increasing the likelihood that the threshold required for epizootics will be exceeded. The material they presented focused on viruses and bacteria of fish, and they discussed three models involving thiamine deficiency complex, botulism, and bacterial kidney disease in the Great Lakes.

A possible example of parasites and a dysfunctional ecosystem involves the occurrence of cestodes, especially of the genera *Bothriocephalus* and *Proteocephalus*, in *Sander vitreus* in Saginaw Bay, Lake Huron. These cestodes use copepod zooplankton as the first intermediate host and small fish as the second intermediate host or as the paratenic host. *Sander vitreus* and other fish species become infected by eating the infected copepods or small fish. In 2007, there were numerous angler reports of an increased prevalence of cestodes in *Sander vitreus* from Saginaw Bay and its tributaries (J. Baker, Michigan Department of Natural Resources and the Environment, personal communication, 2007 and 2008). It was suggested that biological conditions in Saginaw Bay (specifically, changes in the food chain) in 2007 may have changed to make the cestode infection in *Sander vitreus* more prevalent than in previous years. The increased

prevalence of cestodes (tapeworms) may be the result of a change in the diet of *S. vitreus* due to reduced abundance of *Alosa pseudoharengus*, which was a principal prey fish for *S. vitreus*. In response to reduced abundance of *A. pseudoharengus*, *S. vitreus* changed its diet to include more of other kinds of forage fish, including a variety of cyprinid minnows and *Perca flavescens* that serve as second intermediate hosts and paratenic hosts for the cestodes *Bothriocephalus* sp. and *Proteocephalus* sp.

CONCLUSIONS

The small number of studies performed on the parasites of fish in the Great Lakes after 1990 is not surprising since there are few fish parasitologists working in the Great Lakes area. This shortage is attributable to fewer fish parasitologists being trained, few fish parasitologists being employed by agencies and institutions in the Great Lakes area, and the lack of funds to support fish parasitological studies. The deficiency of research on the parasites of fishes and on the ecology of fish diseases in the Great Lakes and connecting waterways is disturbing. Furthermore, the entry of exotic parasites and exotic invertebrates and fishes with their parasites into the Great Lakes makes increased vigilance a necessity.

There are probably large numbers of parasite species present in fish of the Great Lakes and their connecting bodies of water that are still to be found, described, and/or recorded. It is difficult to even estimate the total number of parasite species in fish from each lake since many fish species have not been examined, and several fish species have only been examined once. A great deal of work is needed before we have a more-complete list of parasites of fish from the Great Lakes. Even if this list is completed, there will remain the greater task of examining and mapping the distribution of the parasites in relationship to a variety of variables in the Great Lakes. It is our view that this synopsis is a starting place for future parasite studies. We believe that a holistic and integrative approach to research should be undertaken to study the parasites of fish in each Great Lake that involves parasitologists, fish health specialists, ichthyologists, fisheries biologists, and other researchers from various agencies and institutions.

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