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M. Christopher Barnhart
Iowa State University

Gregg W. Calderwood
Iowa State University

Edwin C. Powell
Iowa State University

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Helminth Parasites of Some Iowa Fishes

**M. CHRISTOPHER BARNHART¹, GREGG W. CALDERWOOD²,
and EDWIN C. POWELL³**

BARNHART, M. CHRISTOPHER, GREGG W. CALDERWOOD, and EDWIN C. POWELL (Zoology Department, Iowa State University, Ames, Iowa 50011). Helminth Parasites of Some Iowa Fishes. Proc. Iowa Acad. Sci. 83(2): 64-66, 1976. Individuals of 16 species of fishes representing the Centrarchidae, Ictaluridae, Catastomidae, Cyprinidae, Percidae, and Serranidae were collected at 8 localities in central and north-central Iowa,

and examined for helminth parasites. Thirty-nine parasite species were recovered: 20 Monogenea, 8 Digenea, 3 Cestoda, 4 Acanthocephala, and 4 Nematoda. A new host record is reported for *Gyrodactylus machrochiri* from *Lepomis humilis*.

INDEX DESCRIPTORS: Helminths; Parasites; Trematoda; Nematoda; Cestoda; Acanthocephala from Iowa fishes.

Literature concerning the occurrence and geographic distribution of parasites of Iowa fishes is limited. Meyer (1958) surveyed the helminths of fishes in Trumbull Lake, Clay County, Iowa; and Schwink (1950) surveyed the trematode parasites of *Lepomis machrochirus* in McFarland's Pond, Story County, Iowa. A number of studies (Williams and Ulmer, 1970; Calantine and Ulmer, 1961; Mackiewicz, 1969; Frederickson and Ulmer, 1965; Calantine and Frederickson, 1965; Calantine, 1962; Calantine and Mackiewicz, 1966; Mackiewicz and McCrae, 1965) have been made on the Caryophyllaeid cestodes of fishes in Iowa. Several host and locality records have been reported for the digenean genus *Phyllodistomum* from Iowa catfishes (Waffle, 1967). Nearly all other records (e.g. Van Cleave, 1921; Linton, 1940; Remley, 1942; Magath, 1917; Manter, 1926; Hunter, 1930) originated at the U.S. Bureau of Fisheries Biological Station on the Mississippi River at Fairport, Iowa. The purpose of this investigation was to extend present knowledge of the helminth parasite fauna of fishes from various localities in Iowa.

TABLE I. Localities and Dates of Collections

Locality	Date
1. Clear Lake, Cerro Gordo County, Iowa.	10 July, 1974
2. Des Moines River at Jester County Park, S33 T81N R25W Polk County, Iowa.	25 July, 1974
3. Lake Cornelia, Wright County, Iowa.	28 June, 1974
4. McFarland's Lake, Story County, Iowa.	3 June, 1974
5. Skunk River N. of Ames, S23 T84N R24W Story County, Iowa.	18 July, 1974
6. Springbrook Lake, Guthrie County, Iowa	12 June, 1974
7. Squaw Creek at Ames, S29 T84N R24W Story County, Iowa.	30 July, 1974
8. Waterworks Park ponds, Des Moines, Polk County, Iowa.	13 July, 1974

MATERIALS AND METHODS

Fish were collected primarily by electrofishing, fike net, or bag seine. Hoop nets, and hook and line were used occasionally. Specimens were transported at low temperature in styrofoam boxes to Iowa State University and kept alive in a Living Stream® unit (Frigid Units, Inc.) at approximately 5°C until examined.

Fish were necropsied individually, usually within a few days after capture. Superficial examination was made with a binocular dissecting microscope. Gills and fins were detached and agitated in a solution of formalin consisting of 1 ml of 40% formaldehyde/liter H₂O for collection of monogenetic trematodes. Organs were placed in separate dishes of saline and dissected. The digestive tract was slit and examined, then cut into sections and scraped. Flesh was examined for encysted metacercariae.

Monogenetic trematodes and small digeneans were pipetted directly into formalin-acetic acid-alcohol (FAA) for fixation. Larger digeneans and cestodes were fixed with FAA under slight cover-glass pressure. Acanthocephalans were refrigerated in distilled H₂O to protract the proboscis and then fixed in FAA. Trematodes, cestodes, and acanthocephalans were stained with Semichon's acetocarmine, cleared in turpeneol and mounted in Permount® (Fisher Scientific). A fast green counterstain was used occasionally to accent surface features. Nematodes were fixed in hot 70% EtOH and mounted in CMC-10® (Turtox) or glycerin jelly.

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^{1,2,3}Department of Zoology, Iowa State University, Ames, Iowa 50011

RESULTS

The localities and dates of collections are listed in Table 1. The parasites are listed by families. Following each species of parasite the host(s) and organ from which parasites were found are noted and the localities are indicated by numbers corresponding to those in Table 1.

PLATYHELMINTHES: TREMATODA: MONOGENEA

GYRODACTYLIDAE

Gyrodactylus fairporti Van Cleave, 1921.

Cyprinus carpio L., body surface, 6.

Gyrodactylus machrochiri Hoffman and Putz, 1964.

Lepomis cyanellus Rafinesque, body surface, 6.

Lepomis humilis (Girard), body surface, 3, 8. This species has not previously been reported from *Lepomis humilis*. It is known to occur on *Lepomis cyanellus*, *L. machrochirus* and *L. punctatus* (Mizelle and Kritsky, 1967). Heavy infestations were found on *L. humilis* from locality 8.

DACTYLOGYRIDAE

Actinocleidus fergusonii Mizelle, 1938.

Lepomis machrochirus Rafinesque, gills, 1, 4, 6.

Actinocleidus fusiformis (Mueller, 1934) Mueller, 1937. Synonyms: *Ancyrocephalus cruciatus* Wedl, 1858; *Cleidodiscus fusiformis* Mueller, 1934; *Synleithrium fusiformis* Price, 1967.

Micropterus salmoides (Lacépède), gills, 1, 2, 4, 6.

Actinocleidus longus Mizelle, 1938.

Lepomis cyanellus Rafinesque, gills, 6.

Lepomis machrochirus Rafinesque, gills, 6.

Anonchohaptor muelleri Kritsky, et al., 1972.

Carpiodes carpio (Rafinesque) gills, 2, 8.

Clavunculus bursatus (Mueller, 1936) Mizelle and Stokely, 1956.

- Synonyms: *Ancyrocephalus bursatus* Mueller, 1936; *Actinocleidus bursatus* (Mueller, 1936) Mueller, 1937.
- Micropterus salmoides* (Lacépède), gills, 4.
- Cleidodiscus aculeatus* (Van Cleave and Mueller, 1932) Mizelle and Regensberger, 1945. Synonyms: *Ancyrocephalus aculeatus* Van Cleave and Mueller, 1932; *Urocleidus aculeatus* (Van Cleave and Mueller, 1932) Mueller, 1934.
- Stizostedion vitreum* (Mitchill), gills, 1.
- Cleidodiscus capax* Mizelle, 1936.
- Pomoxis nigromaculatus* (LeSueur), gills, 1.
- Cleidodiscus floridanus* Mueller, 1936. Synonym: *Cleidodiscus mirabilis* Mueller, 1937, in part.
- Ictalurus punctatus* (Rafinesque), gills, 2, 7.
- Cleidodiscus longus* Mizelle, 1936.
- Pomoxis annularis* Rafinesque, gills, 8.
- Cleidodiscus pricei* Mueller, 1936.
- Ictalurus melas* (Rafinesque), gills, 1.
- Ictalurus punctatus* (Rafinesque), gills, 2, 7.
- Cleidodiscus vanacleavi* Mizelle, 1936. Synonyms: *Onchocleidus formosus* Mueller, 1936; *Cleidodiscus formosus* (Mueller, 1936) Price, 1937.
- Pomoxis annularis* Rafinesque, gills, 6.
- Pomoxis nigromaculatus* (LeSueur), gills, 1, 3.
- Icelanonchohaptor microcotyle* Kritsky et al., 1972.
- Carpionodes carpio* (Rafinesque), fins, 8. This species was described by Kritsky et al. (1972) from the Missouri River in North and South Dakota, where 34 specimens were taken from the gills of river carp sucker. Both specimens collected in the present study were attached to the pectoral fins of their hosts, rather than the gills.
- Urocleidus cyanellus* (Mizelle, 1938) Mizelle and Hughes, 1938. Synonym: *Onchocleidus cyanellus* Mizelle, 1938.
- Lepomis cyanellus* Rafinesque, gills, 6.
- Urocleidus dispar* (Mueller, 1936) Mizelle and Hughes, 1938. Synonyms: *Onchocleidus dispar* Mueller, 1936; *Haplocleidus dispar* (Mueller, 1936) Mueller, 1937.
- Lepomis macrochirus* Rafinesque, gills, 4.
- Lepomis humilis* (Girard), gills, 1.
- Urocleidus ferox* Mueller, 1934. Synonyms: *Onchocleidus ferox* (Mueller, 1934) Mueller, 1936; *Onchocleidus mucronatus* Mizelle, 1936; *Urocleidus mucronatus* (Mizelle, 1936) Mizelle and Hughes, 1938.
- Lepomis macrochirus* Rafinesque, gills, 1, 4, 6.
- Lepomis gibbosus* (L.), gills, 1.
- Lepomis humilis* (Girard), gills, 8.
- Lepomis cyanellus* Rafinesque, gills, 6.
- Urocleidus furcatus* (Mueller, 1937) Mizelle and Hughes, 1938. Synonym: *Haplocleidus furcatus* Mueller, 1937.
- Micropterus salmoides* (Lacépède), gills, 2, 6.
- Urocleidus interruptus* (Mizelle, 1936) Mizelle and Hughes, 1938. Synonym: *Onchocleidus interruptus* Mizelle, 1936.
- Roccius interruptus* (Gill), gills, 1.
- Urocleidus variabilis* Mizelle and Cronin, 1943.
- Lepomis microlophus* (Günther), gills, 6.
- PLATYHELMINTHES: TREMATODA: DIGenea (ADULT FORMS)**
- BUCEPHALIDAE**
- Bucephalopsis pusilla* (Stafford, 1904) Eckmann, 1932. Synonym: *Bucephaloides pusillus* (see Yamaguti, 1971 for taxonomic discussion).
- Micropterus salmoides* (Lacépède), gut, 2.
- LISSORCHIDAE**
- Lissorchis* sp. Magath, 1917.
- Carpionodes carpio* (Rafinesque), gut, 2, 8. Numerous specimens of *Lissorchis* sp. (to be described elsewhere) were taken from river carp sucker. Kritsky, et al. (1972) also reported *Lissorchis* sp. from this host.
- GORGODERIDAE**
- Phyllodistomum lacustri* (Loewen, 1929).
- Ictalurus punctatus* (Rafinesque), urinary bladder, 7.
- MACRODEROIDIDAE**
- Alloglossidium corti* (Lamont, 1921) Van Cleave and Mueller, 1934. Synonyms: *Plagiorchis corti* Lamont, 1921; *Plagiorchis amieurensis* McCoy, 1928; *Alloglossidium kenti* Simer, 1929.
- Ictalurus melas* (Rafinesque), gut, 1, 3.
- ALLOCREADIIDAE**
- Crepidostomum cooperi* Hopkins, 1931. Synonyms: *C. ambloplitis* Hopkins, 1931; *C. fausti* Hunninen and Hunter, 1933; *C. solidum* Van Cleave and Mueller, 1932.
- Lepomis cyanellus* Rafinesque, gut, 6.
- PLATYHELMINTHES: TREMATODA: DIGenea (METACERCARIAE)**
- DIPLOSTOMATIDAE**
- Posthodiplostomum* sp. Dubois, 1936, metacercaria.
- Lepomis macrochirus* Rafinesque, encysted in viscera, 1, 3, 4, 6.
- Lepomis microlophus* (Günther) in liver, 6.
- Lepomis humilis* (Girard) in viscera, 3, 8.
- Lepomis cyanellus* Rafinesque, in viscera, 6.
- Lepomis gibbosus* (Linnaeus) in viscera, 1, 3.
- Micropterus salmoides* (Lacépède) in viscera, 1, 2, 4, 6.
- Pomoxis annularis* Rafinesque, in viscera, 6, 8.
- Pomoxis nigromaculatus* LeSueur, in viscera, 6.
- Metacercariae from *Micropterus salmoides* taken from Springbrook Lake (6) were fed to hatchling chicks and adult trematodes recovered from the intestine of the chicks were identified as *Posthodiplostomum minimum*.
- Uvulifer* sp. Yamaguti (1934) metacercaria
- Lepomis cyanellus* Rafinesque encysted in skin and muscles, 6.
- Lepomis macrochirus* Rafinesque encysted in skin and muscles, 1, 4, 6.
- Lepomis microlophus* (Günther) encysted in skin and muscles, 6.
- Micropterus salmoides* (Lacépède) encysted in skin and muscles, 4, 6.
- Pomoxis nigromaculatus* LeSueur encysted in skin and muscles, 6.
- Stizostedion vitreum* (Mitchell) encysted in skin and muscles, 1.
- CLINOSTOMATIDAE**
- Clinostomum marginatum* (Rudolphi, 1819) metacercaria
- Micropterus salmoides* (Lacépède), fins, operculum, eye socket, pharynx, 6.
- Lepomis macrochirus* Rafinesque, fins, 6.
- Lepomis cyanellus* Rafinesque, fins, 6.
- Ictalurus melas* (Rafinesque), oral cavity, 3.
- PLATYHELMINTHES: CESTODA**
- BOTHRIOCEPHALIDAE**
- Bothriocephalus cuspidatus* Cooper, 1917.
- Stizostedion vitreum* (Mitchill), caeca, 1, 3.
- Bothriocephalus* sp. Rudolphi, 1808. (immature)
- Lepomis macrochirus* Rafinesque, gut, 4.
- Lepomis cyanellus* Rafinesque, gut, 6.
- Specimens represented by these two records were extensively strobilate but bore no eggs; otherwise, they resemble *B. cuspidatus*.
- PROTEOCEPHALIDAE**
- Corallobothrium* sp. Fritsch, 1886. (immature)
- Ictalurus punctatus* (Rafinesque), gut, 2.
- Proteocephalus ambloplitis* (Leidy, 1887) Benedict, 1900. Synonym: *P. micropteri* Leidy, 1887.

HELMINTH PARASITES

- Micropterus salmoides* (Lacépède), gut, 1, 6.
Proteocephalus sp. Weinland, 1858. (plerocercoid larvae)
Micropterus salmoides (Lacépède), gonads, liver, kidneys, spleen,
 gut, 1, 2, 6.
Lepomis macrochirus Rafinesque, gonads, liver, gut, 1, 6.
Lepomis cyanellus Rafinesque, gonads, liver, gut, 6.
Lepomis gibbosus (L.), liver, 1, 3.

ACANTHOCEPHALA

NEOECHINORHYNCHIDAE

- Neoechinorhynchus cylindratu*s (Van Cleave, 1913) Van Cleave 1919.
 Synonym: *Neorhynchus cylindratu*s Van Cleave, 1913.
Micropterus salmoides (Lacépède), gut, 1, 6.
Lepomis cyanellus Rafinesque, gut, encysted in liver, 6.
Lepomis gibbosus (L.), encysted in liver, 1.
Lepomis macrochirus Rafinesque, gut, 1.
Stizostedion vitreum (Mitchill), gut, 1, 3.
Perca flavescens (Mitchill), gut, 3.
Neoechinorhynchus prolixus Van Cleave and Timmons, 1952.
Carpionodes carpio (Rafinesque), gut, 2.

ECHINORHYNCHIDAE

- Leptorhynchoides thecatum* (Linton, 1891) Kostylew, 1924.
 Synonyms: *Echinorhynchus thecatum* Linton, 1891; *Echinorhynchus oricola* Linstow, 1901.
Micropterus salmoides (Lacépède), upper gut, caeca, 1.
Lepomis gibbosus (L.), cloaca, 1.

POMPHORHYNCHIDAE

- Pomphorhynchus bulbocolli* (Linkins, 1919) Van Cleave, 1919.
Cyprinus carpio L., gut, 1.

NEMATHELMINTHES: NEMATODA

HETEROICHEILIDAE

- Contraecaecum brachyurum* (Ward and Magath, 1917) Van Cleave and Mueller, 1934. Synonym: *Hysterothylacium brachyurum* Ward and Magath, 1917.
Lepomis macrochirus Rafinesque, gut near caeca, 1.
Lepomis gibbosus (L.), gut near caeca, 1.

CAMALLANIDAE

- Camallanus oxycephalus* Ward and Magath, 1916.
Pomoxis nigromaculatus (LeSueur), lower gut, anus, 3.
Stizostedion vitreum (Mitchill), lower gut, anus, 3.
Camallanus sp. Railliet and Henry, 1915.
 Occasional juvenile *Camallanus* were found in the gut lumens of
Lepomis gibbosus, *L. macrochirus* and *Ictalurus melas* from 1.

RHABDOCHONIDAE

- Spinitectus carolini* Holl, 1928.
Lepomis cyanellus Rafinesque, gut, 6.
Lepomis macrochirus Rafinesque, gut, 1, 3, 4, 6.
Lepomis microlophus (Gunther), gut, 6.
Micropterus salmoides (Lacépède), gut, 2, 4.
Perca flavescens (Mitchill), gut, 3.
Spinitectus gracilis Ward and Magath, 1916.
Pomoxis nigromaculatus (LeSueur), stomach, 3, 6.
Pomoxis annularis Rafinesque, stomach, 6.
Micropterus salmoides (Lacépède), gut, 6.

DISCUSSION

The paucity of published records concerning helminths of fishes in Iowa is illustrated by the fact that only 12 of the 39 species recorded herein have been previously reported in Iowa. The Monogenea are particularly poorly known in the state, with only 3 species previously reported (Van Cleave, 1921; Linton, 1940; Remly, 1942). This lack of published records in no way indicates a depauperate fauna, however.

At least 30 helminth species not found in the present survey have been reported by other workers previously cited. The small overlap between this report and previous records indicates that the list is far from complete.

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