

# Parasites of Channel Catfish from the Kentucky River, with a Comparative Note on the Ohio River<sup>1</sup>

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## ABSTRACT

One hundred sixty-one channel catfish were collected from the Kentucky River drainage from April 1975 through June 1976 and examined for parasites.

The parasites recovered were: Trematoda: *Acetodextra amiuri*; Cestoda: *Corallobothrium* sp., *C. fimbriatum*, *C. giganteum*; Nematoda: *Contracaecum* sp.; and Crustacea: *Ergasilus arthrosis*. Seasonal variation was observed in *A. amiuri*, *C. fimbriatum*, *C. giganteum*, and *E. arthrosis*. *Acetodextra amiuri*, *Contracaecum* sp., *C. giganteum*, and *E. arthrosis* are new state records.

## INTRODUCTION

The channel catfish *Ictalurus punctatus* is a moderately abundant and very desirable food fish of the Kentucky River drainage system (Williams 1974). However, the parasitic organisms of *I. punctatus* in the Kentucky River drainage have been neglected with the exception of Aliff's (1977) work on the digenetic trematodes and Bauer and Harley's (1973) work on cestodes. Thus, the present study was done to further the information on the parasites of *I. punctatus* in the Kentucky River by: (a) identification of parasites, (b) determining geographical distribution, and (c) noting any seasonal variation in helminth species.

## MATERIALS AND METHODS

One hundred sixty-one channel catfish were collected from the Kentucky River drainage from April 1975 through June 1976.

In the main channel, fish were captured by setting 1.5- and 2-inch (3.75–5.0-cm) gill nets and lifting them 24 hours later. Fish captured in locks on the river and from coves in Herrington Lake, a tributary to the Kentucky River, were killed with

Pronox-Fish (5% emulsifiable rotenone) at a concentration of 1 ppm at the collection sites. Potassium permanganate was used to oxidize any Pronox-Fish that escaped through the lower lock gate and the area of the blocknet when treating an open cove on Herrington Lake by placing it in porous nylon bags and towing behind the boat throughout the study area after the treatment was completed.

Specimens to be examined were transported to the laboratory on ice and all other fish were buried. In the laboratory, fish usually were autopsied within 72 hours; fish that could not be examined within 72 hours were frozen for later examination. Fish were autopsied by routine procedures, and individual organs were removed and placed in separate Petri dishes with Ringer's solution (0.7%).

Gills and individual organ systems were examined by teasing the tissues apart; stomach and intestine were dissected with fine scissors and the "strip technique" utilized. All helminths and parasitic copepods recovered were placed in Ringer's solution (0.7%) for gross macroscopic examination.

Helminths and parasitic copepods were fixed in hot standard alcohol-formalin-acetic acid solution (AFA). Specimens not to be stained were placed in large screwtop vials filled with AFA.

Specimens were stained in Harris hematoxylin, cleared in xylene, and mounted in

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TABLE 1.—MEAN INTENSITY OF INFESTATION BY PARASITES RECOVERED FROM 161 *ICTALURUS PUNCTATUS* FROM THE KENTUCKY RIVER INCLUDING NEW STATE RECORDS

Parasite	No. fish infested	Mean intensity of infestation	Total parasites	Location	New state record
TREMATODA					
<i>Acetodextra amiuri</i>	2	4	8	ovary	X
CESTODA					
<i>Corallobothrium</i> sp. <sup>1</sup>	18	2	29	intestine	
<i>Corallobothrium giganteum</i>	11	3	28	intestine	X
<i>Corallobothrium fimbriatum</i>	14	3	38	intestine	
NEMATODA					
<i>Contracaecum</i> sp.	10	1	14	mesenteries	X
CRUSTACEA					
<i>Ergasilus arthrosis</i> <sup>2</sup>	108	24	2,590	gills	X

<sup>1</sup> Immature.<sup>2</sup> Females only.

Permout. Nematodes were fixed by dropping them in hot 70 percent alcohol.

Confirmation of helminth species was made by Dr. David A. Becker, Department of Zoology, University of Arkansas, Fayetteville, Arkansas, and Donald Cloutman, Duke Power Company, Huntersville, North Carolina.

Mean intensity of infestation indicates the number of parasites in each infested fish.

## RESULTS AND DISCUSSION

During the sampling period, approximately 2,700 individual parasitic organisms representing 6 species were recovered. Seventy-one percent of the fish examined were infested by 1 or more parasitic organisms. Four of the 6 species of parasites recovered constituted new state records. The following is an annotated list of parasites recovered from *I. punctatus* (Table 1).

*Acetodextra amiuri*.—A total of 8 individuals was found in the gravid ovaries of only 2 (1%) of the fish examined (Table 1). The low number of individuals as well as the low percentage of infestation probably was due to the loss of most of the adults during spawning. The helminth exhibits seasonal variation related directly to the spawning time of the fish, and very few or no helminths were present after the fish

spawned. This was consistent with the results of the present study because the majority of collections were made either too early or too late to coincide with spawning in *I. punctatus*.

In this study, immature adults were found within the ova and mature adults were free in the ovaries. According to Warner and Hubert (1975) there is no question that *A. amiuri* destroys ovarian tissue and ova in *I. punctatus*.

*A. amiuri* has been reported from the ovaries, gas bladder, urinary bladder, and the liver of ictalurid fishes (Warner and Hubert 1975). Aliff (1977) reported it from the urinary bladder of *I. melas* recovered from the Kentucky River. The present report represents a new state record for *A. amiuri* in *I. punctatus*.

*Corallobothrium* sp.—An immature form of the cestode genus *Corallobothrium* was recovered from 18 (11%) of the fish examined, with a total of 29 individual helminths collected (Table 1). The cestode was in what seemed to be an immature form; however, it was capable of inhabiting the definitive host year round.

*Corallobothrium giganteum*.—This proteocephaline cestode was recovered from 11 (7%) of the fish examined with a mean intensity of infestation of 3 (Table 1). Twenty-eight individual cestodes were re-



covered from *I. punctatus* during the summer. This helminth was very similar to the *C. fimbriatum* recovered and was distinguished by the smooth-surfaced scolex versus the large fimbriate scolex with marginal lappets of *C. fimbriatum*.

The study showed that *C. giganteum* demonstrated seasonal variation very similar to that of *C. fimbriatum* and was recovered only in the summer as fully segmented adults.

*Corallobothrium fimbriatum*.—Bauer and Harley (1973) reported the caryophyllaeid cestode *Corallobothrium fimbriatum* from *I. punctatus* in Kentucky as being fully developed, segmented adults. The *C. fimbriatum* of the present study were consistent with those findings and contrary to the report of Van Cleave and Mueller (1934) in which they reported that *C. fimbriatum* (in *I. punctatus*) were small and unsegmented, suggesting that the fish was an unsuitable host.

A total of 38 individual helminths was collected from 14 *I. punctatus* with a mean intensity of infestation of 3 (Table 1). Seasonal variation was shown, however, since the cestode was recovered as a segmented adult only during the summer and in immature forms in the spring and fall.

*Contracaecum* sp.—The only nematode recovered from *I. punctatus* during the present study was *Contracaecum* sp. Fourteen individual nematodes were recovered with a mean intensity of infestation of 1, with 10 (6%) of the fish infested (Table 1).

The nematode had 3 large lips, with well-developed interlabia and intestinal caecum present. Also, there were cuticular papillae on the surface of the external cuticle.

This nematode was found only in fish collected in Kathy's Cove on Herrington Lake, an impoundment of the Dix River, and constituted a new state record. It was also reported by White and Harley (1974) in the white sucker *Catostomus commersoni*.

Seasonal variation could not be con-

firmed due to the scarcity of the nematodes in the study.

*Ergasilus arthrosis*.—The report of the parasitic copepod *Ergasilus arthrosis* in this study was the first record of the species in Kentucky; however, it appears to be common on the gills of ictalurids in North America (Roberts 1970). Because of the synonymy with *E. versicolor*, many investigators have mistaken *E. arthrosis* for *E. versicolor*, since the main distinguishing characteristic between them is that the first endopod in *E. arthrosis* has 3 segments and that in *E. versicolor* has 2 segments (Roberts 1970).

In the present study, *E. arthrosis* was the only copepod species infesting *I. punctatus*. One hundred eight (67%) of the fish examined were infested, and a total of 2,590 copepods were recovered with a mean intensity of infestation being 24 (Table 1).

All *E. arthrosis* recovered were females; males occur only in the free-living form and die after copulation (Hoffman 1967).

*E. arthrosis* showed seasonal variation during the study, with the highest infestation during summer and little or none during fall and winter.

In cases of high infestation, the parasite could have deleterious effects on the fish, especially young individuals, since the parasites attach to and feed from the individual gill filaments. In cases of high infestation, the result may be stunting of growth, and in extremely high infestations (due to tissue damage and toxic wastes produced by the parasite) the results may be lethal (Hoffman 1967). During spring and summer, all fish examined were parasitized; however, the infestations were not extremely heavy. The mean intensity of infestation ranged from 9 to 49 in spring and summer, with higher values being recorded from Herrington Lake. In this study, none of the fish examined showed any signs of deleterious effects from *E. arthrosis*.

The collection of *I. punctatus* and subsequent parasitological survey of the specimens taken from the Ohio River for comparison with those from the Kentucky River



were similar in terms of the parasitic organisms recovered during similar seasons.

Parasitic infestation in the present study showed no pathological effects on *I. punctatus*, and the fish were in relatively good condition with no anomalies observed that could be attributed to parasitic infestations.

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