

MICHIGAN DEPARTMENT OF CONSERVATION
Research and Development Report No. 53*

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THE REDWORM OF YELLOW PERCH IN THE GREAT LAKES¹

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Abstract

Many fishermen are finding redworms about an inch long in the body cavity of perch from certain areas of the Great Lakes. This worm is a nematode (Philometra cylindracea) that lives normally as an adult in the body cavity of yellow perch. The female worm releases tiny live larvae which reach the water and infect a small water organism. The organism called Cyclops is suspected as the one involved here. The larvae develop in the body cavity of the Cyclops to a stage infective to perch, and the fish become infected when they eat the Cyclops.

Twenty-five collections of perch made from 1956 through 1964 included 2,028 perch from 16 locations in Lake Michigan, Lake Huron and the Detroit River. No infested perch were found in the Lake Michigan collections from Ogontz Bay, Big Bay de Noc, Garden Bay, Sturgeon Bay, or at Ludington and Saugatuck. Collections from the Straits of Mackinac near Cheboygan were also negative. In Lake Huron, infestations were high from Alpena southward to Saginaw Bay. A rather low rate of infestation was found in the Detroit River.

In the areas where collections were made for more than one year, infestations in the Pinconning, Tawas Bay, and Alpena areas increased from 1956 through 1964, whereas infestation remained at zero in the Cedarville area.

The redworm is readily removed from perch when the fish are cleaned. It does not affect the eating quality of the fish and is not harmful to human beings.

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¹ A portion of this investigation was supported with Federal Aid funds provided under Dingell-Johnson Project F-27-R.

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THE REDWORM (PHILOMETRA CYLINDRACEA)
OF YELLOW PERCH (PERCA FLAVESCENS)
IN MICHIGAN WATERS OF THE GREAT LAKES¹

By Leonard N. Allison

A species of nematode known as a redworm is abundant in yellow perch in parts of Lake Huron and western Lake Erie. The worm is conspicuous and is readily seen when fishermen clean their fish.

Apparently this parasite of perch has been increasing in abundance since about 1955, and many inquiries about it have come to the Department. Responses to these inquiries, and several news releases, have been effective in getting the message to fishermen that the redworm is not harmful to people. However the parasite is abundant in perch in a part of the Great Lakes area, and it is at least aesthetically objectionable to fishermen.

The redworm of perch goes by the name Philometra cylindracea; it is pink to red in color and may reach 2 inches in length. It occurs in the body cavity of the fish, usually enclosed in a thin-walled cyst. In very heavy infestations, or when the fish are

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Table 1.--Samples of yellow perch examined for redworm, and extent of infestation

Location	Date	Sam- ple size	Average length (inches)		Percent infested			Number of worms			Range
			Male	Female	Male	Female	Both	Average per infested fish			
								Male	Female	Both	
LAKE HURON											
Pinconning	1-30-56	28	6.0	6.3	50.0	33.3	39.3	*	*	*	1-4
	4-30-64	50	8.0	8.1	86.4	85.7	86.0	15.2	14.6	14.9	1-78
Tawas Bay	1-20-57	100	7.2	7.1	36.7	32.9	34.0	3.9	1.8	2.3	1-13
	3-7-61	100	8.4	7.6	58.8	75.0	62.0	9.8	9.5	9.7	1-34
	4-29-63	50	8.1	8.6	83.3	86.4	86.0	4.4	5.6	5.5	1-28
	4-28-64	75	8.7	8.5	72.0	70.0	70.7	5.3	4.9	5.0	1-32
Alpena	9-29-58	35	8.8	8.8	5.3	30.8	15.6	1.0	1.8	1.6	1-3
	9-21-59	100	8.7	9.0	28.6	47.2	42.0	3.0	4.2	3.9	1-25
Cedarville	9-18-59	100	7.1	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0
	5-3-62	93	6.3	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0
	9-14-62	100	7.9	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0
LAKE MICHIGAN											
Big Bay de Noc (Ogontz Bay)	4-25-63	73	7.9	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0
	5-5-64	101	9.5	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0
Little Bay de Noc	4-25-61	100	7.9	10.0	0.0	6.2	2.0	0.0	1.0	1.0	1
	4-25-63	100	8.0	9.4	1.1	10.0	2.0	1.0	1.0	1.0	1

* Not determined.

not dressed shortly after capture, the parasites may leave the cysts and be found either free in the body cavity or partially imbedded in the flesh.

A prior but limited survey of fish parasites in Lake Huron was reported by Bangham (1955). He examined fish from Lake Huron near Manitoulin Island, and from lakes on this island. He found the redworm in 2 yellow perch, from 201 perch examined, but his study is not very helpful in deciding on whether the parasite is increasing in abundance.

Methods of present study

Samples of perch were obtained from various locations, with the help of District Fisheries Biologists, Conservation Officers, and commercial fishermen. A sample size of 100 was considered adequate for any one locality, but this number could not be attained in some instances. Perch were brought to the pathology laboratory on ice (none were frozen), and were examined within 24 hours after collection. They were opened from vent to throat and the body cavity was examined. Length and sex of each fish were recorded, along with the number of redworms present in each fish.

Results

Data on occurrence of the redworm, for 6 of the 16 locations sampled are given in Table 1; this table covers just those stations for which there were samples extending over one to several years. The infestation was greatest in the Saginaw Bay area (Pinconning, Tawas

Table 2. --Samples of yellow perch examined for redworm, and extent of infestation

Location	Date	Sam- ple size	Average length (inches)		Percent infested			Number of worms			Range
			Male	Female	Male	Female	Both	Average per infested fish			
								Male	Female	Both	
DETROIT RIVER											
Trenton	4-30-64	46	6.5	6.3	46.2	35.0	41.3	1.75	1.71	1.74	1-4
LAKE HURON											
Saginaw Bay											
Port Austin	5-22-61	16	*	*	*	*	50.0	*	*	*	*
Wildfowl Bay	10-16-57	28	5.5	6.4	50.0	40.0	46.4	3.2	9.0	4.5	1-18
Straits of Mackinac											
Cheboygan	7-1-58	49	8.3	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0
LAKE MICHIGAN											
Big Bay de Noc											
Open water	2-2-56	91	*	*	0.0	0.0	0.0	0.0	0.0	0.0	0
Garden Bay	5-5-64	100	8.3	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0
Sturgeon Bay	6-10-63	100	11.2	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0
Leland	6-26-64	100	9.9	9.4	1.1	0.0	1.0	1.0	0.0	1.0	1
Ludington	6-24-64	100	9.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0
Saugatuck	7-8-64	102	8.8	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0

* Not determined.

Bay, and Alpena) and the degree of infestation increased during the study period of 1956 to 1964. In the Tawas Bay area, however, the degree of infestation decreased a little in 1963 and 1964, but it is too early to say that this is actually a downward trend. The infestation is light in extreme northern Lake Huron and is almost non-existent in Lake Michigan, at least for the present.

Perch samples from localities where collections have not been repeated over a period of time are listed in Table 2. The Detroit River site, where there was a modest infestation of the redworm, was on the Trenton side of Grosse Ile where there is considerable pollution. Otherwise Table 2 shows the same situation as does Table 1--a heavy infestation in Saginaw Bay and practically no redworms in Lake Michigan.

Sex of the perch made little difference in intensity of infestation. In the 9 collections from the most heavily infested areas (Pinconning, Tawas Bay, Alpena, Wildfowl Bay, and Detroit River), of 248 male perch examined, 54% were infested with an average of 7.6 worms per infested fish, and of the 329 female perch examined, 57% were infested with an average of 6.0 worms per infested fish.

Discussion

This study shows the redworm to be most abundant in Lake Huron from Saginaw Bay to Alpena. Reports from anglers indicate that it is present in Lake St. Clair and in Brest Bay in western Lake Erie. It is also reported to be present in Lake Erie and Lake Ontario (personal communication, 1963, from Dr. Kenneth H. Loftus, of the Ontario Department of Lands and Forests).

The abundance of Philometra cylindracea in the Great Lakes appears to be associated with areas of large human population. This leads to some interesting speculation. Although the life cycle of the redworm is not known, it may be similar to that of P. nodulosa which occurs in the sucker, Catostomus c. commersoni. The intermediate host of P. nodulosa is reported by Thomas (1929) to be Cyclops brevispinosus. Dr. Dominic DeGiusti of Wayne State University has made studies on P. nodulosa and believes that various species of Cyclops may serve as intermediate hosts (personal communication, 1959); also he predicts that the life cycle of P. cylindracea is similar. Conditions that provide nutrients to the water, thus increasing production of microscopic organisms such as diatoms, algae, etc., upon which Cyclops feeds, would favor its multiplication. An abundant supply of Cyclops should produce a high redworm infestation in perch. Because human populations contribute nutrients to the Great Lakes waters, especially in the form of sewage effluent, and because P. cylindracea is most abundant adjacent to areas of high human populations, I suggest that the two have a cause and effect relationship. If this is true, possibly a future improvement in the handling of human wastes will reduce the amount of nutrients reaching these waters and thus result in some decrease of the redworm.

It would be useful to extend this study along several lines. Further collections of perch near population centers such as Chicago and Milwaukee are needed to substantiate the idea that the parasite

thrives near population centers. The possible spread of the parasite in Lakes Huron and Michigan, and perhaps into Lake Superior, should be investigated by intermittent sampling.

Another line of study would be to see if parasite infestation affects the growth rate of perch. The growth of perch in Saginaw Bay is slow. Also, the parasite might cause a heavy mortality of fish. A mortality of perch did in fact occur in Saginaw Bay in 1964, but we were unable to study the problem at that time.

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