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Some Notes on the Biological Relations of the Fish Parasites of the Great Lakes

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SOME NOTES ON THE BIOLOGICAL RELATIONS OF THE FISH PARASITES OF THE GREAT LAKES.

(ABSTRACT)

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A pond or small lake furnishes few variations in depth, temperature, current, or food, and hence the life in it is comparatively uniform. Nowhere else in the world is there found such a continuous body of fresh water as in the Great Lakes. They afford, in themselves alone, an area of water one-fourth greater than that of the state of Nebraska; or, considering the streams and minor lakes within easy reach, no doubt the area is twice as great. Furthermore, there are found here conditions of temperature, depth, light and food more nearly like those prevailing in the ocean. As a result the development of life is greater than in fresh water elsewhere. The existence of a peculiar deep-water fauna has been known for some time, but its extent and the general biological condition of the lakes have never been the object of extended observations. The state of Michigan is bordered by all of the chain except Lake Ontario, and its fisheries are of a magnitude to warrant the large yearly outlay for fish culture under the auspices of the State Fish Commission, by which are planted every year, 100,000,000 fry of the white fish alone. The importance of full and accurate information concerning the entire biological conditions of the lakes has long been felt; and after some tentative work in previous years, the Commission fitted out last summer a temporary laboratory on Lake Saint Clair. Professor J. E. Reighard, the scientific expert of the commission, was appointed director and under his charge work was carried on for nearly three months. To each of the party under his supervision was assigned a particular group; the work on the worms was done by the writer.

This group is represented in fresh water by a few Annelida and free Flat Worms, but most prominently by parasites, including the Trematodes (Flukes), Cestodes (Tape-worms), Nematodes (Round-worms), and Echinorhynchi. Fish of every possible variety were obtained and carefully examined. In the course of the summer one hundred and two individuals belonging to twenty species were dissected and all the parasites found were preserved for future study. The appended table will show the number of each species of fish examined and the number of parasites found in each.

The parasites occur on the gills, in the alimentary canal, in the liver, in the air-bladder, or in the body cavity, so that they are all removed in cleaning the fish and are not to be classed as dangerous to man. Their volume, even in the extreme case, is so small in comparison with that of the fish that, during the summer, a season of abundant nourishment, they can hardly affect at all the health of the host and between those affected by a few parasites and those with many, no difference could be found either in general appearance or in any particular organ so far as could be seen. Five species, Nos. 8, 10, 11, 13 and 16 (see table), were affected by only one kind of parasite and all except the last in small numbers. The other species harboured from two to twenty kinds each.

The Nematodes were the least common of the parasites, being wanting in fourteen species; Acanthocephali were not found in seven species; Trematodes and Cestodes in six species; but while the latter were never very plentiful, the former occurred several times in countless numbers. Some other peculiarities will appear from a study of the appended table.

TABLE No. 1.

Reference number	FISH EXAMINED.					PARASITES FOUND.				
	Scientific Name.	*Common Name.*	No. Infected.	No. free.	Total No. examined.	Total No.	No. of Trematoda.	No. of Cestoda.	No. of Acanthocephala.	No. of Nematoda
1	Acipenser rubicundus Le Sueur	Lake Sturgeon	2	0	2	85	75	0	0	10
2	Ambloplites rupestris (Raf.)	Rock Bass	2	0	2	88	1	1	6	0
3	Ameiurus natalis[d] (Le Sueur)	Yellow Cat	1	0	1	19	17	1	1	0
4	Amia calva L.	Dog Fish	4	0	4	[a]3521	[a]3469	13	7	32
5	Aplodinotus grunniens (Raf.)	Sheep's Head	12	0	12	30	26	4	0	0
6	Catostomus teres (Mitch.)	Common Sucker	3	0	3	364	0	7	357	0
7	Coregonus clupeiformis (Mitch.)	White Fish	10	0	10	263	[e] 5	15	226	17
8	Cyprinus carpio L	German Carp	2	0	2	5	0	0	5	0
9	Esox lucius L.	Pike	3	0	3	24	8	8	8	0
10	Esox masquinongy (Mitch.)	Muskallunge	1	0	1	15	15	0	0	0
11	Hiodon tergisus Le Sueur	Moon Eye	2	4	6	52	52	0	0	0
12	Ictalurus punctatus (Raf.)	White Cat	2	0	2	12	8	4	0	0
13	Lepidosteus osseus (L.)	Gar Pike	1	1	2	1	1	0	0	0
14	Lepomis gibbosus (L.)	Pumpkin Seed	4	0	4	[b] 24	6	[b] 1	6	[b] 11
15	Micropterus dolomieu (Lacép)	Smallmouthed Black Bass	6	0	6	[c]1489	[c] 272	20	1194	3
16	Moxostoma aureolum (Le Sueur)	Lake Red Horse	2	2	4	154	0	0	154	0
17	Perca flavescens (Mitch.)	Yellow Perch	28	0	28	155	5	23	1	126
18	Roccus chrysops (Raf.)	White Bass	1	0	1	105	94	11	0	0
19	Stizostedion canadense (C. H. Smith)	Sauger	3	0	3	25	0	23	2	0
20	Stizostedion vitreum (Mitch.)	Wall Eye	6	0	6	227	0	96	130	1
	Total number of species, 20. Total number of individuals		95	7	102					
	Total number of species free from the parasite at the head of the column					.....	5	6	7	13
	Total number of individuals free from the parasite at the head of the column					.....	41	45	44	62

TABLE No. 1. [CONTINUED.]

ALSO EXAMINED.					PARASITES FOUND				
Scientific Name.	*Common Name*	No. infected	No. free	Total No. examined.	Total No.	No. of Trematoda.	No. of Cestoda.	No. of Acanthocephala.	No. of Nematoda.
Merrula migratoria (L.)	Robin	1	0	1	7	[f] 7	0	0	0
Larus philadelphia Ord	Bonaparte's Gull	13	0	13	[g] 51	28	11	0	0
Chelydra serpentina (L.)	Snapping Turtle	2	0	2	[h]250	0	0	0	[h]250
Chrysemys marginata (Agassiz)	Mud Turtle	1	0	1	[i] 16	[i] 16	0	0	0
Anodonta ovata Barnes Unio gracilis Lea	Mussel	[h]33	[h]17	50	[k]	[k]			

Names after Jordan, Manual of the Vertebrates, fifth edition, 1890.

[a] The number of Distomata in one specimen was estimated at 3,000; only one-third was counted with a result of 1,023.

[b] Also an indefinite number of cysts in the liver.

[c] The total number is too small since there was also an unknown (large) number of a very small Distoma, of which only a few were preserved and included in the figures given.

[d] Intermediate between A. natalis and A. nebulosus, having 23 rays in the anal fin.

[e] From gills of two specimens only.

[f] Distoma macrourum Rudolphi.

[g] Including 12 which cannot be assigned to any order at present.

[h] Estimated.

[i] Monostoma n. sp.

[k] The foot was filled with encyst Cercariea which have not been identified as yet. The number present in each specimen was almost incalculable. About two-thirds of the mussels were infected.