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INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
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THE PARASITE BURDEN OF EXPERIMENTAL TROUT FROM HARRIETTA HATCHERY, JANUARY 20th, 1942

by

Leonard N. Allison

Pond #3. (Exp. Diet #102--All frozen carp)

1. F.--G.0. on fins.
2. M.--3T.--G.0. on fins and gills.
3. M.--2T.--
4. F.--1T.--G.0. on fins and gills.
5. F.--G.0.
6. F.--1T.--
7. F.--4T.--G.0. on fins.
8. F.--2T.--
9. F.--1T.--
10. F.--1T.--G.0. on fins and gills.

Abbreviations:
M. - male
F. - female
T. - tapeworm, Abothrium crassum.
G. - Gyrodactylid worms.
0. - Very few found.

Pond #4. (Exp. Diet #108--2/3 Carp, 1/3 sheep liver)

1. M.--G.0. on fins and gills.
2. M.--3T.
3. F.--3T.--G.0. on fins and gills.
4. F.--4T.--G.0. on fins.
5. M.--1T.
6. M.--2T.--G.0. on fins.
7. F.--2T.--G.0. on fins and gills.
8. F.--1T.
9. F.--3T.--G.0. on fins and gills.
10. M.--G.0.
11. F.--4T.--G.0. on fins and gills.

Pond #5. (Exp. Diet #109--1/3 carp, 2/3 sheep liver)

1. F.--5T.--G.O. on fins.
2. M.--4T.
3. F.--G.O. on fins and gills.
4. F.--G.O. on fins and gills.
5. F.--G.O. on fins and gills.
6. F.--5T.--G.O. on gills.
7. F.--Negative
8. F.--G.O. on gills.
9. F.--2T.--G.O. on fins and gills.
10. F.--3T.--G. on fins and gills.

Mr. Wilkinson says an error exists here - he says diet #3 was fed in pond 5 and vice versa. 5-8-42 P.

Pond #6. (Exp. Diet #3--1/3 balto, 2/3 sheep liver)

1. F.--3T.
2. F.--2T.--G.O. on gills.
3. F.--1T.--G.O. on gills.
4. M.--3T.
5. F.--G.O. on fins and gills.
6. F.--G.O. on fins and gills.
7. F.--G.O. on fins.
8. M.--Negative
9. M.--4T.--G.O. on fins and gills.
10. F.--G.O. on fins.

Pond #17 (Exp. Diet. Hatchery diet--50 per cent pork melts, 3 per cent common salt, 17½ per cent meat scrap, 15 per cent cottonseed meal, 10 per cent dried buttermilk, 4½ per cent red dog flour or wheat middlings.)

1. F.--3T.
2. F.--2T.--G.O. on fins.
3. F.--G.O. on fins.
4. F.--G.O. on fins and gills.
5. F.--3T.
6. F.--3T.--G.O. on fins.
7. F.--2T.--G. on fins and gills; Saprolegnia on peduncle.
8. F.--3T.--G.O. on fins.
9. F.--4T.--G.O. on fins and gills.
10. F.--1T.--
11. F.--G.O. on fins; Saprolegnia on dorsal surface near dorsal fin.

Bacteriological smears of the blood and various internal organs were negative, and blood stained in Wright's Stain had a normal appearance.

The Gyrodactylid worms found on the fins and gills of the trout in all ponds were few in number and had caused little damage. However, these same worms could cause serious losses to fry and fingerlings held under hatchery conditions and precautions should be taken to prevent this.

Tapeworms identified as Abothrium crassum (identification verified by Dr. G. R. LaRue, Parasitologist, University of Michigan) were found in 35 of the 52 fish examined (67 per cent infection) and were present in all ponds. The largest specimen measured 120 mm. long by 6 mm. wide. The life cycle of this tapeworm has not been reported but that of Bothriocephalus cuspidatus, a related genus in the walleyed pike reported by Essex in 1928, may provide some clue.

In B. cuspidatus the eggs hatch, are eaten by a copepod and develop into procercoids. The infected copepods are eaten by the pike where they develop into plerocercoids in the stomach and then directly into adult worms in the intestine, thus eliminating the need of a second intermediate host as is the case in most fish tapeworm life cycles.

This might well be the case at Harrietta where the infected fish are confined within ponds and have little opportunity to feed on other species of fish. It is possible, however, that the trout themselves may serve as second intermediate hosts and get the adult tapeworm through cannibalism.

It is interesting to note here that in 1917 Dr. G. R. LaRue received a shipment of tapeworms taken from brook trout at the Harrietta Hatchery and which were identified by A. R. Cooper, 1918, as Abothrum crassum, the same tapeworm that was found in the present shipment. It may be that the present infection is a continuation of the latter one since A. crassum is not confined to one species of host but has been reported from various Salmonid fishes.

I found no evidence of damage to the trout from the infestations of tapeworms although since the tapeworms are large for fish, it is conceivable that heavy infestations could sufficiently block the gut to cause serious disturbances.

Planting infected fish would serve to spread the infection to previously uninfected waters, if the proper intermediate host or hosts are present.

Butcher, 1940, in reporting on an outbreak of white spot, or Ichthyophthiriasis, at the Ballarat Hatcheries in Australia states that carp are carriers of this protozoan and serve to spread infections. He performed experiments on the temperature tolerance of Ichthyophthirius multifilus and found that lowering the temperature to 46°F. was fatal to the parasite. From this it would seem that the freezing of carp for trout diets would eliminate possibility of this infection. The freezing, however, would not destroy the furunculosis bacteria so that there is always a possibility of infection from this source.

Butcher, A. Dunbavin, 1941.

Outbreaks of white spot of Ichthyophthiriasis (Ichthyophthirius multifilus Fouquet, 1876) at the hatcheries of the Ballarat Fish Acclimatization Society, with notes on laboratory experiments.
--Proc. Roy. Soc. Victoria, Vol. LIII., Pt. I (New series) 1941, pp. 126-144.

Cooper, A. R., 1918.

North American Pseudophyllidian Cestodes from Fishes.
--Ill. Biol. Monog. IV:4:243 pp.

Essex, H. E., 1928

On the life-history of Bothriocephalus cuspidatus Cooper, 1917. A tapeworm of the walleyed pike.
--Trans. Amer. Mic. Soc., 47:348-355.

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