

Original: Fish Division
cc: Institute for Fisheries Research
Education-Game

Dr. Allison
INSTITUTE FOR FISHERIES RESEARCH

DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
UNIVERSITY OF MICHIGAN

ALBERT S. HAZZARD, PH.D.
DIRECTOR

September 17, 1947

ADDRESS
UNIVERSITY MUSEUMS ANNEX
ANN ARBOR, MICHIGAN

Report No. 1128

"GRUBS" IN MICHIGAN FISHES

by

Leonard N. Allison

RECEIVED
SEP 19 1947
FISH DIVISION

Most "grubs" in fishes are actually larval stages of certain parasitic worms that spend their adult life in another animal, usually a bird, and occasionally another fish. This type of parasitic worm does not grow into an adult directly from the egg, but must live in several different hosts (animals infected by the worm) before it can complete its development. Many of the various species of parasitic worms have definite limitations as to the species of hosts in which they can live, and have definite preferences as to the location in the body of the host which they infect. Some "grubs" are found only in the liver, some only in the skin and some only in the crystalline lens of the eyes.

The life cycle of a "grub" is the story of its life from egg to adult. The life cycles of only several of the "grubs" commonly found in Michigan fishes are given here as examples, since the same general pattern is followed by the majority of those occurring in fishes.

"BLACK-SPOT"

This "grub" may be seen as small black spots about the size of a pinhead on the fins and body of many species of fish. These black spots

are cysts containing the larval parasitic worm. If a kingfisher eats fish infected with "black-spot," the cyst wall is digested and the larval worm is liberated in the intestine of the bird. Here it grows into an adult worm and begins to lay eggs in about one month. The eggs pass out of the bird in the droppings and fall into a lake or stream where they hatch in about three weeks. These "first-larvae" (miracidia) swim around until they find a certain species of snail. They burrow into the snail and begin another stage of their life. However, they must find the right species of snail within a few hours or they die. Each "first-larva" that penetrates a snail multiplies a thousand-fold, and in about 42 days, the progeny leave the snail as "second-larvae" (cercariae) and swim in the water. Unless a suitable fish host presents itself within a few hours, these larvae perish. If they find a suitable fish host, they burrow through the skin and build a cyst wall around themselves. They are then the "third-larvae" (metacercariae). The fish builds an outer wall around the cyst which becomes darkly colored and is what we know as "black-spot." Within the cyst the parasite undergoes only slight development, and remains dormant until it is eaten by a kingfisher, in whose intestinal tract it grows into an egg-laying adult worm.

LIVER "GRUB"

The liver "grub" is another small larva of a parasitic worm, representing a stage in the life cycle similar to the cyst of "black-spot," except that the cyst wall is very thin and transparent. They occur not only in the liver but also in the kidneys, spleen, reproductive organs and heart membranes, sometimes in such large numbers as to greatly weaken the fish.

The life cycle follows the same pattern as that of "black-spot," involving fish, bird and snail. The great blue heron is the bird host, spreading infection as it visits various lakes and streams. Liver "grub" is most commonly found in the bluegill, pumpkinseed and rock bass, and occasionally in the black basses, minnows and darters.

YELLOW "GRUB"

The yellow "grub" also belongs to the same group of worm parasites as the "black-spot" and liver "grub", having a complicated life cycle involving fish, bird and snail. This parasite may occasionally be found as whitish or yellowish grubs encysted in the muscles of fishes. Sometimes they are seen just beneath the skin near the gill covers, or at the base of the fins and tail. In these locations they form wart-like bulges on the skin. Cysts may also be found in the muscles near the backbone and in the abdominal region. When removed from the cysts, the larvae are about a quarter of an inch long by one twentieth of an inch wide. The larvae live in yellow perch, bass, bluegills, sunfish, pike, minnows and darters. The adult worm lives in the throat and mouth of the great blue heron where eggs are laid and dispersed when the bill is thrust into the water.

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Unless present in large numbers, grubs do not usually adversely affect the fish hosts for they are dependent upon the fish to carry them to the next host. Since warm water favors the development of the parasite in the snail and since snails are more abundant in weedy

locations in lakes and streams, the number of "black-spot" cysts on a fish gives some clue to the habitat preference of that individual fish. Presence of a large number of the parasites would indicate that the fish had frequented areas of warm water where weeds, and snails, were abundant.

Fish carrying "grubs" need not be considered as unfit for food because, with one exception, they are not infective to man and are easily destroyed by normal cooking. The one exception, the broad tapeworm of man, is found in Michigan in a small area of the Upper Peninsula, but it too is easily destroyed by normal cooking. Man becomes infected with this worm by eating raw or improperly prepared fish.

The control of "grubs" such as those described above, could be effected by breaking the chain of events in the life cycle. Obviously, the snails would be the weakest link in the chain because of their restricted habitat. Snails can be adequately controlled in very limited areas, such as at fish hatcheries, but complete poisoning of all snails in a lake would be very costly, and would probably have to be repeated periodically because snail eggs or snails themselves could be transported to the lake on the feet and feathers of water birds.

Fish are also parasitized by many other larval and adult worms, but those specifically mentioned here are the most common ones found in Michigan. Most fish of our inland lakes and streams become infested with "grubs" although because of their small size they are usually not noticed. Occasionally they become very numerous and are then quite conspicuous.

Further information may be obtained by writing to the Institute for Fisheries Research, University Museums Annex, Ann Arbor, Michigan.

Specimens of parasites or infected fish should be preserved in 10 percent formalin or 70 percent alcohol.

INSTITUTE FOR FISHERIES RESEARCH

Leonard N. Allison

Approved by: ~~A. S. Hazzard~~ 9/17/47

Typed by: ~~S. E. Bommer~~