

MANUAL OF  
COMMON DISEASES, PARASITES, AND ANOMALIES  
OF MICHIGAN FISHES

INTRODUCTION

Fishing is a popular recreation in Michigan and many fishermen are intensely interested in the welfare of the fish. Consequently, the fish they catch are often scrutinized for anything unusual, and fisheries biologists, fish hatcherymen, and personnel of the pathobiology laboratory are consulted for identification of these conditions. Because fish, like humans, are attacked by a wide variety of bacteria, viruses, parasitic worms, tumors, and deformities, many inquiries are received every year.

Over the years a number of the more common afflictions of fish in Michigan were photographed by the staff of the Grayling Research Station. The illustrations should facilitate identification of the various parasites, diseases, and anomalies that affect Michigan fishes.

Since it would not be practical to include all known diseases of fish in manual form, this work was designed primarily to assist fisheries personnel to identify the common afflictions of fish in Michigan. Each subject is discussed briefly, including salient identification features, life cycles of parasites, and specific therapeutic measures for hatchery fish. References are included for those readers who desire to consult technical reports. The specific identity of many parasites, bacterial and viral diseases, and tumors can only be accomplished through complex laboratory techniques. Any unusual specimens not described in this manual should be taken to the fish pathobiology laboratory. Live specimens are most desirable, but fresh, refrigerated, or iced material is good, although material preserved in 70 percent alcohol or 10 percent formalin may be suitable in some cases. If there is any question about

the method of preservation, the pathobiology laboratory should be contacted for instructions. Valuable specimens may be destroyed through poor preservation.

All species of fish are vulnerable to invasion by parasites, depending somewhat on the habits of the species of fish and the type of lake or stream where they live. Many of the parasites that attack fish must live part of their lives in snails, so fish in shallow lakes with many aquatic plants, where most snails prefer to live, may be very heavily parasitized, and fish in deep lakes with few plants are lightly infested. In lakes that have deep water and weed beds in shallow areas, fish that prefer to live in shallow water may be heavily infested, while fish that prefer deep water may be lightly infested with parasites. Fish in streams that are cold and have few weeds have few parasites as compared to fish in warm, sluggish streams where weeds are abundant. The stage of the parasite in snails must have a certain degree of warmth for development.

Parasites usually do not destroy the animals they infest (hosts); if they did, they would soon eliminate their homes, and thus, themselves. Normally, most parasites do not visibly affect the health of fish, unless present in enormous numbers. One notable exception is the cataract worm. An intermediate stage of this parasite infests the crystalline lens of the eyes of fish, thus blinding it and making it easy prey for gulls, which are the final hosts where the parasite matures. Many people believe that parasites of fish may infest humans, thus they discard fish if a parasitic worm is observed. Actually, there are several parasites of Michigan fishes that are capable of infesting humans, but all are easily destroyed by normal cooking, smoking, or pickling practices. One parasite of the flesh of fish, the broad tapeworm of man (Diphyllobothrium latum), has been listed in textbooks as endemic in the Portage Lake area of the Keweenaw Peninsula. This information was taken from a study made about 40 years ago. A survey made in 1965 of fish from this area failed to find a single fish infested with this parasite.

Fish are no different than other animals where disease is concerned. A healthy animal is more resistant to disease than a weak animal, or an animal temporarily under stress. Fish are confined to living in water and are subjected to all the many natural and unnatural changes that occur. The body temperature of fish is not constant, as it is in mammals and birds, but is very close to the temperature of the water. Thus its metabolism is fast or slow, depending upon the water temperature. If the temperature changes very rapidly, physiological processes are drastically altered, sometimes causing death. Such things as low oxygen, excess silting, lightning, excessive current, supersaturation by gas, and pollutants of all kinds exert stresses on fish. If fish are not damaged directly by these things, they may be weakened, their resistance lowered, and they are then vulnerable to attacks by parasites, bacteria, fungus, etc.

A certain terminology is used to describe various stages in the life cycle of parasites and other conditions relating to pathology. Some of these terms are defined below:

1. Parasite: A plant or animal living upon or within another plant or animal and usually at its expense.
2. Host: A plant or animal upon or within which the parasite lives.
3. Intermediate host: A host that harbors a larval stage of a parasite. Some parasites have one or more intermediate hosts before they reach the final host.
4. Final host: The host that harbors the adult, or sexually mature, parasite.
5. Cercaria: Free swimming, larval stage of a trematode. It is released from snails where it developed.
6. Metacercaria: Larval stage of a trematode, living in the skin, flesh, or vital organs of the intermediate host. It developed from a cercaria that burrowed into the fish and it becomes an adult when eaten by the final host.

7. Plerocercoid: Larva of a tapeworm found in the flesh or vital organs of the intermediate host. When ingested by the final host it matures in the intestine of the final host.
8. Lesion: The easily visible or the microscopic changes which occur in the tissue and cells during disease, or as a result of injury.

Since the purpose of this manual is to assist the person with limited training in fish diseases to identify common afflictions of Michigan fishes, the diseases are grouped as to their location on the fish, either external or internal. Those diseases common to hatchery fish are so indicated and methods of control are included.