

**FISHERIES RESEARCH BOARD
OF CANADA**

MANUSCRIPT REPORTS OF THE BIOLOGICAL STATIONS

No.

516

Title

The bearing of the Great Slave Lake and the Lake Winnipeg
on the Triaenophorus problem

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May, 1951

INTRODUCTION

Personnel of the Central Fisheries Research Station are making detailed studies of the commercial fisheries of Great Slave Lake and of Lake Winnipeg. These studies complement one another. The practical application of the results of these studies to the management of Canadian lakes has been discussed elsewhere. Those aspects of the studies that are likely to have a bearing on the control of T. crassus are discussed here.

Both lakes have all the organisms usually involved in Trianaenophorus studies. In addition to the parasite T. crassus there are the plankter, Cyclops bicuspidatus, the cisco, Leucichthys spp. (apparently 3 species in each lake), the lake whitefish, Coregonus clupeaformis, and the pike, Esox lucius. In addition, Great Slave Lake has the following species of fish which are less commonly involved in the life history of the parasite: lake trout, Cristivomer namaycush; round whitefish, Prosopium cylindraceum; inconnu, Stenodus leucichthys and American grayling, Thymallus signifer.

Great Slave Lake and Lake Winnipeg together yield almost one-half of all the whitefish produced in Canada. Also any general principles which apply to these lakes probably apply to most large Canadian lakes which produce whitefish.

On Great Slave Lake data are being collected regarding "black whitefish". These fish are distinguishable from the more usual Coregonus clupeaformis by being darker and more terete, by

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spoiling more quickly, by being generally found in a special habitat, and by being more heavily infested with T. crassus. "Black whitefish" are known from some other lakes where they are usually heavily infested with T. crassus. There is considerable doubt as to whether they should be regarded as taxonomically different from the more usual C. clupeaformis or whether the observed differences should be regarded as the result of environment only (in Lake Winnipeg the available information indicates that individual whitefish probably change their shade of blackness "at will"). This matter is of considerable importance in managing lakes where "black whitefish" occur, since if they are genetically different fishermen should be encouraged to eliminate them from the lake, while if the difference is the result of environment alone, then they should be protected because although they are valueless in themselves they are potential parents of useful fish.

Although Mr. J. J. Keleher's study of the relationship between T. crassus and various Leucichthys spp. is regarded as a separate study from those under consideration here, it is nevertheless true that the presence of the parties which are studying the commercial fisheries on Great Slave Lake and on Lake Winnipeg has facilitated his studies. It is significant that Mr. Keleher has chosen to do most of his fundamental research on these two

lakes. Similarly the presence of the party on Lake Winnipeg influenced Mr. G. Arnason to do the major part of his food studies--which were related to the Triacnophorus problems--on the stomachs of coregonines from that lake. Lake Winnipeg is a logical place to do many types of fundamental studies since it is the lake nearest to the Central Fisheries Research Station.

From observations on Lake Winnipeg, supplemented by some on Great Slave Lake, it has become apparent that whitefish (at least in larger lakes) probably are grouped in schools which retain their identity over considerable periods of time. Each school has its own rate of infestation with the parasite. It is important to realize this fact when preparing a plan for certifying the rate of infestation of fish that are to be exported. It is obvious that fish from one school might be acceptable for export while those from another school from the same lake would not be.

The same personnel as are studying the commercial fishery of Lake Winnipeg also are experimenting with two types of gear not normally used in the lakes of Western Canada to see if they could be useful for Triacnophorus control. The Lake Erie type trapnet is being tried to see if it is an effective means of decreasing a cisco population. A trammel net is being tried to see if it is an effective means of decreasing a pike population. A decrease in numbers of either of these species of fish will probably reduce the population of T. crassus.

Although at present the above are the most tangible contributions to the solution of the Triaenophorus problem that are being made in connection with the general studies of the commercial fisheries of Great Slave Lake and Lake Winnipeg, the data that are being accumulated during these studies will probably eventually be by far the greatest contribution. These studies are expected to indicate relative abundance of the species, fluctuations in abundance, changes in average size of the fish, changes in rates of growth and relative year class strength. A little thought will show some of the many ways in which this type of information is likely to have a bearing on the Triaenophorus problem. As an example, the relative abundance of the various species is important among other things because of its probable effect on feeding habits in ways such as: the young of most fish eat plankton, so that they are competing with the coregonines for those Cyclops bicuspidatus which are carrying procercooids of T. crassus; the relative abundance of those fish which eat bottom fauna probably has an effect on the degree to which Coregonus turn to plankton food, hence expose themselves to infestation with T. crassus; the relative abundance of other predators and of other prey no doubt influences the extent to which pike eat tullibee, which in turn governs their chances of getting the parasite. The above serve as examples of the many ways in which the data that are being accumulated are likely to clarify those

ecological relationships which determine the abundance of T. crassus.

The role of these studies of the commercial fishery in the solution of the Triaenophorus problem will probably be that of supplying information which will serve as background material for those studies in which the problem is attacked more directly. Several bits of information, other than those mentioned above, that were accumulated during the study of the commercial fisheries have already had a subtle influence on the progress made to date in the parasite studies.

Many times the quantity of certain types of data can be gathered by a given number of investigators from a thorough study of a commercial fishery than can be gathered by the same number of investigators, if they have to catch the fish to be used themselves. It is therefore, obvious that a study of one or more commercial fisheries is the most economical way to attack some parts of the whole Triaenophorus problem.