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A FOOD STUDY OF FUNDULUS DIAPHANUS FROM CHAMCOOK LAKES, N.B. CANADA.

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The present paper records the results of analyses of stomach and alimentary tract content of Fundulus diaphanus (Le Sueur). This fish, commonly known under the name of killifish, has the wide distribution in the Canadian Maritime provinces and in the provinces of New England. As with the majority of other minnows it has received but little attention from standpoint of aquiculture. However, it is evident that due to its extreme abundance in many localities it must play a part of some importance in the ecology of our lakes and streams. For a complete understanding of the biological conditions of our waters it is not enough to study the life history of important game and commercial fishes only but it is also necessary to study the ecology of those organisms which occur together with them. A study of the feeding habits of killifish was, therefore, included in the large program of Chamcook lakes investivations carried out under the auspices of the Biological Board of Canada.

Killifish are distributed in First and Second Chamcook lakes in littoral regions where they are associated with Notropis cornutus, Couesius plumbeus, Eupomotis gibbosus, Gasterosteus aculeatus and young Tatostomus commersonnii.

The fact that no remains of killifish have been found in alimentary tracts of landlocked salmon, speckled trout and togue, might support the suggestion that it is restricted entirely to shallow places. As far as we know killifish are not a food of salmon

or trout in Chamcook lakes. One fresh specimen of killifish was found in the stomach of an eel from Second Chamcook lake taken in fairly shallow water near shore.

The analyses of fifty stomachs of killifish from Chamcook lakes show that although its food consists mostly of planktonic Crustacea it takes also certain amounts of bottom as well as surface food. In contrast to Catostomus fry, Fundulus diaphanus feed chiefly on animml food and most of the algae which occur in quantity in the alimentary tract of sucker fry, caught at the same place and time as the killifish, are absent from the stomach content of the latter.

The total combined stomach contents of fifty killifish of 32-68 mm. in length, all one year old, from the above mentioned lakes secured during the first week of July, 1935, were: planktonic Crustacea - 23 species or over 9,000 individuals, the majority of which were Diaptomus minutus; bottom organisms - 6 species or approximately 360 individuals, most of which were Chironomidae larvae; surface insects, mostly small Deipters, about 20 individuals; planktonic algae comprising Bacillarieae, Myxophyceae and Chlorophyceae, were in small number; miscellaneous as Hydracarina, Corixa, etc., insignificant amount; eggs of fish and eggs of insects - fair amount.

From the following table it is evident that killifish destroy a certain quantity of fish eggs, belonging probably to Notropis cornutus and other minnows, as well as many eggs of aquatic insects,larvae and adult stages of which provide one of the most excellent items of food for salmon and trout. It might be pointed out that due to their small size mouth killifish can devour the

salmon or trout eggs but it is possible, however, that they destroy also smelt eggs. The last statement needs verification as we have not examined stomach contents of Fundulus diaphanus in early spring when smelt usually spawn.

The following is a summarized result of food analyses of fifty yearlings Fundulus diaphanus from Chamcook lakes:

Crustacea

Acropterus harpae	40
Alona quadrangularis	104
Alona rectangula	295
Alona sp.	110
Alona costata	125
Alonella nana	1
Bosmina longirostris	140
Canthocamptus minutus	137
Ceriodaphnia quadrangula	165
Chydorus sphaericus	18
Cyclops serrulatus	80
Cyclops sp.	65
Cypris sp.	193
Daphnia longispina	16
Daphnia pulex retrocurva	30
Diaphanosoma leuchtenbergianum	7
Diaptomus minutus	7723
Drepanothrix dentata	1
Holopedium gibberum	15
Hyalella knickerbockeri	5
Ilyocryptus sp.	1
Leptodora kindtii	1
Rhynchotalona falcata	2
Nauplii	0

Insects

Chironomidae (larvae)	302
Corixa sp.	4
Culex sp.(puppae)	1
Diptera (imago)	9
Dixidae (larvae)	3
Ephemeridae (nymphs)	7
Odonata (nymphs)	1
Trichoptera (larvae)	50
Simulium sp. (imago)	9

Rotatoria

Cathypna luna	1
Rattulus cylindricus	10

Algae

Bacillariear (Synedra, Cocconema, Surirella, Navicula, etc.)	Fair amount
Myxophyceae (Anabaena, etc.)	few
Pediastrum integrum	1
Spirogyra sp.	few

Ova

Fish eggs	50
Insect eggs	540
Mollusca eggs	100

Miscellaneous

Fragments of larger aquatic plants	few
Hydracarina	2
Nematoda (free living)	1
Planorbis sp.	1

Several two-year-old specimens of killifish ranging from 75 to 84 mm. in length were obtained during the second part of September from First Chamcook lake and an examination of their stomachs shows that they were feeding mostly on nymphs of Hexagenia and other mayflies as well as on small Trichoptera larvae. Remains of certain planktonic crustaceans were also found in their stomachs but in comparatively small amounts.