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FOOD OF THE MINK IN MICHIGAN: Its Relation to Fish Life

An opportunity to accomplish this piece of work was given in the spring of 1931 by Dr. Ned Dearborn of the School of Conservation, University of Michigan. Dr. Dearborn had just completed a study of the food habits of the mink through the 12-month cycle. He invited the writer to re-check the identification of fish in those mink stomachs thought to contain fish fragments. This the writer did, with the results shown in the detailed list of the analyses.

The material figuring in this work is distinctive in that it served three classes of specialists here at the University: the Parasitology division of the Zoology Department, the School of Forestry and Conservation, and the Institute for Fisheries Research. Dr. Dearborn's extensive study of the food habits of the mink is we presume now in the hands of the Conservation Department. Since, however, much time and careful work was expended in making the identification of the fish fragments, as accurately as possible, it was thought that this service and information should be made available to the Fish Division of the State in the form of a report from the Institute for Fisheries Research.

Most of the material was in the form of mink feces. A few stomach contents were available. This report, in its embodied results, strikingly demonstrates the validity for Mammals of fecal examinations as an index of their food habits. But it must be most emphatically stated that this is not true for fish-eating birds. Much has been made of the food habits of Great Blue Heron information as to which was obtained from regurgitated material collected from under the heron rookery. No less than three

ornithologists of repute and one national biological organization (economic) have been led astray by the information thus obtained. Whereas a comparison between the regurgitated material found under a given heronry and the actual contents of the stomachs of a reasonable number of herons inhabiting that heronry demonstrate an incomparable hiatus between the two. This the writer is prepared to prove in a forthcoming report as a result of field studies of a heronry during the summer of 1931. Yet this spurious information is now utilized to a varied extent in game and fish administration over the nation.

The Institute investigator only presumed to identify the fish remains. The identification of other vertebrate remains as made by Dr. Dearborn, was taken for granted. Dr. Dearborn has an honored name in the ranks of economic zoologists and it is due to his zeal that the feces analysis method has been so successfully developed for our common and often times wrongly persecuted Mammals. All determinations were made on the basis of actual skeletal or scale evidence, checked against prepared skeletons of the forms so designated. This is true of all reports on the food of fish predators rendered by the Institute.

From their contents, it is evident that with few exceptions these mink came from non-trout streams and lakes. In fact, field work has failed to demonstrate any considerable mink population on the trout streams of the lower peninsula as a whole, either from observation of the living mink or presence of tracks, feces etc., along such streams. The writer was glad to hear Mr. Ruhl of the Game Division recently evince the same opinion. Locally, of course, mink do fish in some numbers along trout streams.

On the basis of this small number of samples, the mink appears to take rather large fish (as one would expect) and to manifest almost a preference for species of the sunfish family. However, the frequency of the latter in the mink's diet is probably accounted for by Dr. Hubbs' explanation. He says that sunfish rest at night on the bottom of pools. Further, extensive trapping experience with this animal has convinced the investigator that the mink is fonder of fishing quiet pools than ripples.

Considering the species of fishes included in the mink diet, it will be seen that

basses, sunfishes, Crappie, bluegill, rock bass occur most frequently. These are noted in the report simply as centrarchids whenever the evidence was not sufficiently positive as to the species present. Centrarchids, then, occur as such in 14 examinations, totaling 20 fish.

Positively identified Centrarchids include:

- a. Green sunfish (3) in 2 mink.
- b. Rock bass in 2 mink.
- c. Black bass (2) in 1 mink.
- d. Common sunfish (E. gibbosus) (4) in 3 mink.

The common sucker was found in 2 mink samples, and the hog-molly (Hypentelium) in one. Brook trout occur in 3 separate instances. Member of the large minnow family are present in 9 mink. The mud minnow (U. limi) was found in 6 mink. A carp was identified in one case and a yellow perch in another. The bones of 3 muddlers (Cottus) were detected in the last stomach analyzed. The bones of these fish are so resistant to digestion that they certainly would have passed through the animal in a readily identifiable form, if eaten. This closely parallels my experiences in studies on the fish-eating birds. In the stomachs of these species, Cottus occurs very infrequently. I have come to consider Cottus as having the best protective scheme of any of our fresh-water fishes. In fact, the water snake (Natrix) is the only consistent consumer of Cottus I have been able to find. Fish, the exact species of which was not determinable from the scanty fragments, occurred in 23 mink. Nevertheless, in many instances, the evidence was sufficient to place the respective fish in their family group.

The individual examinations now follow. For a complete picture of the minks diet, the percentages and classes of food, the reader is referred to Dr. Dearborn's report. Although a report of this work was afforded Dr. Dearborn earlier in the fall of 1931, it was not assembled in the form of a formal report to the Fish Division until recently, due to the pressing need for work on other predators.

ANALYSES OF FISH ITEMS IN DIET OF MINK FROM MICHIGAN

- M 1. Bones and scales of 1 common sucker.
Hair and bone fragments of some mammal.
Wood and stem fragments.
- M 2. June 1930. Ann Arbor, Mich.
Centrarchid fish scales.
- M 3. Ann Arbor. Sunfish.
Scales of 1 green sunfish two years old.
- M 5. Late Oct. 1930. Grasshoppers, mouse hair and bones, fish bones.
Bones (dentaries and orbitals) of two 3" large-mouthed black bass.
- M 23. Dec. 1930. Paris, Mich. Fish only.
Traces of centrarchid (by scale fragment and supraoccipital).
- M 24. Dec. 1930. Paris, Mich. Fish only.
Bones of one brook trout about 10" long (perfect vomer).
- M 40. Dec. Bradley, Mich. Fish?
Fish bones. Suborbital of a sucker, probably H. nigricans.
- M 56. Dec. 1930. Muskegon, Mich. Fish, muskrat.
A centrarchid, from characteristic scales on base of fin.
- M 57. Dec. 1930 Bones - undetermined.
Bones of a minnow.
- M 59. Dec. 1930. Paris, Mich. Fish bones.
Fish and frog bones.
- M 63. Dec. 1930. Linden, Mich. Fish bones.
Scales and bones of centrarchid fish.
- M 73. Dec. 1930. Stockbridge, Mich. Fish and Microtus, crayfish, and peculiar set of teeth.
1 mud-minnow, crayfish and Microtus. Peculiar set of teeth are crayfish mandibles.
- M 89. Dec. 1930. Sebawaing, Mich. Minnow.
Minnow.
- M 92. Dec. 1930. Steuben, Mich. Fish traces.
Fish bones - minnow.
- M100. Dec. 1930. Stockbridge, Mich. Fish, muskrat.
Scales of a large centrarchid, most likely a rock bass.
- M103. Dec. 1930. Hillsdale, Mich. Fish traces.
Remains of 2 green sunfish (otoliths, jaws, etc.).

- M 113. Dec. 1930. Mich. Muskrat and fish.
1 centrarchid about 8" long.
- M 117. Dec. 1, 1930. Hanover, Mich. Fish - a trace.
Preopercle and scales of a mud minnow.
Bones of a frog.
- M 121. Dec. 1930. Muskegon, Mich. Fish, muskrat.
A centrarchid, from characteristic scales on the base of fin.
- M 134. Dec. 1930. Metamora, Mich. Fish bone traces.
Traces of fish bones.
- M 135. Dec. 1930. Coopersville, Mich. Fish.
Bones and scales of a centrarchid fish. From the subopercle it seems to be one of the two basses, large-mouth or small-mouthed.
- M 136. Dec. 1930. Fennville, Mich. Fish scales and bones.
Mud-minnow.
- M137. Dec. 1930. Romeo, Mich. Fish, frog.
Minnow, frog.
- M 138. Dec. 1930. Marshall, Mich. Frog, crayfish, Miller's thumb.
Frog, crayfish, and traces of unknown fish.
- M 141. Dec. 1930. Quimby, Mich. Fish.
Bones of 1 minnow.
- M 151. Dec. 1930. Ortonville, Mich. Fish.
Scales and bone fragments of a centrarchid fish.
Tooth fragment of a minnow.
- M 186. Dec. 1930. Union City, Mich. Beetle, fish.
Bones and scales of minnow.
- M 195. Nov. 1930. Union City, Mich.
Bones and scales of a centrarchid.
- M 199. Dec. 1930. Allen, Mich.
Bones of minnow.
- M 210. Nov. 1930. Kiva, Mich. Cottontail, fish.
Same, fish traces slight.
- M 223. Nov. 1930, Barbeau, Mich. Dragonfly larvae, fish bones.
Fish bones and dragonfly nymph. Nymph was probably in stomach of the fish.
- M 225. Nov. 1930. Munising, Mich. Fish bones.
Traces of a centrarchid (preopercular).
Tubular bones of an amphibian.
- M 227. Nov. 1930. Prescott, Mich. Fish bones.
Bones of unidentified fish.

- M 229. Nov. 1930. Marshal, Mich. Fish bones.
Bones of: 1 common sucker
1 pumpkinseed sunfish
4 minnows (Notropis cornutus chrysocephalus.)
- M 230. Nov. 1930. Coldwater, Mich. Fish.
Bones of 1 rock bass.
- M 239. Nov. 1930. Barbeau, Mich. Frog, fish.
Bones of 1 mud minnow (Maxillary and opercle).
- M 240. Nov. 1930. Ste. Marie, Mich. Fish.
Bones of a centrarchid, probably a rock bass.
- M 247. Nov. 13. Prescott, Mich. Fish.
Bones of 1 brook trout about 6" long.
- M 249. Nov. 1930. Prescott, Mich. Fish.
A minnow (preopercle)
- M 250. Nov. 1930. Marshall, Mich. Frog, crayfish, fish.
Rib bones, scales and vertebrae of a carp.
- M 257. Nov. 1930. White Pigeon, Mich. Crayfish, frog, fish.
Crayfish, frog and 4" yellow perch.
- M 279. July 1930. Omstead, Mich. Fish 2 1/2 cc.
1 sunfish 4" long, 1 mud-minnow 3", traces of crayfish and a big carabid beetle.
- M 280. Aug. 1930. Houghton Forest, Mich. Fish bones.
Bones of 1 mud-minnow, 1 trout, several frogs, and at least one rodent. Remains of crayfish and numerous insects, including a mole cricket, a tiger beetle, a carabid, and two species of Dytiscus.
- M 293. March 1931. Homer, Mich. Cottus, Rana, Cambarus.
Unidentified fish; frog, crayfish.
- M 311. Atlanta, Mich. Examined only Salyer.
Bones of 3 muddlers, - ave. 3" long.
Traces of a centrarchid (Maxillary and fin rays).
2 small snails (Physa), probably from stomachs of muddlers.

This investigation was made and report prepared by the undersigned.

INSTITUTE FOR FISHERIES RESEARCH

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