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ANALYSIS OF THE STOMACH CONTENTS OF THIRTEEN AMERICAN
MERGANSERS AND TWO AMERICAN GOLDEN-EYES FROM THE
KALAMAZOO RIVER, ALLEGAN COUNTY, MICHIGAN

Thirteen American Mergansers (Mergus merganser americanus Cassin) and two American Golden-eyes (Glaucionetta clangula americana (Bonaparte)) were received on March 20, 1937, from Mr. G. W. Bradt of the Game Division of the Michigan Department of Conservation. According to Mr. Bradt, these birds were collected three days before, on March 17, on the Kalamazoo River, Allegan County, Valley Township, T. 2 N., R. 14 W., "on a stretch of approximately six miles, including curves, between 12:30 and 4:00 o'clock p.m. Weather clear, strong west wind; about 500 ducks flushed on the river during the collecting trip, approximately half mergansers and half golden-eyes, with occasional old squaws and black ducks."¹ The identification of the birds sent in was made by Mr. Thomas Henshaw of the Ornithology Division of the Museum of Zoology at the University of Michigan. One Old Squaw was also received but the stomach was discarded by mistake in the preparation of a study skin of this specimen.

The contents of the stomachs of the Mergansers and Golden-eyes were analyzed and the findings for each individual were recorded. (Table 1).

¹ Letter of April 6, 1937 from Mr. Bradt.

All thirteen of the Mergansers had eaten carp. Unidentifiable remains of fishes occurred in twelve fish-duck stomachs. Four stomachs of this same species contained minnows (Cyprinidae) other than carp, and mud pickerel and sunfishes each were present in three. Some coarse gravel was found in all. The percentage composition by volume of the contents of the Merganser stomachs and the number of individuals of the various kinds of fishes present are given in Table 2. The count of the number of individuals represented for each kind of fish is actual.

The counts for carp were obtained from pharyngeal pads present in the stomachs. These pads are roughly pentagonal in outline and are non-calcareous, being cartilagenous or "gristly" in nature. They seem to offer a grinding surface against which the pharyngeal teeth work and number one per carp. Since they remain in the stomach long after all other traces of many of the individuals which they represent have disappeared, they symbolize a greater number of carp for any one duck than would be taken at one feeding. This same cumulative effect of the persistence of the pharyngeal pads enhances the per cent by volume of carp in the total volume of the stomach contents observed and is therefore somewhat misleading.

In contrast to the feeding habits of the American Merganser when it is forced by severe winter conditions onto trout streams, these data indicate positively that when this species feeds where coarse fish are dominant or abundant it will eat these possibly less desirable fish forms.

A study of the stomach contents of two Golden-eyes is hardly sufficient material upon which to draw any far-reaching conclusions. However, it should be noted (Table 1) that evidence of fishes is entirely lacking from the stomachs of this species. This agrees with other findings as to the food habits of this duck, even on trout streams.

INSTITUTE FOR FISHERIES RESEARCH

Karl F. Lagler
By: Karl F. Lagler

Table 1

Individual Records of Stomach Contents of Thirteen American Mergansers and Two American Golden-eyes from the Kalamazoo River, Allegan County, Michigan

American Merganser				Items constituting contents of stomach	Estimated Total Length of Item in Inches	Volume of Item in cc	Remarks
Sex	Maturity	Weight					
		Pounds	Oz.				
Male	Adult	1 ¹ / ₂	15	15 Carp (<u>Cyprinus carpio</u>) Gravel	4-6" estimated average To 3/16"	3.0 1.0	No flesh; bones and pharyngeal pads of at least 15 only present.
Male	Immature	3	10	16 Carp (<u>Cyprinus carpio</u>) 1 Pumpkinseed (<u>Eupomotis gibbosus</u>) Fish bone remains Gravel	4-6" 2 1/2" To 5/16"	21.0 5.0 1.0 1.5	Flesh; pharyngeal teeth of 2; pharyngeal pads of at least 16. Undigested. Length an actual measurement. Probably carp.
Male	Immature	3	11	13 Carp (<u>Cyprinus carpio</u>) Fish bone remains Gravel	4-6" To 4/16"	20.0 0.5 1.2	1 actually measured 6 3/4"; pharyngeal pads of at least 13.
Male	Immature	3	11	18 Carp (<u>Cyprinus carpio</u>) 1 Golden shiner (<u>Notemigonus crysoleucas auratus</u>) Fish bone remains 1 Pumpkinseed (<u>Eupomotis gibbosus</u>) 1 Mud pickerel (<u>Esox vermiculatus</u>) Vegetable matter Gravel	4-6" 2 3/8" 2 3/4" 5 1/8" To 6/16"	9.0 0.5 0.2 3.2 0.5 1.2	1 tail region with flesh; bones and pharyngeal pads of 17 Bones only. Head digested off. Few bones and scales of at least 1. Leaf fragment.

Table 1 (Continued)

American Merganser				Items constituting contents of stomach	Estimated Total Length of Item in Inches	Volume of Item in cc	Remarks
Sex	Maturity	Weight					
		Pounds	Oz.				
Male	Immature	3	10	38 Carp (<u>Cyprinus carpio</u>)	4-6"	43	Caudal area with flesh of 1; pharyngeals of 7; flesh and scales; pharyngeal pads of at least 37.
				Fish bone remains		0.5	Probably carp.
				Gravel	To 3/16"	1.2	
Male	Immature	3	14	41 Carp (<u>Cyprinus carpio</u>)	4-6"	37	Caudal region and head bones of 1; pharyngeal pads of at least 41.
				1 Pickerel (<u>Esox</u> sp.)			Few partly digested scales--probably <u>E. vermiculatus</u> .
				Fish bone remains		1.7	
				Gravel	To 6/16"	1.0	
Male ?	Immature	2	3	27 Carp (<u>Cyprinus carpio</u>)	4-6"	2.5	27 pharyngeal pads; a few scales.
				1 Golden shiner (<u>Notemigonus crysoleucas auratus</u>)	2 7/8"	0.2	Pharyngeals 5-5; scales of at least 5-5.
				Fish bone remains		0.5	
				Gravel	To 3/16"	0.7	

Table 1 (Continued)

American Merganser				Items constituting contents of stomach	Estimated Total Length of Item in Inches	Volume of Item in cc	Remarks
Sex	Maturity	Weight					
		Pounds	Oz.				
Male	Immature	4	3	18 Carp (<u>Cyprinus carpio</u>)	4-6"	40.0	1 undigested measured 6 1/8"; pharyngeal pads of at least 18.
				Fish bone remains		1.0	
				Gravel	To 5/16"	1.2	
Male	Adult	3	14	28 Carp (<u>Cyprinus carpio</u>)	4-6"	3.0	Few bones and pharyngeal pads of at least 28.
				Fish bone remains		0.8	
				Gravel	To 3/16"	0.2	
Female	Immature	3	3	21 Carp (<u>Cyprinus carpio</u>)	4-6"	33.0	1 undigested measured 6 1/4"; pharyngeal pads of 20 others.
				Fish bone remains		0.5	
				2 Feathers of Merganser Gravel	To 4/16"	1.2	
Female	Immature	2	10	27 Carp (<u>Cyprinus carpio</u>)	4-6"	19.0	Some flesh and scales; 27 pharyngeal pads. Pharyngeals 4-4.
				1 Minnow (<u>Cyprinidae</u>)	1 3/4"		
				Fish bone remains		1.0	
				Gravel	To 3/16"	0.6	

Table 1 (Continued)

American Merganser				Items constituting contents of stomach	Estimated Total Length of Item in Inches	Volume of Item in cc	Remarks
Sex	Maturity	Weight					
		Pounds	Oz.				
Female	Immature	2	13	28 Carp (<u>Cyprinus carpio</u>)	4-6"	24.0	Flesh, bones, scales, and 28 pharyngeal pads.
				1 Mud pickerel (<u>Esox vermiculatus</u>)			Scales
				Fish bone remains		0.3	
				Gravel	To 2/16"	0.5	
Female	Immature	2	14	26 Carp (<u>Cyprinus carpio</u>)	5-6"	2.0	Pharyngeal pads of at least 26 plus some carp bones.
				1 Golden shiner (<u>Notemigonus crysoleucas auratus</u>)	2 1/2"	2.1	Undigested. Length measured.
				Sunfish (Centrarchidae)			Segment of dentary bone and 1 partly digested pharyngeal. Probably <u>E. gibbosus</u> .
				Fish bone remains		0.5	
			Gravel	To 3/16"	0.3		

Table 1 (Continued)

American Golden-eyes				Items constituting contents of stomach	Estimated Total Length of Item in Inches	Volume of Item in cc	Remarks
Sex	Maturity	Weight					
		Pounds	OZ.				
Female	Adult ?		12 ¹	25 Caddis fly (Trichoptera) larvae	To 3/16"	0.2	At least 25. Largely dis-articulated by digestion. Mostly <u>Hydropsyche</u> sp. ² Includes on large mandible.
				Unidentifiable insect remains		0.1	
				Gravel ³		0.2	
Male	Immature	2	2	49 Caddis fly (Trichoptera) larvae and a few of their houses.		0.4	Mostly <u>Hydropsyche</u> sp. Head and thorax. Very fine
				1 Hellgrammite (<u>C. Corydalis</u> sp.)		0.2	
				3 Snails (<u>Goniobasis livescens</u>) ⁴		0.1	
				Unidentifiable insect remains		0.2	
				Few tiny woody stem fragments ³			
Gravel	0.1						

¹ Weight of skinned carcass.

² Determined by J. W. Leonard

³ A portion of this material is undoubtedly from caddis larva houses.

⁴ Identification verified by C. Goodrich.

Table 2

Number of Individuals Composing Each Item and Volume and Per Cent of Total Volume of Items or Types of Items Present in the Stomachs of Thirteen American Mergansers from the Kalamazoo River.

Item	Number of individuals	Volume of item in cc.	Per cent of total volume
Carp	316	265.5	89
Gravel		11.8	4
Miscellaneous fish		8.5	3
Sunfish	3	8.2	3
Other minnows	4	2.8	1
Pickerel	3	0.5	0.2
Total volume		288.3 cc.	100.2%