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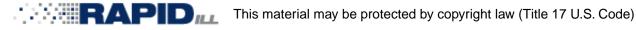
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SEINING RECORDS AND FOOD OF THE INTERMEDIATE STAGES OF LAKE ERIE FISHES A. E. ALLIN

Although the biological part of the summer's work consisted largely of plankton analyses and a study of the early life history of the fishes of Lake Erie, due record was made of any later stages observed or taken in the nets. Occasionally a larger specimen was taken in the meter net or the Helgoland trawl, but such ocurrences were uncommon. Such gear rarely captures any fishes longer than 25 mm. in the daytime due to the limited straining ability of the fine mesh. For stages between 25 mm. and 60 mm. offshore, the Petersen trawl has proven most effective, and is quite as applicable to large lakes as to the sea.

The trawl records in the following table indicate the large number of individuals, if not species, taken.

Station	Gear	Species	No.	Aver. Dimensions (S. L. & D. mm.)	Remark
02.02	P. trawl	P. flavescens (Mitchill)	631	37.0 x 9.5	\
02.04	P. trawl	P. flavescens (Mitchill)	212	41.0 x 11.0	
02.04	P. trawl	N. atherinoides (Rafinesque) ¹	7	47.0 x 9.0	
02.04	P. trawl	C. cognatus	2	Aver. S. L. 17 mm	
02.04	P. trawl	P. guttatus (Agassiz)	7	Aver. S. L. 18 mm	
02.05	P. trawl	P. caprodes zebra (Agassiz)	1	62.0 x 11.0	
02.11	P. trawl	P. caprodes zebra (Agassiz)	1	22.0 x 3.5	
02.21	P. trawl	P. guttatus (Agassiz)	1	S. L. 28 mm	
7A	H. trawl	B. nigrum (Rafinesque)	3	2 f. 32 x 5	mature ova
				1 m. 35 x 6	

The efficiency of the net is indicated by the catches of 631 and 212 specimens respectively taken at stations 2 and 4 on the second trip. In view of the small number of specimens obtained at most of the other stations it would appear that there were few fishes between the lengths of 25 and 60 mm. offshore during the period of the investigation. The yearlings of the fall spawners (of 1927) were too large and active to be taken, and many, perhaps the majority of the early spawners, would most likely have been found in the shallower waters about the margin of the lake. The young of those

species spawning in the early summer were taken in the fine mesh nets. It may be noted that the greater number of intermediate stages was found at the eastern end of the area studied.

On July 9, 1928, three hauls were made at the mouth of a small stream on the west side of Grand Island with a one-hundred and-fifty foot seine for the purpose of determining what food was being taken by the fish of the region. The natural lake food supply was supplemented by outwash from the land as well as backwash from the Niagara River. Table 29 lists the stomach contents of the fishes taken in the three hauls at Grand Island together with a percentage table of the food of all the adult fish taken during the summer.

Although the number is too small to give an adequate idea of the food of the fish in the lake, excepting at one or two individual stations, it is interesting to observe that those fish, taken in the seine hauls, vividly show a balance of nature even in so restricted an area. There are those fish feeding on algae and diatoms, those living principally on crustaceans or larvae of aquatic insects, and finally those feeding on smaller fish and fish eggs. In the first class may be included the Cyprinidae and Catostomidae; in the second, the smaller Percidae and Centrarchidae; in the third, the larger Percidae, Esocidae, and Catostomidae.

TABLE 29.—Percentage of organisms in stomach contents

REMARKS										Coptotomus 1-2%						6 sp. Av. L. 115 mm. 100% Crustacea debris			Crustacean debris 50	Crustacean debris 50						Crustacean debris 50
dei¶							1	i									100								-	
Figh eggs	-	-			92	-	1	-	-	-	-		-	-			-	-	-		20	-	-			-
Frag. adult Insects	-		-		10	20	10		-			-		-					-	-		-	-			
эяБіліту О	25		35				S		8	9																
Backis sp.																										-
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Cambarus ap.														İ				i								
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SpoqeqoO		_		20			12	10					12	œ	_											
Daphnia sp.	10	<u>~</u>		4		40	-	ļ	-			-	18	2	10		_		<u> </u>	_	_	_	_	-		_
Rotifera			_		— 		t	t	_		-		t +		_			_						-	+	
Сріогорруссва		80	15			10	3	70	10		1	33	5		10			100	20	20	50	100	3	100	06	20
Bacillariaceae		- -	t	_			— 	~	+			_	_							_						
T. L. mm.	73	51	75	71	85	85	62	06	73	88	81	06	89	69	69				_							
SPECIES, STATION AND DATE	C. commersonii	Grand Island	7-9-28		· '		H. nigricans	Grand Island	7-9-28	·'			M. lesueurii	Grand Island	7-9-28	N. hudsonius Grand Is. 7-9-28	N. hudsonius	Sturgeon Pt.	7-6-28				·			

TABLE 29.—(cont'd).

Fish	- -	Crustacean depris 100			06								Crustacean debris 96		Crustacean debris 90		Crustacean debris 10		001	Orustacean debris 100						_
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Frag. adult Insects		3	S	යි	101	Š.				100	7	٦	4 4		* S	3 2	3									
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Ттісореєва	- -	- -	- -	-			-	-	-	-	+	-	-	-	-	- -	-	-	-	-	- -	- -	- -	-	-	-
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Daphnia sp.	-		- -	- -						-	 	-	55		-		-	_			- -		1001	8	-	-
Rotifera	-	-	-	1			-			-	-		-	-	-		-		-		-		-		_	ŀ
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ВасіЛатівсеве	-		- -	- - 	_	_			-		[— 				-	-	-				-	-		<i>:</i>	_	-
T. L. mm.	95	8	32		င္တ	103	95	73	73	75	84	48	65	39	47	35	38	35	33	450	7.2	67	65	51	46	707
SPECIES, STATION AND DATE	N. cornutus	frontalis	Grand Island	7 0 00			·'	 -	'	' 	-	N. atherinoides	Sturgeon Pt.	7-6-28	'		'	·	' <u>-</u>	E. lucius Grand Is. 7-9-28	F. diaphanus	menona	Grand Island	7-9-28		'_

TABLE 29,---(cont'd).

	REMARKS						Palpomyia sp 20							Daphnia sp 100 pulex							
	ЯяіЯ			100	100	<u> </u>		50	50	50			-		_		_		_		
	eggs dei4		_			_															_
	trag. adult Etsecta		_			75				20											
	Gyrinidae						 	-	_										- -	 -	_
	Backis sp.		100			15	50														
(2000)	Chironomus				 1	_	99 —	<u> </u> 	17				-				_	_			
	Tricoptera]—			<u> </u>	<u> </u>	_	_		_		_							_
	Cambarus sp.			_		_	_	_								_		_			
7777	abosantaO				_		-	-	_	_		_			_						_
	Сорерода	_				10						06	15	65	92	06	06	40	100	100	20
	Daphnia sp.	188			_			20	33		001	10	85	35	2	10	10	- 23	_		20
	RetitoH		<u> </u>	 	- 	-		_	_	_	_									-	
	Chlorophyceae																				
	Bacillariaceae	-	-	_	-			_	-			_	_	_							
	T. L. mm.	84	73	85	107	29	65	92	28	68	94	46	47	41	46	47	22	41	43	43	S
	SPECIES, STATION AND DATE	P. flavescens	Grand Island	7-9-28	•	_					_	P. flavescens	02.02 7-9-28				_				

TABLE 29.—(cont'd).

	REMARKS			cop. 100— D. ashlandi	Daphnia pulex mainly														Amphipod 1.							
ļ	Fish																	<u> </u>							45	100
	Fish eggs		_																							
	frag. adult fraects																									
	Gyrinidae				-					_	-	-		_			<u> </u>	 				_			— 	_
	Bach's sp.																-	-		18	<u>8</u>	85				
,	eumonorid ^O				-		-				-	4	47	75	25	83	75	8.	35			10	_		-	_
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	Cambarus sp.							_	-	_							-	_	_			4	100	100	55	
TUDE	врозвттвО		-		-		-		 		_	-	9	-	_	 -	<u> </u>	- 7	 	-	 	- 	— 	<u> </u>	_	
	Сореродя	9	66	7.5	09	82	8	85	06	8	100	96	47	22	47	67	2	×	2			-	_			
	Daphnia sp.	99		25	40	15	101	15	101	10	_		-	5	28		20		2		_	-	_			
İ	Rotifera	- 	 					-	-	-		- -	 	-			 			-	_	— 	 -			_
	Срјогоррусеве				_		_		_	_		_		-						-	_					_
	Bacillariaceae		 	-	<u> </u>			-	-	-		<u> </u>	_		_			-	— 	<u> </u>	 					-
	T. L. mm.	42	42	41	44	40	43	37	42	45	39	40	35	31	37	36	38	32	35	44	47	45	330	330	260	380
	SPECIES. STATION AND DATE	P. flavescens	02.02								E. inconstans	Grand Island	7-9-28							A. rupestris	Grand Island	7-9-28	M. dolomieu	Silver Creek	7-11-28	

REMARKS														
Fish	-	-		 		-			-			_	 	
sage dai'i			<u> </u>	[—		-	-	-			-	-		
Frag. adult Insects	1001	- 2		!	 	 	— 	-		-	-: 		-	, i
Gyrinidae	-	 	 		-	-		-				-	— ·	!!
Ractis sp.		22	5.5		-			-		-		-	50	
sumonoridD	-	75	45	1001	100	100	86	001	901	99	001	1001	2	96
Ristopiera .	·		 		 	 	-	-	_	_	\		-	_
('ambarus sp.)		_	_		_	-				\	!—
BhoartteO		 	-	 	- 	 		-	 	 	-	— 	<u> </u>	3
Copepoda		_		 			_	_		9				
Daphnia sp.		— 	-	 	 	ļ·	<u> </u>					 	-· 	
Rotifera		-	-	[-·		 	- -	-		i—	· 	 		
Сиюторруссае				 	-				i I					
98998iTsIlingA	-	-	— 		-	<u> </u>	—]—	
mm Al .T	20	25	 33 —	73	26	— 38 100 100 100 100 100 100 100 100 100 10	57	51	6.1	62	4 35	50	47	43.
SPECIES, STATION AND DATE	P. caprodes zebra	Grand Island	7-9-28	`	`	B nigrum 7.A	7-12-28	Grand Island	7-9-28	·—	'	·	`	' [