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Vernon L. Spykerman
Iowa Conservation Commission

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Food Habits, Growth and Distribution of Larval Walleye, *Stizostedion vitreum vitreum* (Mitchill), in Clear Lake, Iowa[1]

VERNON L. SPYKERMAN[2]

SPYKERMAN, VERNON L. (ISCC Big Spring Fish Hatchery, Elkader, Iowa 52043). Food Habits, Growth and Distribution of Larval Walleye, *Stizostedion vitreum vitreum* (Mitchill), in Clear Lake, Iowa. *Proc. Iowa Acad. Sci.* 81(4): 143-149, 1974.

Larval walleye were collected in Clear Lake, Iowa, during May and June, 1972, to determine their food habits, growth and distribution while in the pelagic stage. Larvae were pelagic until early June, and then moved into littoral areas of the lake. During the pelagic stage, larvae exhibited vertical movement toward the surface at night and to deeper zones during the day. Mean total body length of larvae was 9 mm on May 13 and 32.6 mm on June 8. Feeding commenced when larvae reached 9 mm in length. Cladocera and Copepoda comprised 94.6 percent of the total number of food organisms consumed by 444 larvae. Dominant Copepoda used as food were *Cyclops* and *Diaptomus*. *Daphnia* was the predominant Cladocera and individual food organism consumed. Electivity indices showed larvae positively selected *Cyclops* and *Diaptomus,* but selected *Daphnia* in proportion to its abundance. Mean lengths of *Daphnia* and *Cyclops* in larvae stomachs were consistently larger than mean lengths of these organisms in plankton samples, suggesting size selection in feeding.

INDEX DESCRIPTORS: Larval Walleye, Stizostedion vitreum vitreum.

The walleye, *Stizostedion vitreum vitreum* (Mitchill), has been an important sport fish in Clear Lake, Iowa, for many years. Meek (1892) reported this species was the chief game fish in the lake during his study of Iowa fishes from 1889 to 1891.

Although the walleye in Clear Lake has been studied considerably (Cleary, 1949; Ridenhour, 1960; Carlander and Whitney, 1961), little information is available on the pelagic stage of larval walleye in the lake. The larval stage is a crucial period in fish development, and both Johnson (1961) and Priegel (1970) pointed out that the success of walleye year classes frequently was determined by survival from the fry to fingerling stage. Marr (1956) suggested that a "critical period" of catastrophic mortality due to food availability or other factors was a possibility in the early life history of marine fishes. Shelbourne (1957) also agreed that an insufficient food supply during the larval stage of development of a fish can produce a local catastrophe. This study was undertaken to determine food habits, growth and distribution of larval walleye during their pelagic stage in Clear Lake. Collection of larvae began on May 10 and continued until June 15, 1972, when the young walleye were no longer pelagic and could not be captured with a 0.5-meter tow net.

Clear Lake is a shallow, eutrophic lake of glacial origin located in western Cerro Gordo County, north-central Iowa. The lake has a surface area of 1,474 hectares and is 7.7 km long and 3.3 km wide in its eastern portion (Pearcy, 1953). Maximum depth is about 5 m.

The extent of natural reproduction of walleye in Clear Lake is unknown, but the population is supplemented by artificial propagation and stocking by the Iowa State Conservation Commission. With the exception of the period from 1948 to 1958, when an evaluation of alternate year stocking of walleye fry was being carried out (Carlander et al., 1960), fry have been stocked annually in Clear Lake since 1915 (Bailey and Harrison, 1945). From May 6 to 13, 1972, while this study was in progress, approximately 36,000 walleye fry per hectare were stocked in the lake.

MATERIALS AND METHODS

Walleye larvae were collected with a 0.5-meter tow net of 0.79 mm (1/32-in.) square mesh nylon with an attached cup of 0.85 mm (1/30-in.) square mesh metal screen. Horizontal tows were made at the surface and at 1.5 meters at five stations located in the eastern portion of the lake. The five stations were sampled regularly at midday and from 2000 to 2200 at night throughout the sampling period. Tows were five minutes in duration at speeds approximating four miles per hour. The depth of tow was set by the angle and length of the tow line. A depressor was attached to the tow line to maintain constant towing depth.

Tow-net samples were preserved immediately in 10% formalin and brought to the laboratory for sorting. All fish were removed from the samples, transferred to 4% buffered formalin, and stored in the dark to avoid pigmentation loss. Later, larvae were identified with the aid of a key by May and Gasaway (1967) and studies by Norden (1961), Nelson (1968) and Priegel (1967). Total length of each walleye was measured to the nearest 0.5 mm with a caliper rule. Each larva was washed in distilled water before removal of the digestive tract to eliminate any organisms attached to the external surface of the fish. After washing, the larva was placed under a binocular dissecting scope and the complete digestive tract removed using a pair of finely pointed dissecting needles. The digestive tract was placed in a drop of distilled water on a slide and all food organisms were identified and counted. Undamaged Cladocera and Copepoda found in the digestive tract were measured (body length exclusive of terminal spines and setae) to the nearest 0.033 mm with a calibrated ocular micrometer. Food organisms were identified to genus when possible and feasible. Computations of

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[2] ISCC Big Spring Fish Hatchery, Elkader, Iowa 52043.

mean numbers of organisms per stomach were based on stomachs with and without food.

After each tow-net sample was collected, a zooplankton sample was collected from the same area and depth, using a 4.1-liter Van Dorn bottle. In the laboratory, each sample was strained through Number 20 silk bolting cloth and preserved in 3% formalin.

For zooplankton enumeration, organisms in four 2-ml subsamples totaling 3.49% of each sample were identified and counted (Bulkley, 1970). In each subsample, up to five specimens of each genus of Cladocera and Copepoda were measured in the same way as those found in walleye stomachs. Zooplankton were identified with the aid of keys by Pennak (1953) and Yeatman (1959) and the work of Small (1961).

An electivity index described by Ivlev (1961) was used to determine if the larval walleye were selective in their feeding. The electivity index E is calculated by the formula

$$E = r_i - p_i / r_i + p_i$$

where r_i is the relative quantity of any item in the ration expressed as a percentage, and p_i is the percentage of the same item in the food complex of the environment. Values of E range between −1 and +1. Positive selection for a food item is expressed by values of E between 0 and +1. Negative selection of a food item is expressed by values of E between 0 and −1.

RESULTS

Distribution

Catch data of larval walleye collected at the five stations were analyzed to discern any differences in catch due to depth, time of day, date and location. Any catch differences might then be construed to reflect distributional patterns of the larvae. One hundred eighty-three samples were collected between May 14 and June 8, including samples which contained no walleye.

Information on depth distribution of larvae was obtained by comparing mean catch of larval walleye per tow in samples collected at the surface and 1.5 m, irrespective of time of day or month. The mean catch per tow from 92 surface samples and 91 samples from 1.5 m was 4.01 and 7.65 larvae respectively. This difference was significant at the 0.01 level of probability (F = 6.93, df = 1, 163). A further breakdown of the data separated day and night catches. Thirty samples from each of the two depths during the day and 62 surface samples and 61 samples from 1.5 m at night were compared. Mean catch during the day was 0.73 at the surface and 10.63 larvae at 1.5 m. Mean catch at night was 5.59 at the surface and 6.19 fish at 1.5 m. These differences were significant at the 0.02 level of probability (F = 5.34, df = 1, 163). Differences in catch with respect to depth and time of day indicated a vertical movement of larvae upward to the surface at night and a deeper distribution during the day.

Although there was a difference in the vertical distribution of larvae between night and day, when samples collected at both depths were combined, mean catch per tow was not significantly different. Mean catch of larvae per tow was 5.89 for 123 night tows and 5.68 for 60 day tows. Mean catch was higher during the day at stations 1, 2 and 4, whereas the mean catch per tow was higher at night at stations 3 and 5. No pattern was evident in these differences and no reason for them was determined. This information indicated that any net avoidance by the larvae was not affected by time of day but probably occurred on an equal basis during light and dark hours.

Daily catch for each sampling date from May 14 to June 8 was examined. The mean catch per tow gradually declined over this period, and June 8 was the last sampling date when a meaningful number of larvae were captured. Only one walleye larva was captured in 30 tows made on June 12, 14 and 15. Hence, tows on these three days were not considered in the catch data analysis. The decline in catch was fairly uniform for all stations and there was no significant difference in the mean catch per tow at each station for the sampling period. The major reasons for the declining catch as the sampling period progressed were mortality, net avoidance and a distributional change by the larvae. No estimate of mortality was made because of known movement of walleye out of the sampling area. Net avoidance undoubtedly occurred and probably increased as the fish grew. According to Noble (1971), avoidance evidently can begin when larvae are less than 10 mm long, and increases rapidly thereafter. Moreover, poor catches from June 8 to 15 coincided with the appearance of young walleye in littoral areas. At midday on June 14, 100 young walleye were taken along the shoreline in approximately 1 m of water with a 7.6-m (25 ft.) bag seine. Thus it appears that by the middle of June young walleye were well established in littoral areas of the lake. The shift from a pelagic to littoral existence conceivably began as early as the first week of June.

Growth

Total body length of 650 walleye larvae collected from May 13 to June 8 was measured to the nearest 0.5 mm. Mean length at each sampling date was plotted and a curve was mathematically fitted to the points (Figure 1).

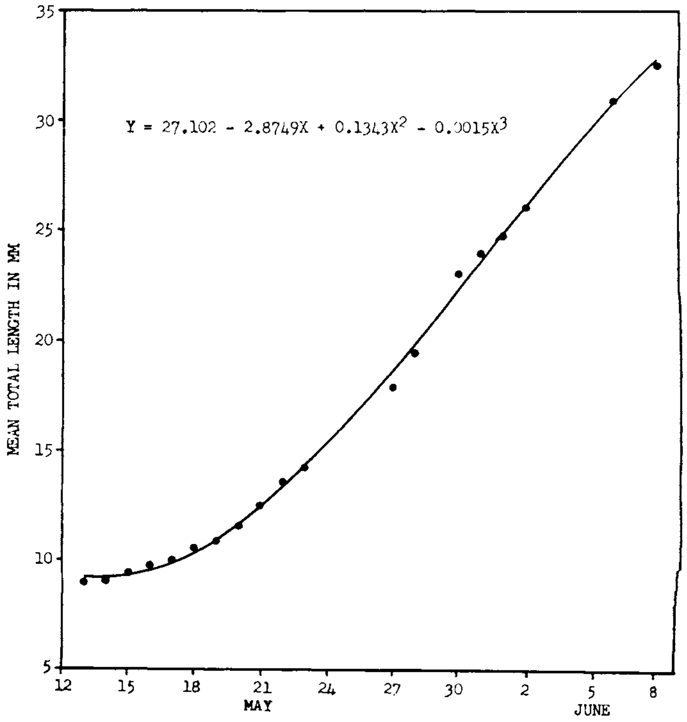

Figure 1. Growth of Clear Lake larval walleye during May and June, 1972.

Few studies are available which report the growth of young-of-the-year walleye before June 15. Forney (1966) reported that young walleye reached a length of about 20 mm during the first or second week in June from 1959 through 1964 in Oneida Lake, New York. Johnson (1969) found that walleye fry increased in length from 7 mm on May 14 to 11-14 mm on May 29, 1958, in the Little Cutfoot Sioux Lakes, Minnesota. Smith and Moyle (1943) found young walleye in Minnesota rearing ponds attained an average length of 27 mm after 30 days of growth. Priegel (1970) concluded that from 1960 through 1967 walleye growth in Lake Winnebago, Wisconsin, during May was relatively the same, varying from 20 to 26 mm. In comparing these studies with Clear Lake data, it was evident that growth of Clear Lake walleye compared quite favorably with growth reported from other areas. The difference in growth from that reported by Johnson (1969) can be explained by considering the time of hatching. He reported the walleye hatch in Little Cutfoot Sioux Lakes occurred between May 7 and 15, and the fry were 7 mm in length on May 14. All stocked walleye fry in Clear Lake had hatched and been planted by May 13. Mean length was 9.1 mm on May 14.

Food Habits

Stomachs from 444 walleye larvae collected in Clear Lake were analyzed for food contents. Of this total, 28 stomachs contained no food; all empty stomachs were from larvae 10 mm or less in length. The analyses revealed that Cladocera and Copepoda were the major classes of food organisms ingested during May and June. Combined, these two classes comprised 94.6% of the total food items found in stomachs. Cladocera were most common, making up 62.5% of the total food, followed by Copepoda, accounting for 32.1%. Utilization of organisms from both of these classes was fairly constant throughout the sampling period except for the last three collection dates (Table 1). Beginning on June 2, fewer Copepoda were found in the stomachs, with a corresponding increase in Cladocera and chironomids. This change in diet probably indicated a shift to larger prey species by the larger larvae in June. Chironomid pupae and larvae and unidentified fish comprised less than 10% of the food organisms on all sampling dates, except May 28 when only one fish was examined.

Dominant food items within the Copepoda class were *Cyclops* and *Diaptomus*, accounting for 86% of the total Copepoda consumed. Although the two genera were not consumed on an equal basis each sampling date, in general *Cyclops* and *Diaptomus* contributed equally to the diet, comprising 13.7% and 13.9% of the total food. Unidentified Copepoda nauplii never accounted for more than 2% of the food on any sampling date.

Daphnia was the predominant individual food organism consumed, both within the Cladocera class and in the total food. This organism accounted for 66.7% of the total Cladocera and 41.7% of the total number of food organisms consumed. Also, *Daphnia* was generally one of the most common food items eaten on each collection date between May 14 and June 2. After June 2, however, consumption of *Daphnia* declined to less than 20% of the food due mainly to the appearance of large numbers of *Latona* in the diet. Although no *Latona* were found in the stomachs of larvae collected before May 31, they contributed 13.2% of the total food and 21.1% of the total Cladocera consumed over the sampling period. *Latona* inhabits weedy littoral areas (Pennak 1953) and no *Latona* were found in the plankton samples collected during this study. The occurrence of *Latona* in the food of

TABLE 1. FOOD OF LARVAL WALLEYE COLLECTED IN CLEAR LAKE, IOWA, DURING MAY AND JUNE, 1972; PERCENTAGE OF THE MEAN TOTAL NUMBER OF FOOD ORGANISMS PER STOMACH (NUMBER OF FISH IN PARENTHESES, INCLUDING THOSE CONTAINING NO FOOD)

Food Organisms	*5/14 (20)*	*5/15 (39)*	*5/16 (26)*	*5/17 (12)*	*5/18 (20)*	*5/19 (16)*	*5/20 (11)*	*5/21 (16)*	*5/22 (18)*	*5/23 (15)*	*5/27 (5)*	*5/28 (1)*	*5/30 (16)*	*5/31 (71)*	*6/1 (71)*	*6/2 (48)*	*6/6 (22)*	*6/8 (15)*
Daphnia	25.0	34.4	28.1	55.3	55.5	40.8	50.0	75.2	59.1	64.1	29.9		48.0	53.3	39.6	30.1	19.4	14.5
Latona														0.2	4.1	24.5	58.6	70.0
Bosmina	25.0	0.8	2.9			2.3	6.2			0.5				0.9	0.1	4.3	0.2	2.4
Chydorus	8.3		0.6				0.8							0.1	0.3	0.5	0.5	
Leptodora														0.7	1.2	0.2	3.7	2.8
Alona		0.8	0.6															
Unidentified Cladocera					1.3	2.3	1.6	2.9	0.4	5.6			7.2	6.1	6.0	14.8	2.5	0.2
Total Cladocera	58.3	36.0	32.2	55.3	56.8	45.4	58.6	78.1	59.5	70.2	29.9		55.2	61.3	51.3	74.4	84.9	89.9
Cyclops	41.7	59.2	62.6	29.8	35.5	35.4	15.6	3.7	28.6	8.1	0.9		19.4	7.4	19.6	2.6	1.7	0.3
Diaptomus		1.6	2.3	12.8	0.6	8.5	25.0	16.8	6.7	16.2	67.5	46.2	15.5	21.1	14.7	6.4	1.5	5.5
Nauplii		0.8				1.5		0.7						0.1	0.3			
Unidentified Copepoda		1.6	2.9		5.8	9.2	0.8	0.7	3.2	3.5	1.7	7.6	6.3	6.2	6.8	2.7	0.5	
Total Copepoda	41.7	63.2	67.8	42.6	41.9	54.6	41.4	21.9	38.5	27.8	70.1	53.8	41.2	34.8	41.4	11.7	3.7	5.8
Chironomid Pupae									0.4	0.5		30.8	1.8	3.2	4.5	6.4	9.9	3.1
Chironomid Larvae		0.8											1.6	0.4	1.8	4.3	1.0	1.2
Unidentified Diptera Pupae																2.3		
Chaoborus Larvae																0.2		
Hydracarina															0.2	0.2		
Unidentified Fish				2.1	1.3				1.6	1.5		15.4	0.2	0.3	0.8	0.5	0.5	
Mean Total Number	0.60	3.22	6.58	3.92	7.75	8.14	11.64	8.56	14.00	13.21	23.40	13.00	27.75	24.24	16.64	13.64	18.32	38.67

the larval walleye agreed with catch data which indicated inshore movement of the larvae in early June. All of the larvae examined for food contents were collected in pelagic areas; thus some migration to littoral areas for feeding must have occurred as early as May 31. Other Cladocera ingested in small quantities were *Bosmina, Chydorus, Leptodora* and *Alona.*

Larvae were divided into 1-mm length classes and food proportions were examined within each class to determine feeding differences between size classes. Initiation of feeding evidently did not begin until larvae reached approximately 9 mm in length. Stomachs of 20 larvae 7.5 to 8.5 mm in body length were examined and no food was found.

Food ratios within 1-mm length classes above 9 mm showed the same trends as those by sampling date (Spykerman, 1973). *Daphnia, Cyclops* and *Diaptomus* were the dominant food items of each length class up to 29 mm, when the two Copepoda declined and *Latona* became more important. The majority of the chironomids utilized during the sampling period were consumed by larvae over 20 mm, further indicating a shift to larger food items by larger larvae. However, fish were not more important food to any particular length class and were eaten in small quantities by different length classes.

Food Selection

Stomach contents of larval walleye were compared to plankton samples collected on the same dates to determine whether the larvae fed selectively on certain food organisms. Food selection by the larvae was measured by calculating an Ivlev electivity index for common food organisms. Percentages used in the calculations were based on total food consumed by date (Table 2) and total plankton collected by date (Spykerman, 1973). No attempt was made to determine food selection of larvae captured after May 23 because it appeared that shortly after this date larvae began obtaining some of their food from littoral areas where plankton samples were not collected.

TABLE 2. MEAN LENGTHS (MM) OF DAPHNIA AND CYCLOPS IN LARVAL WALLEYE STOMACHS ($\overline{x}_s$) BY 1-MM FISH BODY LENGTH INCREMENTS AND IN PLANKTON SAMPLES ($\overline{x}_p$) COLLECTED FROM CLEAR LAKE, IOWA, 1972; CALCULATED STUDENT'S (T) AND DEGREES FREEDOM (DF)

	Daphnia				*Cyclops*			
Length Increment	$\overline{x}_s$	$\overline{x}_p$	*DF*	*t*	$\overline{x}_s$	$\overline{x}_p$	*DF*	*t*
9.0- 9.9	0.861	0.924	191	0.884	0.876	0.723	141	4.618†
10.0-10.9	0.956	0.914	329	0.868	0.990	0.769	191	7.857†
11.0-11.9	1.010	0.913	193	1.459	1.109	0.878	52	3.608†
12.0-12.9	1.003	0.900	153	1.656	1.192	0.953	29	2.609*
13.0-13.9	1.161	0.895	178	5.235†				
14.0-14.9	1.103	0.935	181	3.419†				
15.0-15.9	1.069	1.015	52	0.687				

* Significant difference, $p < 0.05$, two-tailed test.
† Significant difference, $p < 0.01$, two-tailed test.

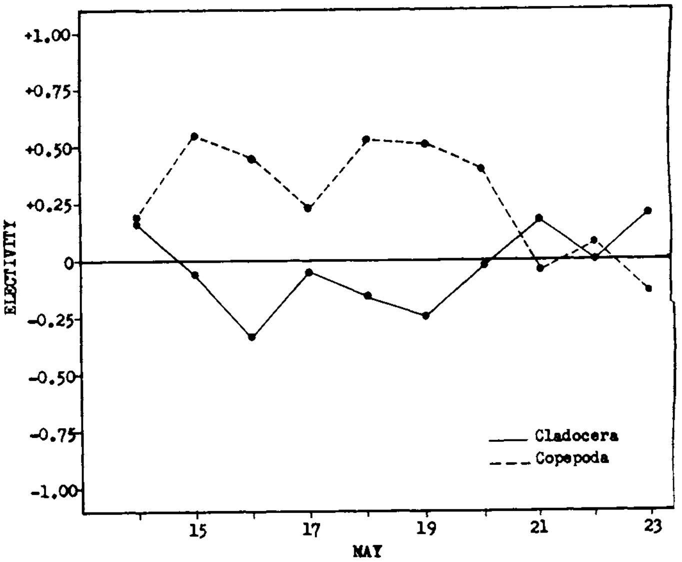

Figure 2. Electivity of Cladocera and Copepoda by larval walleye in Clear Lake, Iowa, 1972.

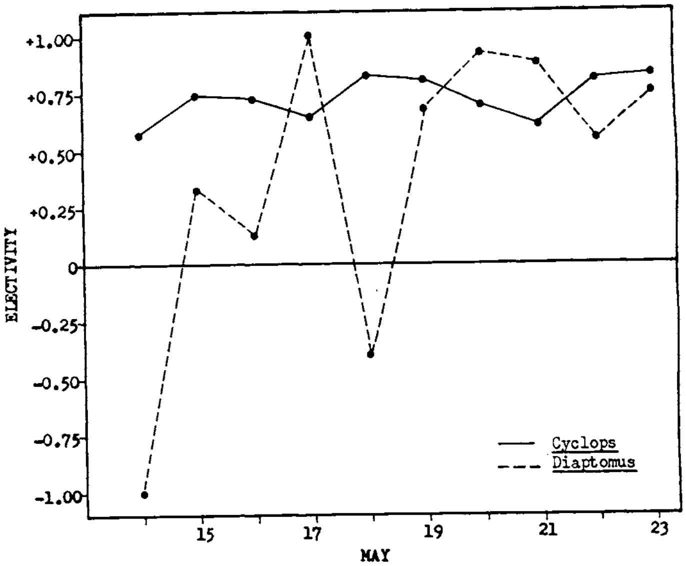

Figure 3. Electivity of *Cyclops* and *Diaptomus* by larval walleye in Clear Lake, Iowa, 1972.

Electivity for Copepoda and Cladocera was calculated for each day from May 14 to May 23 (Figure 2). The electivity values indicated positive selection for Copepoda on all dates except May 21 and May 23. Cladocera, while the most common food during the sampling period, were generally negatively selected. Two of the three dates when positive selection occurred corresponded to the dates when Copepoda were negatively selected.

Electivity indices for *Cyclops* and *Diaptomus* showed both genera were positively selected (Figure 3). Selection of *Cyclops* was highly positive on all dates from May 14 to 23. However, selection of *Diaptomus* was more varied during this period. Electivity of *Diaptomus* ranged from completely negative to completely positive and no definite pattern was evident.

Daphnia, the most common food organism, fluctuated in electivity above and below zero electivity from May 14 to 23 (Figure 4). It appeared that *Daphnia* was negatively selected by the small larvae at the beginning of the sampling period

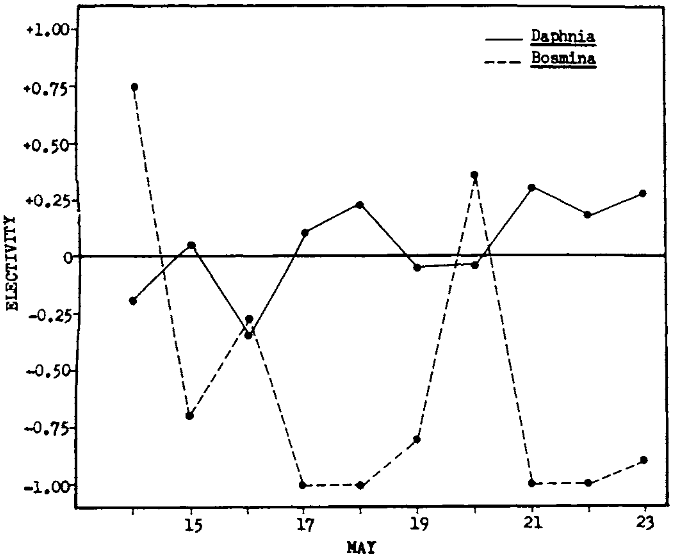

Figure 4. Electivity of *Daphnia* and *Bosmina* by larval walleye in Clear Lake, Iowa, 1972.

TABLE 3. MEAN LENGTHS (MM) OF DAPHNIA AND CYCLOPS IN LARVAL WALLEYE STOMACHS ($\overline{x}_s$) AND IN PLANKTON SAMPLES ($\overline{x}_p$) COLLECTED FROM CLEAR LAKE, IOWA, 1972; CALCULATED STUDENT'S (T) AND DEGREES FREEDOM (DF)

	Daphnia				*Cyclops*			
	$\overline{x}_s$	$\overline{x}_p$	*DF*	*t*	$\overline{x}_s$	$\overline{x}_p$	*DF*	*t*
May 15	0.854	0.887	157	0.469	0.912	0.723	88	4.016†
May 16	0.903	0.904	171	0.019	0.927	0.749	107	5.971†
May 17	0.825	0.884	88	0.561				
May 18	1.087	0.934	168	5.040†	1.075	0.811	58	3.951†
May 19	0.954	0.970	188	0.171	1.066	0.862	55	3.330†
May 20	1.075	0.946	122	1.656	1.235	0.931	21	3.052†
May 21	1.030	0.894	166	2.280*				
May 22	1.193	0.907	161	5.703†	1.205	0.710	44	6.516†
May 23	1.005	0.931	170	1.739				
May 30	1.258	1.040	230	3.666†	1.260	0.508	95	20.564†
May 31	1.161	1.059	342	3.360†	1.257	0.485	142	31.265†
June 1	1.255	1.078	327	4.566†	1.235	0.570	180	24.238†
June 2	1.302	1.065	250	4.977†	1.055	0.588	71	6.197†
June 6	1.297	1.074	238	3.729†				
June 8	1.477	1.151	168	5.497†				

* Significant difference, $p < 0.05$, two-tailed test.
† Significant difference, $p < 0.01$, two-tailed test.

and more selected on later dates. Although *Bosmina* was a minor food item, it was consumed over the entire sampling period. Thus it seemed pertinent to determine whether any selective processes were at work with respect to its utilization as a food item. *Bosmina* was negatively selected on eight of the ten days electivity indices were calculated (Figure 4). The high positive selection on May 14 could be due to small larvae selecting a small food organism, but the immediate drop in electivity on the following days casts doubt on this generalization.

Mean lengths of *Daphnia* and *Cyclops* in plankton samples and in larvae stomachs were compared using Student's t-test to determine if the larval walleye exhibited size selection in feeding. Comparisons were made by 1-mm length increments of the larvae through 15 mm (Table 2) and by date of collection (Table 3). *Daphnia* consumed by 9 mm larvae were smaller than those in the plankton samples but the difference was not significant. *Daphnia* found in the stomachs of larvae of all length classes above 9 mm were larger than those found in the plankton samples. However, differences were significant only for the 13 mm and 14 mm length classes. When sizes of *Daphnia* in the stomachs and plankton were compared on each date between May 15 and 23, the *Daphnia* ingested were smaller on four dates and larger on five dates than those in the plankton samples. Only on May 18, 21 and 22, when the *Daphnia* from the stomachs were larger, were these differences significant. On no date when the *Daphnia* from the stomachs were smaller were the differences significant. Mean lengths of *Cyclops* in the stomachs were significantly greater than the average lengths in the plankton samples for all length classes and dates (Tables 2 and 3).

DISCUSSION OF RESULTS

Young-of-the-year walleye in Clear Lake were pelagic until early June, when they moved inshore and inhabited littoral areas of the lake. The behavior of walleye was relatively unknown before 1950, when Eschmeyer (1950) suggested that walleye fry in Lake Gogebic, Michigan, moved into the open water of the lake shortly after hatching and led a pelagic existence until reaching a length of an inch or more. Later studies have confirmed Eschmeyer's theory on the behavior of walleye larvae. Faber (1967) found walleye larvae to be limnetic in Wisconsin lakes, as did Houde (1967) in his study of walleye larvae in Oneida Lake, New York. Morsell (1970) reported that walleye fry in Escanaba Lake, Wisconsin, moved out to open water within a day or two after hatching and remained there until they reached a length of about 30 mm, when they returned to inshore areas of the lake. Thus the early pelagic stage and subsequent return to littoral areas of young walleye is commonly recognized, and distribution of Clear Lake larvae was not different.

While the horizontal distribution of the walleye larvae in Clear Lake conformed to that reported from other areas, the vertical distribution of the larvae differed from other studies. The catch data revealed that the larvae moved toward the surface at night and to deeper zones during the day. This activity pattern suggests a photonegative response by the larvae. However, in two studies regarding larval walleye in Oneida Lake, New York, Houde (1969) and Houde and Forney (1970) reported larvae were photopositive. Perhaps an explanation for this inconsistency was indicated in a study reported by Johnson (1969). Johnson found that in the brown waters of the Little Cutfoot Sioux Lakes, Minnesota, the catch of walleye fry during the day was greatest near the surface. However, he concluded that the depth distribution noted in his study area might not hold for other less turbid water. To substantiate this, Johnson pointed out that fry towing in the clearer waters of Lake Mille Lacs, Minnesota, showed that the concentration of walleye fry occurred at a depth of about ten feet, and there was no tendency for fry to gather near the surface. Thus turbidity of the water was probably an important factor influencing the depth distribution of larval walleye. During the Clear Lake study, 15 Secchi disk measurements were taken on various dates, and these measurements averaged 2.02 m. Hence the relatively clear water of Clear Lake probably accounted for the deeper distribution of the larvae during the day.

Although the food habits of larval walleye in Clear Lake were in general similar to those reported in other studies, certain features differed. Smith and Moyle (1943) found that walleye larvae in Minnesota rearing ponds began feeding on rotifers and nauplii, and Johnson (1969) also found rotifers in the stomachs of larvae in Little Cutfoot Sioux Lakes, Minnesota. Larger zooplankton were the initial food source of Clear Lake larvae, and no rotifers and few nauplii were found in the stomachs even though they were fairly abundant in the zooplankton samples. Houde (1967) found Copepoda to be the most common food of Oneida Lake larvae, and likewise Smith and Pycha (1960) found Copepoda were the most important food organisms of walleye up to 50 mm in length in Red Lakes, Minnesota. Although Copepoda were important food to Clear Lake larvae, Cladocera, namely *Daphnia*, were the most common food item. The food habits of Clear Lake larvae differed appreciably from studies by Hohn (1966) and Paulus (1969) of walleye fry food habits in Lake Erie. Hohn and Paulus found that diatoms were major food items of walleye larvae under 9 mm in length and were utilized to some extent by larger larvae. No diatoms were found in stomachs of Clear Lake larvae. Evidently the walleye fry in Lake Erie must select food from a different food complex than Clear Lake larvae.

Initiation of feeding by walleye larvae in Clear Lake did not occur until the larvae reached 9 mm in length, a larger size than that reported by Hohn (1966) and Paulus (1969). Size of the Clear Lake larvae at the time of stocking might have been a factor in this difference. Clear Lake larvae were approximately 7.5 to 8 mm in length when stocked, and only one larva captured after May 13 was less than 8 mm in length. If the larvae required a few days to acclimate to the lake before starting to feed, as was suspected, they would have been approaching 9 mm in length at the end of this transitional period.

The common occurrence of a food organism in the stomachs does not necessarily indicate selection of that food organism, as is apparent in the electivity index itself. Although *Daphnia* was the most common food organism consumed during the study period, there was little evidence which showed it was a preferred food item. *Daphnia* was probably the dietary mainstay simply because it was the most available food organism. However, the high positive electivity of *Cyclops* showed that this organism was definitely selected as food by larvae. Evidently *Cyclops* is a preferred food of walleye larvae, as both Houde (1967) and Priegel (1970) found it to be positively selected by larvae also. *Diaptomus* was also positively selected by larvae in Clear Lake, but both Houde (1967) and Priegel (1970) found this genus to be negatively selected.

According to Ivlev (1961), the phenomenon of food selectivity depends upon a number of features including abundance and size of the food. The abundance feature is incorporated into the electivity index. Food size selection by larvae was determined by comparing the mean lengths of *Cyclops* and *Daphnia* in larvae stomachs and in plankton samples. As larvae grew, they selected larger *Daphnia*. Also, *Cyclops* consumed by the larvae were significantly larger than the *Cyclops* found in the plankton samples on all occasions. Size selectivity in feeding has been reported for the alewife (Brooks and Dodson, 1965; Hutchinson, 1971) and rainbow trout (Galbraith, 1967). Undoubtedly other planktivores, including larval walleye, also exhibit this characteristic. On the whole, the trend in size of food consumed over the sampling period was from smaller zooplankton to larger zooplankton of the same genera, to chironomids and the large Cladocera, *Latona*.

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