

OBSERVATIONS ON THE NATURAL HISTORY OF THE CHAIN PICKEREL (*ESOX NIGER*)

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INTRODUCTION

The eastern chain pickerel, *Esox niger*, was first introduced into Ohio when local sportsmen in the northeastern part of the State stocked seven hundred adults in Long Lake, Summit County, in 1935. The breeders came from New Jersey.

Long Lake is a natural body of water located in the lower level of the Portage Lakes chain, which supplies water for industrial use in South Akron. The Lake is 935 feet above sea level and has an area of 225 surface acres. The shoreline is approximately six and one-half miles in length.

The Lake has a maximum depth of approximately forty feet, and 17 percent of the surface area is less than ten feet in depth. This shallow zone is filled with various types of vegetation such as cattail (*Typha* spp.), bulrush (*Scirpus* spp.), smart weed (*Polygonum* spp.), parrot feather (*Myriophyllum* spp.), hornwort (*Ceratophyllum* spp.), chara (*Chara* spp.), white water lily (*Castalia tuberosa*), spatterdock (*Nuphar* sp.), water loosestrife (*Lysimachia* spp.), and curlyleaf pondweed (*Potamogeton crispus*).



FIGURE 1. Chain Pickerel (*Esox niger*) from Long Lake. Male (left) Female (right).

The northwest margin of the lake is a large marsh. Lake bottom types are chiefly muck and peat, but small areas of sand and silt are present.

The fish population of Long Lake consists chiefly of bluegill, (*Lepomis macrochirus*), crappie (*Pomoxis annularis* and *P. nigromaculatus*), gizzard shad (*Dorosoma cepedianum*), largemouth bass (*Micropterus salmoides*), and smaller numbers of brown bullheads (*Ameiurus nebulosus*), carp (*Cyprinus carpio*), yellow perch (*Perca flavescens*), warmouth (*Chaenobryttus coronarius*), and western chub suckers (*Erimyzon sucetta kenneblyi*).

METHODS AND MATERIALS

An intensive effort was made in 1951 to obtain detailed information on the life history of the chain pickerel. Modified fyke nets, described by Roach (1942) were used in obtaining specimens for study. Pickerel were tagged, measured to the nearest half inch, weighed in grams or ounces, and scale samples collected for age-growth studies. Spawning observations were attempted in the field, but to facilitate such study, breeders were moved from Long Lake into a pond at the Akron Fish Farm.

Air and water temperatures and transparencies were obtained each morning and evening in the breeder pond.

No body-scale relationship was calculated, but scale samples were consistently taken from the area above and behind the pectoral fins at approximately one-third the distance from the pectoral fin joint and the anterior point of attachment of the dorsal fin. The growth was calculated on the assumption of direct proportion between the scale measurements and the length of the fish at the time of annulus formation.

TABLE I
Take of chain pickerel by fyke nets in Long Lake

| Year | Number | Length Range Inches | Water Temperatures Fahrenheit | Hours Fished |
|------|--------|------------------------|----------------------------------|-----------------|
| 1948 | 2 | 16.0-20.5 | 73 | 168 |
| 1949 | 11 | 14.5-23.0 | 48-55 | 120 |
| 1950 | 9 | 15.0-20.5 | 37-68 | 214 |
| 1951 | 27 | 11.0-22.0 | 39-68 | 636 |
| 1952 | 48 | 10.5-24.0 | 38-46 | 648 |
| 1953 | 12 | 13.0-23.5 | 42-50 | 110 |
| 1954 | 17 | 11.5-24.5 | 48-54 | 204 |
| 1956 | 3 | 16.0-25.0 | 46-48 | 70 |

RESULTS

Habitat and Distribution

Chain pickerel were taken in fyke nets in Long Lake. The nets which took pickerel were in or near the marshes, in narrow channels or near heavy vegetation. Webster (1942) described their habitat as weedy areas. Most of the pickerel were taken in March and April when water temperatures ranged from 37 to 68° F (table I).

One chain pickerel was taken in November, 1957, from Nesmith Lake, one mile down a canal from Long Lake.

They prefer the deeper cooler waters during mid summer but move into the shallow weedy areas in the fall when the water cools. Very few pickerel have been taken in nets located in shallow waters after May. A definite movement into the marshy spawning areas occurs in spring shortly after the ice leaves the lake, usually in March or April. Embury (1918) found such movements in Cayuga Lake, New York at the end of March. The ratio of males to females taken during this season of the year in Long Lake was 1:1, but it may not be typical because of the small samples.

Spawning

To provide for closer observations on the spawning habits, four males and four females, ranging from 14 to 25 in. in length, were placed in a vegetated pond

0.6 acres in surface acreage at the Akron Fish Farm in April, 1951. Observations were made during all hours of the day and night. The first spawning was seen at 9:45 A. M. on April 10. The water temperature was 44° F. Spawning occurred over a mass of willow roots in vegetation. On April 11, spawning was noted at 5 P. M. Embury (1918) reported spawning at a temperature approaching 47° F.

Those spawning groups observed were comprised of only one male and one female. The fish swam side by side, weaving in and out among the vegetation. The male turned his ventral side toward the female and appeared to bump her. At this time the female turned her ventral side toward the male, and the eggs were laid with what appeared to be a lashing of their tails. The male appeared to initiate the action.

On April 25, eggs were found scattered over willow roots and vegetation in the pond; paired fish were observed at this time but spawning was not. Water temperatures ranged from a low of 36° to a high of 72° F during the period from April 10 to April 25.

Although Webster (1942) reported the incubation to be from a week to ten days, according to water temperature, fry were found in the pond on the first of May. As reported by Underhill (1949) fry were found lying on vegetation, but some appeared to be clinging to the surface scum on the hatchery ponds.

TABLE 2

A comparison of the calculated age growth of chain pickerel from Long Lake with that reported from other states

| State | Average calculated total length at each annulus | | | | | | |
|----------------|---|------|------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Massachusetts* | 7.1 | 11.1 | 14.0 | 16.4 | 18.4 | 20.4 | |
| Connecticut** | 7.3 | 11.0 | 14.0 | 16.6 | 18.6 | 20.6 | |
| Ohio | 5.7 | 10.6 | 14.0 | 16.0 | 17.4 | 20.3 | 20.7 |

*Carlander, 1950.

**Thorpe—Correspondence.

Age Growth

Gizzard shad and western lake chub suckers were stocked in the hatchery pond to provide food. The pond was drained September 10, 1951. The fingerling ranged from 2.8 to 8.8 in. in length and averaged 4.2 in. They ranged from 1 to 44.5 gm in weight. A growth of 4½ in. in length at one year of age was reported in the Massachusetts Fish Commission's report for 1870. Raney (1942) reported the total length of specimens taken in Rensselaerville, New York to have ranged from 3.2 to 4.7 in. on September 22. Correspondence with Lyle M. Thorpe, State Board of Fisheries of Connecticut, indicates a growth of approximately 7.3 in. for the first year's growth. Age growth data for adult Long Lake fish indicates a slightly slower growth than Thorpe's Connecticut estimates of age growth for that State (table 2).

A significant difference in the growth of female chain pickerel over that of males was found after the second year. This also is found in the northern pike. The limited size of the sample of each sex may have greatly influenced the data on the growth relationship.

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