increase in weight, as in the case of the yellow variety. Thus, in the fifth summer, the average weight of the blue is 10 oz., which increases to 16 1-3 oz., by the seventh summer, but this increase in weight is accompanied by a very small increase in length.

In the case of the yellow pike perch, on the other hand, the slowing up of growth occurs about the end of the fifth year but the slow growth is more than compensated by the large increase in weight which then begins.

From a consideration of the curves obtained, it would appear that the best time to take the blue pike perch is after the fifth year when they have obtained a length of about 28 to 30 cm. (11 to 12 inches) and weigh 14 to 16 ounces. Since the girth measurement posterior to the gill cover at this age is about 6 inches, this is approximately the size which would be taken in a 3-inch gill net.

With the yellow pike perch, since they increase so rapidly in weight after the sixth year, it would appear that they should not be taken until they have reached a length of at least 15 inches and weigh approximately 2 lbs.

The study of the rates of growth of the blue and yellow pike perch shows that the former do not reach nearly so great a size as the latter, and amply confirms the opinion of fishermen that the blue are much smaller. Moreover, after the fourth year the rate of growth of the blue variety falls off very rapidly, whereas the yellow continue to grow uniformly up to a considerable age. This peculiar difference in the rates of growth possibly indicates some basic physiological distinction between the two varieties which also possibly finds expression in their difference in colour.

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THE RATE OF GROWTH OF THE YELLOW PERCH (*PERCA FLAVESCENS*) IN LAKE ERIE

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THE RATE OF GROWTH OF THE YELLOW PERCH (*PERCA FLAVESCENS*) IN LAKE ERIE

As shown in the returns given in the annual reports of the Department of Game and Fisheries of the Province of Ontario, the catch of yellow perch (*Perca flavescens* Mitchell) in Canadian waters of Lake Erie has practically doubled in the past ten years. In 1919 the catch amounted to 1,096,935 pounds, valued at $87,755. In view of this increasing value of the yellow perch fishing industry in Lake Erie, it seemed desirable to obtain some definite information as to the rate of growth of this fish.

The study was undertaken at the suggestion of Professor W. A. Clemens, and carried out under his direction. The material was obtained by Dr. Clemens, at the Crewe Bros. Fishery, Merlin, Ontario, during the summer and autumn of the year 1920.

The age of the fish was determined by counting the seasonal growth areas on the scales. The scales found most satisfactory were those from the region about the middle of the body below the lateral line. An examination of a perch scale shows alternating light and dark areas. It has been taken for granted that the light area corresponds to a period of rapid growth which would take place during the summer months, while the darker area, where the lines are more crowded, represents a period of slower growth which no doubt occurs during the winter months. This interpretation of the areas on the scale is supported by the fact that the scales from perch taken in late summer show a distinct light area on the margin, while those from perch taken in early summer show a dark area on the margin. Figure 1 illustrates the characteristics of a perch scale, and the method used in age estimation. Table 1 shows the results of this study coördinated.

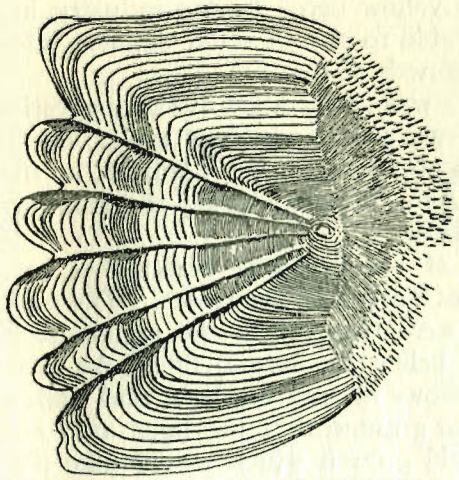

Fig. 1. Scale of a yellow perch at the beginning of its fourth summer.

TABLE 1. DATA ON RATE OF GROWTH OF YELLOW PERCH IN LAKE ERIE.

Age	Number of Fish Examined		Length in cm. to base of caudal fin			Length in inches over all	Girth in inches just posterior to the gills	Weight in Ounces	
	Actual Number	Percentage of Total No.	Average by Measurement	Average by Estimating	Estimated Increase from Year to Year			Average by Observation	Estimated Increase from Year to Year
½ year	1	1.3	4.4	5.0	5.0	2			
1½ "	0	0		10.0	4.0				
2½ "	30	40.5	14.4	14.0	3.0	6.6	4.4	2.6	1.7
3½ "	18	24.0	16.8	17.0	2.5	7.7	5.1	4.3	1.4
4½ "	13	18.0	18.7	19.5	2.0	8.5	5.7	5.7	3.5
5½ "	4	5.2	21.7	21.5	2.0	9.9	6.6	9.2	2.4
6½ "	4	5.2	23.4	23.5	1.0	10.8	7.3	11.6	1.2
7½ "	4	5.2	24.4	24.5		11.0	7.2	12.8	

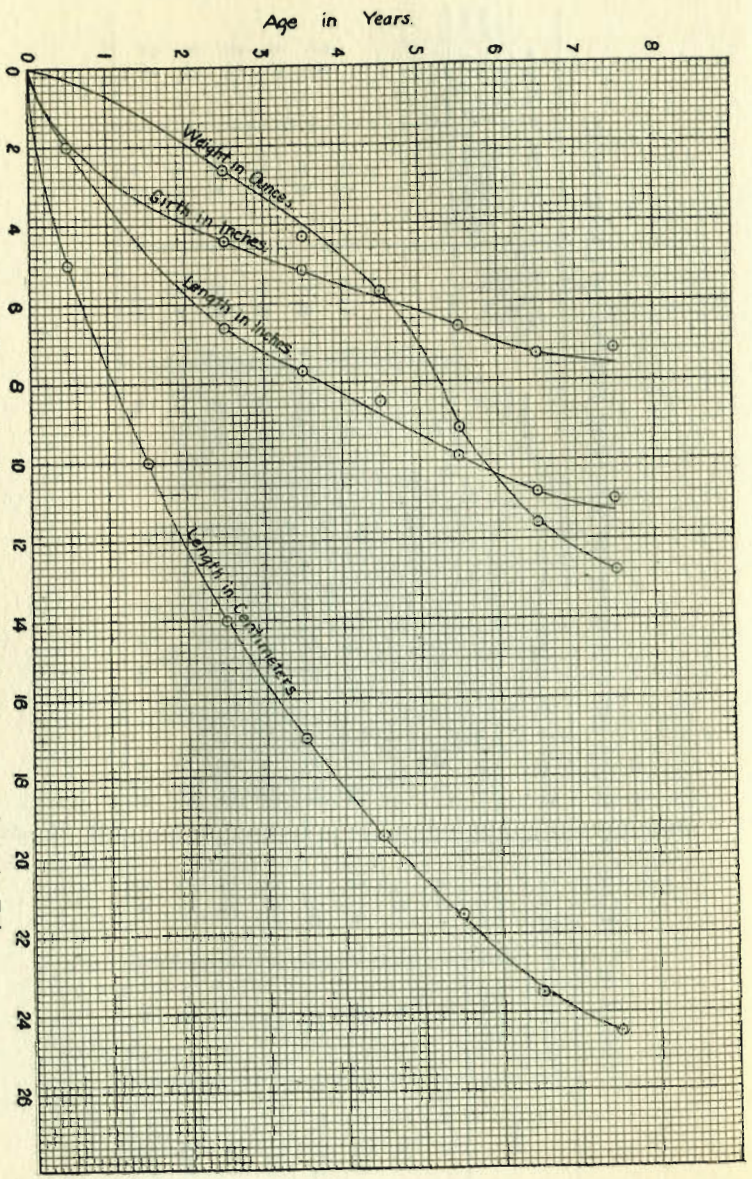

Fig. 2. Graphs showing rate of growth of yellow perch in Lake Erie.

Fig. 2 is a graph showing the relation of age to length in centimeters, length in inches, girth in inches and weight in ounces.

Embody (1915) gives the following table for the growth of yellow perch as compiled from data obtained on the fish growing in natural waters in the vicinity of Ithaca, N.Y.

Age	Length in in. over all	Length in cm. over all	Length in cm. to base of caudal fin
5 months	2–2.5	5–6.5	3.5–5
1 year	3–4	7.5–10	5.5–8
2 years	6–7	15–17.5	13–15.5
Spawn	April		
Advanced fry	May–June		
Fingerlings	September		

The measurements given by Embody have been reduced to centimeters, and the last column shows the approximate lengths of these fish to the base of the caudal fin. These figures agree very closely with the data compiled from fish growing in Lake Erie as do also those of Pearse and Achtenberg (1920) who give the lengths of yellow perch taken in Lake Mendota, Wis., in the first summer as 2.9 cm. on July 7 to 6.1 cm. on August 24.

If the fish are taken before they reach maturity and are thus prevented from spawning, the supply of that species will soon become depleted. This is amply exemplified by the disappearance of the trout from many of the Ontario streams, and the bass from the lakes.

It is believed that the fish studied are a fair average of the total catch. By a study of table 1 and Fig. 2 it is seen that approximately

40 per cent. of all the perch caught were 2½ years old averaging 14.0 cm. (6.6 in.) in length, 4.4 inches in girth and 2.6 ounces in weight.

24 per cent. of all the perch caught were 3½ years old averaging 17.0 cm. (7.7 in.) in length, 5.1 inches in girth and 4.3 ounces in weight, an increase of 1.7 ounces over the 2½ year old perch.

18 per cent. of all the perch caught were 4½ years old averaging 19.5 cm. (8.5 in.) in length, 5.7 inches in girth and 5.7 ounces in weight, an increase of 3.1 ounces over the 2½ year perch, and only

5.2 per cent. of all the perch caught were 5½ years old averaging 21.5 cm. (9.9 in.) in length, 6.6 inches in girth and 9.2 ounces in weight, an increase of 6.6 ounces over the 2½ year old perch.

Pearse and Achtenberg (1920), judging by the measurements made on individuals from a school of young perch which remained near the base of Picnic Point, Lake Mendota, during the summer of 1916, and by observations of the gonads of half grown perch at various seasons, believe that perch may become sexually mature in Lake Mendota at the end of two years of growth. No information was obtained as to the age when the yellow perch first spawns in Lake Erie waters, but it probably is the end of the third year.

Yellow perch increase most rapidly in weight between the age of 3½ and 5½ years (Fig. 2). During these two years the perch in Lake Erie increase on an average about 5 ounces, which is more than their weight at 3½ years of age (Fig. 2).

It would appear from the data at hand, that no yellow perch should be caught which are less than 4½ years old. In other words from the standpoints of conservation and of monetary returns this fish should be taken when about 8 to 10 inches in length. This would allow the fish to spawn at least twice, and this would tend to ensure an inexhaustible supply. This would also give the fisherman a larger supply of a much more satisfactorily marketable fish. Unless some protection is given there is danger of the yellow perch fishery in Lake Erie becoming depleted in a few years if the rate of increase in the amount of catch during past few years is maintained.

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