AGE AND GROWTH OF WALLEYE, *STIZOSTEDION VITREUM VITREUM* (MITCHILL), IN CANTON RESERVOIR, OKLAHOMA[1]

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The present reproducing population of walleye, *Stizostedion vitreum vitreum* (Mitchill), was established in Canton Reservoir by the Oklahoma Department of Wildlife Conservation through stockings in 1960, 1961, and 1962. It was believed that the walleye would occupy an unused ecological niche, while feeding mainly on undesirable fish species.

In 1964, the Oklahoma Fishery Research Laboratory initiated a detailed study of the walleye and its effect upon the existing fish population. The age and growth of walleye was one part of the walleye life history investigation, which included food habits, distribution, and reproduction. An understanding of the walleye life history will facilitate evaluating the contribution rate of walleye to the sport fishery of Canton Reservoir.

Canton Reservoir is located in Blaine and Dewey counties in northwestern Oklahoma. At the designated pool elevation of 1,615.2 ft, the reservoir has an area of 7,500 acres, a capacity of 118,400 acre-ft, and an average depth of 15 ft. A more complete reservoir description can be found in the report by Bross (1).

METHODS

Age determinations were made by identification of annuli on wet mounted scales at a magnification of 45X. Prior to reading, scales were cleaned with a mild clorox solution to facilitate the removal of any attached dead skin. The back calculations of growth were made by the method outlined by Jenkins et al. (2), which assumes a direct body length-scale length relationship.

Age determinations and growth calculations of walleye in Canton Reservoir were based on 870 fish collected from 1964 through 1968. Trap nets, seines, bottom trawls, surface-midwater trawls, electrofishing, rotenone, gill nets, and creel surveys were utilized to collect specimens. Total length, weight, and sex of all specimens were recorded in the field.

RESULTS AND DISCUSSION

Walleye in Canton Reservoir averaged

TABLE 1. *Calculated average length and weight of walleye in Canton Reservoir.*

Year-Class	Sexes combined	Calculated average lengths in inches, Age in years 1	2	3	4	5	6	7
1960		12.4	16.9	19.2	21.5	23.6	25.7	
1961		12.3	17.1	20.0	22.3	24.3	25.9	27.7
1962		12.2	17.3	19.8	21.7	23.2	25.3	
1963		11.9	16.9	19.8	22.6	22.5		
1964		11.8	16.8	19.1	20.0			
1965		12.5	16.3	18.0				
1966		12.1	14.9					
1967		11.7						
Average,	Sexes combined	12.2	16.8	19.5	21.8	23.9	25.6	27.7
	Males	12.2	16.8	18.7	20.5	22.0		
	Females	12.2	16.6	19.6	21.7	24.4	25.6	27.7
		Calculated average weight in pounds, Age in years 1	2	3	4	5	6	7
Average,	Sexes combined	0.70	1.75	2.75	3.85	4.95	6.25	7.75

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12.2 inches and 0.70 pounds their first year of life (Table 1). Each succeeding year of life the linear growth increment decreased while the weight increment increased. During the seventh year, they grew 2.1 inches and 1.50 pounds.

The calculated linear growths of the 1960 and following year-classes showed an apparent reduction in the growth of succeeding age groups. The one year-old 1960 fish were 12.4 inches long and the one year-old 1967 fish were 11.7 inches long. The two year-old 1960 fish were 16.9 inches long, and the 1966 fish were 14.9 inches long. This trend was repeated through age group five with the 1960 fish 23.6 inches long and the 1963 fish 22.5 inches long.

This growth reduction may have reflected the stabilization of the increasing walleye population to the carrying capacity of the pre-existing forage fish population. Henderson (3) showed that walleye feed mainly on gizzard shad, *Dorosoma cepedianum* (LeSueur). This reduction could also have been the result of a decrease in the reservoir's primary productivity.

The growth rate of walleye in Canton Reservoir was higher than that reported for some other states, e.g., Wisconsin (4), Tennessee (5), and Minnesota (6), as shown in Table 2. This higher growth rate is probably a composite result of differences

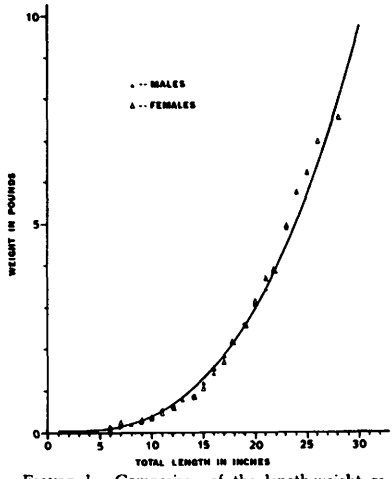

FIGURE 1. Comparison of the length-weight relationship (log 100W = -1.4030 + 2.9721 log L) for the sexes combined to the mean weights per inch class of the male and female walleye.

(7). Plots of the mean weights per inch-class of male and female walleye indicated no difference in their length-weight relationship.

There was, however, a strong differential linear growth rate between the sexes, with the females having the greater rate (Table 1). During the first two years their growth rates were about the same. However, the male's growth rate declined after sexual maturity at age 2. The female growth rate continued at the higher rate until, at age

TABLE 2. Comparison of the calculated average length of walleye in Canton Reservoir with average walleye lengths in other states.

Linear Growth	Age in Years 1	2	3	4	5	6	7
Canton	12.2	16.8	19.5	21.8	23.9	25.6	27.7
Wisconsin Niemuth, 1959 (4)	5.1	9.0	12.3	15.1	17.3	19.2	20.9
Tennessee Stroud, 1949 (5)	10.3	16.4	18.7	19.9	20.8	21.0	22.1
Minnesota Carlander, 1939 (6)	4.3	8.3	11.6	14.7	18.2	20.6	23.8

n latitude, elevation, and primary productivity.

The length-weight regression for sexes, mbined in Figure 1, log 100W = -1.4030 2.9721 log L, was derived from the mean eight per inch-class according to Ricker

3, they reached sexual maturity. At this time, females also showed a slight reduction in their growth rate.

Canton walleye matured sexually at an earlier age than did walleye in northern waters. In Wisconsin, males matured at 2 to 3 years and females matured at 4 to 5 years of age (4).

This study indicated the longevity of walleye to be 7 years for females and 5 years for males, although this probably was not an accurate representation. These calculations were based on fish from the initial stockings, with a maximum possible age of 8 years. Continued sampling of older, naturally spawned, year-classes, with larger age groups having a higher probability of capture, will probably show a greater longevity.

CONCLUSIONS

Canton walleye had a higher growth rate and an earlier sexual maturity than walleye in most other states. The females, while growing faster than the males, had the same length-weight relationship.

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