

SEXUAL MATURITY OF SMALL YEARLING LARGEMOUTH BASS IN OKLAHOMA

Douglas A. Nieman*, Michael D. Clady, and Glen E. Gebhart

Oklahoma Cooperative Fishery Research Unit[†], Oklahoma State University, Stillwater, Oklahoma 74074

Sexual maturity of largemouth bass (*Micropterus salmoides*) is believed by some investigators to depend on size rather than on age (1). Most authors report a minimum total length of about 250 mm for sexually mature female northern largemouth bass (*M. s. salmoides*), noting that males may spawn at somewhat smaller sizes (1, 2). Chew (3) reported a similar minimum spawning size for the Florida subspecies, *M. s. floridanus*. Swingle and Smith (4) reported that largemouth bass weighing less than 140 g (corresponding to bass 220-230 mm in the present study) always failed to spawn in Alabama ponds. Clugston (5), who reared both subspecies in southern Florida, reported that Florida largemouth bass became sexually mature when they were 9 months old and 230-290 mm long. The northern subspecies was larger, but did not reach sexual maturity even after 16 months.

The appearance of bass fry in ponds near Stillwater, Oklahoma, containing only age I Florida or northern largemouth bass (length range, 122-175 mm) suggested that both subspecies may reproduce at total lengths 80 to 120 mm shorter than the generally accepted minimum length for sexual maturity. Although hatchery workers in Oklahoma have previously observed age I largemouth bass of similar size spawning in ponds (T. Inslee, U.S. Fish and Wildlife Service, and Charles Wallace, Oklahoma Department of Wildlife Conservation, personal communications), this occurrence has apparently not been reported before. Therefore, the objective of this study was to document sexual maturity of small age I largemouth bass.

In August and September 1976, 200 young-of-the-year largemouth bass of the two subspecies (range in total length, 51-111 mm) were fin-clipped and stocked separately or in combination in each of nine 0.1-ha ponds (maximum depth, 1.2 m). The ponds are located below the dam of Lake Carl Blackwell, a 1,400-ha reservoir from which they receive water from an outlet located at a depth of 7 m. Lake Carl Blackwell contains a sparse population of northern largemouth bass (6).

The fish stocked in the ponds over-wintered and were being removed from the ponds (by draining) when fry were observed in four of the ponds on 24 May 1977. On 27 May age I bass in these four ponds were removed by seining. One pond contained 77 Florida largemouth bass 122 to 161 mm long; a second pond contained 88 Florida largemouth bass 123 to 175 mm long, and a third (stocked with 100 of each subspecies) contained 38 Florida largemouth bass and 3 northern largemouth bass 149 to 170 mm long. The fourth pond was supposedly stocked with 200 northern largemouth bass, but on draining it contained 120 northern largemouth bass and 1 Florida largemouth bass, 127 to 161 mm long. The fry were kept in the ponds for about 2 weeks, during which time they had grown to 23-35 mm. They could be positively identified to species, but not subspecies. No other fish were present in the ponds when they were finally drained. Three of the nine ponds had been drained before fry were observed in four of the six remaining ponds.

The size and appearance of the ovaries from seven Florida and one northern largemouth bass also indicated that yearling bass of these small sizes were sexually mature. Ovaries were expanded and bright orange-yellow in color, and the eggs were clearly visible. The whole ovary appeared granular. Gonosomatic indices (7), which

*Present address: Oklahoma Department of Wildlife Conservation, 1801 N. Lincoln Blvd., Oklahoma City, OK 73105.

[†]Cooperating agencies are the Oklahoma Department of Wildlife Conservation, Oklahoma State University, and the U.S. Fish and Wildlife Service.

are the weight of the gonads expressed as a percentage of total body weight, ranged from 2.2 to 4.3%. Gonosomatic indices of this magnitude are indicative of sexually mature largemouth bass (8), and have not been reported previously for bass this small.

Four other northern largemouth bass appeared sexually immature (not spent); ovaries of these bass were all small, pale, or colorless, and had no eggs that were yolky or maturing. The ovaries constituted only 0.4 to 0.7% of the total body weight. It is not known why only one of five northern largemouth bass appeared mature while all seven Florida largemouth bass appeared so. Nevertheless, the absence of large bass in all of the ponds in which fry appeared, and the mature appearance and size of ovaries from many of the bass, strongly suggest that some largemouth bass from 122-175 mm long became sexually mature and produced viable young. Entrance of the fry into the ponds through the water supply is unlikely. To reach the ponds through the water supply, the fry would have to have been living at a depth of 7 m in the open water of the reservoir above the ponds. Furthermore, the chances of fry, and only largemouth bass fry, appearing in only some of the ponds are remote, since many species of fish are more abundant than largemouth bass in Lake Carl Blackwell (9).

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REFERENCES

1. R. C. HEIDINGER, *in*: R. STROUD and H. CLEPPER (eds.), *Black Bass Biology and Management*. Sport Fishing Institute, Washington, D. C., 1975, pp. 11-20.
2. M. G. JOHNSON and H. R. MacCRIMMON, *Prog. Fish-Cult.* 29: 216-221 (1967).
3. R. L. CHEW, *Early Life History of the Florida Largemouth Bass*. Fla. Game Freshwater Fish. Comm., Fish. Bull. 7 (1974).
4. H. S. SWINGLE and E. V. SMITH, *Factors Affecting the Reproduction of Bluegill Bream and Largemouth Black Bass in Ponds*, Alabama Polytech. Inst. Circular No. 87 (1950).
5. J. P. CLUGSTON, *Trans. Am. Fish. Soc.* 93: 146-154 (1964).
6. P. L. ZWEIACKER and B. E. BROWN, *in*: G. E. HALL (ed.), *Reservoir Fisheries and Limnology*. Am. Fish. Soc. Spec. Publ. No. 8, Washington, D. C., 1971, pp. 481-493.
7. C. M. KAYA and A. D. HASLER, *Trans. Am. Fish. Soc.* 101: 270-275 (1972).
8. D. H. BENNETT and J. W. GIBBONS, *Trans. Am. Fish. Soc.* 104: 77-82. (1975).
9. J. N. JOHNSON, *Effects of water level fluctuations on growth, relative abundance and standing crop of fishes in Lake Carl Blackwell, Oklahoma*, M.S. Thesis, Oklahoma State University, Stillwater, 1974.