

Food Habits, Sex Ratios, and Size of Longnose Gar in Southwestern Oklahoma

Jack D. Tyler, Jerry R. Webb, Tyler R. Wright, Jack D. Hargett, Keland J. Mask, and David R. Schucker

Department of Biology, Cameron University, Lawton, OK 73505

Received: 1994 Mar 15; Revised: 1994 Apr 06

Relatively little is known about the natural history of the longnose gar (*Lepisosteus osseus*), though it ranges extensively over the eastern United States and throughout Oklahoma. At Lake Texoma, Oklahoma, Echelle (1) and May (2) have studied foods of young-of-the-year and adults, respectively, and Echelle and Riggs (3) reported on several aspects of the biology of young gars. Gars have traditionally been considered "trash fish" and voracious predators of game fish. For instance, according to Scarnecchia (4), Indiana law once required that all gars taken from state waters be destroyed. Hussakof (5) described them as "highly predaceous fish that devour vast numbers of food and game fishes." This view, however, is not supported by the available evidence. Gars are integral components of aquatic ecosystems, but investigations of their autecology and economic value are all but nonexistent. Potter (6) stated that "when soaked in brine overnight, baked gar are quite palatable." In recent years, anglers and bowfishermen have shown more interest in them; their hard, diamond-shaped scales are useful to hobbyist and jeweler.

To obtain further information on this species, we collected 142 longnose gar from two large streams in southwestern Oklahoma. Data on food contents, measurements, and sex ratios are presented.

Nylon gill nets (1.5 × 15 m) and electroshock (produced by a 7.5-kW, 360-VDC, 20-A generator mounted in a 4.8-m boat) were used to collect 142 specimens at two locations along the North Fork of Red River in Jackson/Kiowa counties (4 km east of Headrick; 13 km west of Mountain Park) and at the confluence of East Cache Creek with the Red River in southern Cotton County. Most gar were taken near the top of the net in about 2 m of water. Gar were immobilized by applying a sharp, upward jerk to the rostrum, thereby breaking the neck. In the field, each specimen was weighed (± 1 g) on a 10-kg Manostat Terraillon scale. Total lengths were measured, with a steel tape, from tip of rostrum to end of caudal fin. Metal shears were used to cut through the hard ventral scales in order to determine sex and to remove the stomach. Contents of each stomach were placed into labeled containers of 10% formalin. In the laboratory, food items were identified visually; a 12 - 20× dissecting microscope was used when needed.

We collected 65 females and 73 males (0.9/1 female/male ratio), plus four gar of unknown sex. The stomachs of 94 (66%) of these 142 gar contained no food. This high incidence of empty stomachs agrees with the findings of Diana (7), who examined 1297 longnose gar stomachs in Florida, of which 70% were empty, and with Scott (8), who examined 89 specimens in Indiana, and found that 56% of them had empty stomachs. Our study indicates the species to be piscivorous. Of our 46 gar with non-empty stomachs, 98% contained fish, and only 2% crayfish and insects. Crumpton (9), Goodyear (10), Netsch and Witt (11), and others have reported similar results. Advanced digestion precluded prey species' identification in most cases, but the following fish were identified: two drum (*Aplodinotus grunniens*), six gizzard shad (*Dorosoma cepedianum*), five red shiners (*Cyprinella lutrensis*), one bluegill (*Lepomis macrochirus*), and one black bullhead (*Ictalurus melas*). Prey length was 35-240 mm (mean: 105 mm). There was a trend for larger gar to feed on bigger prey. In our sample, 69% of piscine prey were forage fish, 7% game/pan fish, and 24% fish remains. Similarly, Lagler and Hubbs (12), Diana (7), and Bonham (13) found that forage fish composed the primary diet of this species in other parts of the country. At Lake Texoma, May (2) found that the Mississippi silverside, *Menidia audens*, comprised 54% of the fish eaten by adult longnose gar. These findings hardly

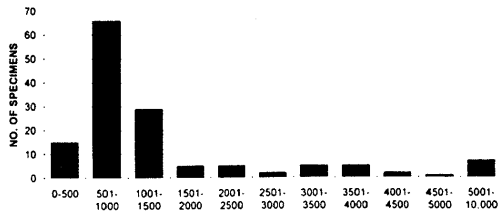


Figure 1. Numbers of longnose gar in each category of weight (g).

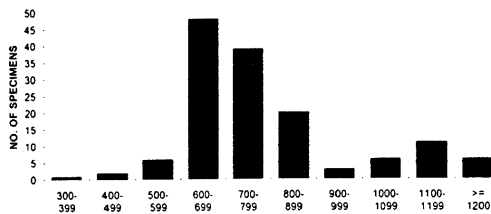


Figure 2. Numbers of longnose gar according to length (mm).

make the longnose gar a "predaceous fish that devours vast numbers of food and game fish" (4).

Female longnose gar in this study weighed 80 to 10,005 g (mean: 2060 g); their lengths were 385 to 1331 mm (mean: 865 mm). Male weights varied from 172 to 5852 g (mean: 1056 g) and lengths, 465 to 1249 mm (mean: 723 mm). Mensurative data were divided incrementally into 11 weight classes of 500 g each and ten 100-mm length categories. As illustrated in Figures 1 and 2, the 500-1000-g weight class was best represented, in which 66 gar (46% of total) occurred, and the largest length category (600-700 mm) contained 48 gar (34% of total). The next higher length class was close behind with 39 individuals (27%) and 61% of all gar fell into these two classes. Females dominated both the longest and heaviest categories. For instance, whereas 63% of all males were in the 0 - 900 mm range, 88% of the females measured between 900 and 1400 mm; 60% of the males occurred in the 0 - 3 kg range, but 85% of females occupied the 3 - 10 kg category. Our data tend to support the conclusion of Netsch and Witt (11) who found that "females grow faster, are larger, and live longer than males."

ACKNOWLEDGMENTS

We thank Larry Cofer, director of the Manning State Fish Hatchery in Medicine Park, for his invaluable aid in collecting gar and state game ranger Curtis Latham, who was instrumental in acquiring landowner permission for us.

REFERENCES

1. Echelle, A.E., Food habits of young-of-year longnose gar in Lake Texoma, Oklahoma. *Southwest. Nat.* **13**, 45-50 (1968).
2. May, E.B., Personal field notes.
3. Echelle, A.E., and Riggs, C.D., Aspects of the early life history of gars (*Lepisosteus*) in Lake Texoma. *Trans. Am. Fish. Soc.* **101**, 106-112 (1972).
4. Scarnecchia, D.L., A reappraisal of gars and bowfins in fishery management. *Fisheries* **17**, 6-12 (1992).
5. Hussakof, L., Fishes swallowed by gar pike. *Copeia* No.11, 2 (1914).
6. Potter, E.C., Food of the short-nosed gar-pike (*Lepisosteus platystomus*) in Lake Okoboji, Iowa. *Proc. Iowa Acad. Sci.* **30**, 167-170 (1923).
7. Diana, M., The diet of longnose gar (*Lepisosteus osseus*) in Lake Griffin, before, during, and after a selective rotenone treatment with differences in male and female diets. *Game & Freshwater Fish. Comm.*, FL, pp. 1-22 (1966).
8. Scott, W., *Invest. Indiana Lakes, Streams* **1**, 112-115 (1938).
9. Crumpton, J., Food habits of longnose gar (*Lepisosteus osseus*) and Florida gar (*Lepisosteus platyrhincus*) collected from five central Florida lakes. *Proc. Ann. Conf. SE Assoc. Game & Fish Comm.* **24**, 419-424 (1971).
10. Goodyear, C.P., Feeding habits of three species of gars, *Lepisosteus*, along the Mississippi Gulf Coast. *Trans. Am. Fish. Soc.* **95**, 296-300 (1967).
11. Netsch, N.F., and Witt, A., Jr., Contributions to the life history of longnose gar (*Lepisosteus osseus*) in Missouri. *Trans. Am. Fish. Soc.* **91**, 251-262 (1962).
12. Lagler, K.F., and Hubbs, F.V., Food of the long-nosed gar (*Lepisosteus osseus oxyurus*) and the bowfin (*Amia calva*) in southern Michigan. *Copeia* No. 4, 239-241 (1940).
13. Bonham, K., Food of gars in Texas. *Trans. Am. Fish. Soc.* **82**, 13-33 (1940).