Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Gulf of Mexico)

SHEEPSHEAD

Fish and Wildlife Service
U.S. Department of the Interior

Coastal Ecology Group
Waterways Experiment Station
U.S. Army Corps of Engineers
SHEEPSHEAD

NOMENCLATURE/TAXONOMY/RANGE

Scientific name..............Archosargus probatocephalus
Preferred Common Name.......Sheepshead
Other Common Names..........English: Sheepshead, porgy, mutton, Spanish: Sargo, pargo
Class..................Osteichthyes
Order....................Perciformes
Family..................Sparidae

Geographic range: The sheepshead (Figure 1) is common along the Atlantic and Gulf of Mexico coasts (Figure 2) of the United States, from Cape Cod to Texas (Bigelow and Schroeder 1953). It has been reported from Nova Scotia (Gilhen et al. 1976) to Rio de Janeiro (Randall et al. 1978). The sheepshead is divided into three subspecies: A. p. probatocephalus, the northern form, is distributed from Nova Scotia to Cedar Key, Florida; A. p. oviceps ranges in the Gulf of Mexico from St. Marks, Florida to the Campeche Bank, Mexico; and A. p. aries, the southern form, ranges from Belize to Bahia de Sepetiba, Brazil (Caldwell 1965; Randall et al. 1978; Burgess 1980).

MORPHOLOGY/IDENTIFICATION AIDS

Morphological descriptions and identification aids for the sheepshead in this report were largely extracted
from Hildebrand and Schroeder (1927), Hoeve and Moore (1977), and Johnson (1978). The primary counts of fin rays are as follows: Dorsal-XII (spiny rays), 10-12 (soft rays); and anal-III, 10-11 respectively. There are 44-49 scales in the lateral line and 8 scales above and 15 below the lateral line at the insertion of the dorsal fin. The body is deep and compressed and the back is elevated above the short and deep head. The snout is short, 2.1 to 2.6 times in head length; the eye is 2.75 to 4.55 in head length.

The mouth is moderate and nearly horizontal, 2.7 to 3.3 times in head length. The incisor-like anterior teeth and broad posterior molars are strong. Gill rakers are short, with six to seven on the lower limb of the first arch. Scales are finely serrate. The dorsal fin has strong spines; the spinous portion is longer than the soft portion. The caudal fin has a shallow fork. The second spine of the anal fin is enlarged. The pectoral fins are long, 2.7 to 3.7 times in standard length (SL).

The adult sheepshad is gray to greenish-yellow and has five to seven vertical black crossbars along the body. Crossbars are more distinct in young specimens. The dorsal, anal, and ventral fins are mostly dusky to black; the caudal and pectoral fins are greenish.

**REASON FOR INCLUSION IN THE SERIES**

The sheepshad is a relatively popular sport fish in much of its range (McClane 1964) and usually can be caught throughout the year in the Gulf of Mexico and its estuaries (Perret 1971). It has some commercial value for food (Hildebrand and Schroeder 1927; Perlmutter 1961; Burgess 1980), but its acceptance as a food fish varies among coastal states.

In Alabama, and probably the other gulf states as well, more sheepshad could be caught without endangering their abundance (Swingle 1977).

Information on the biology and population dynamics of the sheepshad is scarce.

**LIFE HISTORY**

**Spawning**

Sheepshad probably spawn in spring in mid-Atlantic coastal waters (Jordan and Evermann 1896; Hildebrand and Cable 1938; Springer and Woodburn 1960) and in the Mississippi Sound (Christmas and Waller 1973). Spawning probably takes place offshore because larvae and ripe adults are scarce in spring in shallow beach waters and estuaries (Hildebrand and Cable 1938; Springer and Woodburn 1960).

Sheepshad tend to congregate in nearshore waters of the gulf in March, April, and May (Swingle 1977). Adults migrate to offshore waters to spawn in spring and later return to nearshore waters and estuaries.

Sheepshad eggs are about 0.8 mm in diameter (Rathburn 1892), are buoyant, and hatch in about 40 hours at water temperatures near 25°C (Rathburn 1892; Smith 1907).

**Larvae**

The data on larvae in this section are largely taken from Mook (1977). His findings are the result of his examinations of specimens from the collection of the Florida Department of Natural Resources Marine Laboratory.

Yolk-sac larvae are about 2.0 to 4.5 mm long (Johnson 1970) and have a median fin fold (Mook 1977). The caudal fin is the first of the median fins to form, becoming apparent in larvae 3 mm long as ray elements in the post-ventral part of the fin fold. The caudal and anal fins are well developed
in larvae 4-mm long. The pectorals, the first paired fins to develop, appear as small fin buds in 2-mm long larvae and have developed ray elements in larvae 4 mm long. Yolk-sac larvae of sheepshead have about 24 myomeres (successive muscle segments).

Pigmentation in yolk-sac larvae is limited to one small melanophore at the angle of the jaw and three melanophores along the ventral side of the body posterior to the vent. Some individuals may have one or two small melanophores on the yolk sac. Most melanophores disappear in larvae 6 mm long (Mook 1977).

The morphological development of larval sheepshead (5 to 25 mm long) is similar to that of other perciform fishes, but they attain adult characteristics at a smaller size than do other sparid fishes (Mook 1977). At 6 mm, body depth/length ratio is 3.4, head length/body length ratio is 3.0, and the snout length/head length ratio is 4.2 (Hildebrand and Cable 1938; Johnson 1978). The caudal fin is well developed (Hildebrand and Cable 1938), and the dorsal fin has 7 spines and 12 soft rays.

Pigmentation of the body of larval sheepshead is brownish with a median ventral line. There are three black spots—one behind the isthmus, one below the base of the pectoral fin, and one a short distance anterior to the anal fin (Hildebrand and Cable 1938). Two dark specks are located at the base of the anal fin as well (Hildebrand and Cable 1938, Johnson 1978).

Most evidence suggests that sheepshead eggs hatch in offshore waters and that the larvae or postlarvae move inshore along beaches, and into estuaries (Hildebrand and Cable 1938; McClane 1964; Burgess 1980). Ostracods constitute much of the diet of sheepshead less than 30 mm long (Hildebrand and Cable 1938).

**Juveniles**

The dorsal and anal spines of juvenile sheepshead (25 to 30 mm long) are similar to those of adults (Hildebrand and Cable 1938; Johnson 1970). The caudal fin is forked and the lateral line is fully developed. The pectoral fins become larger and oblique instead of rounded as in smaller fish (Hildebrand and Cable 1938). Juvenile sheepshead are most abundant in grass flats and over mud bottoms (Hildebrand and Cable 1938; McClane 1964; Burgess 1980). In late summer, when juveniles are about 40 mm long, they begin leaving the grass flats (Hildebrand and Cable 1938; Johnson 1978) and congregate with adults around stone jetties, breakwaters, piers, and wrecks (Hildebrand and Cable 1938; LaMonde 1952; McClane 1964; Mook 1977; Burgess 1980; Juneau and Poillard 1981).

Juvenile sheepshead collected on grass flats had eaten primarily copepods and filamentous algae (Hildebrand and Cable 1938). Sheepshead that inhabited areas with structures (e.g., pilings and jetties) fed primarily on mollusks and crustaceans (Hildebrand and Cable 1938; LaMonde 1952; Randall et al. 1978).

**Migration**

Sheepshead are not a true migratory species (Gilhen et al. 1976) -- their movements are primarily offshore and inshore. In Texas and Louisiana they move offshore with the onset of cool weather in late fall (Gunter 1945; Kelly 1965). In winter, high concentrations of sheepshead have been reported at depths of 7 to 12 fathoms near oil platforms and artificial reefs off the Mississippi River Delta and the Mississippi and Alabama coasts (Bennie A. Rohr, National Marine Fisheries Service, Pascagoula, Mississippi; pers. comm. 1983). Sheepshead overwinter in offshore gulf waters and spawn in spring. After spawning, they
apparently return to nearshore waters.

GROWTH CHARACTERISTICS

The sheepshead grows and matures slowly (Hildebrand and Cable 1938; Johnson 1978). No published data were found on growth beyond age group 0 or on size at maturity. Springer and Woodburn (1960) reported that the average total lengths (TL) for young-of-the-year in the Tampa Bay area were 21, 29, and 42 mm long in June, July, and August, respectively.

The heaviest sheepshead recorded weighed 66 kg (Hildebrand and Schroeder 1927; Perlmutter 1961). Large sheepsheads in the Chesapeake Bay area ranged from 11 to 33 kg (Hildebrand and Schroeder 1927). Near Beaufort, North Carolina, most sheepshead caught by anglers were 280-380 mm long and weighed 0.5 - 1 kg. Individuals up to 500 mm and 2.3 kg sometimes were caught (Hildebrand and Cable 1938). A sheepshead weighing about 5.4 kg is considered large along the Mississippi coast; they are larger in Louisiana (Bennie A. Rohr, National Marine Fisheries Service, Pascagoula, Mississippi; pers. comm. 1983).

FISHERY

In 1964, sheepshead constituted 15% of the brackish water fish caught in the Mobile Delta by sport fishermen (Swingle et al. 1966). In 1975, about 64% of the sheepshead landed in Alabama were taken by sport fishermen (Wade 1977). In 1979, 1.8 million sheepshead were caught in the Gulf of Mexico by sport fishermen (National Marine Fisheries Service 1981). The sport fishery for sheepshead probably produces a major portion of the total landings of sheepshead in the Gulf States.

Commercial catches of sheepshead were largest in Florida and Alabama in 1981, and in Texas and Louisiana in 1982 (Table 1) (National Marine Fisheries Service 1983). From 1971 to 1982, annual commercial landings of sheepshead in the northern Gulf of Mexico (including Florida's east coast) was about 453.6 tons (t) (National Marine Fisheries Service 1983). The northern gulf landings (Table 1) were 554 t valued at $246,500 in 1981 and 558 t valued at $225,300 in 1982 (National Marine Fisheries Service 1983).

Sheepshead landings declined in the Gulf States from about 1 million lb in 1939 to a low of 576,000 lb in 1965 (Gunter 1945; Lyles 1967; Christmas and Waller 1973). This decline was attributed more to reduced fishing intensity than to a reduction in available stocks. Landing statistics from 1971 to 1982 support this conclusion (Perret 1971; Christmas and Waller 1973).

ECOLOGICAL ROLE

Sheepshead are omnivorous, and often eat plant material as well as invertebrates and small vertebrates that inhabit shallow, inshore brackish waters (Hildebrand and Cable 1938; Gunter 1945; Darnell 1961; Johnson...

<table>
<thead>
<tr>
<th>State</th>
<th>1981</th>
<th>Value (thousands of dollars)</th>
<th>1982</th>
<th>Value (thousands of dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight (t)</td>
<td></td>
<td>Weight (t)</td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>253</td>
<td>$139.3</td>
<td>77</td>
<td>$43.3</td>
</tr>
<tr>
<td>Alabama</td>
<td>111</td>
<td>36.0</td>
<td>132</td>
<td>43.8</td>
</tr>
<tr>
<td>Mississippi</td>
<td>80</td>
<td>24.4</td>
<td>68</td>
<td>21.7</td>
</tr>
<tr>
<td>Louisiana</td>
<td>59</td>
<td>27.7</td>
<td>135</td>
<td>36.9</td>
</tr>
<tr>
<td>Texas</td>
<td>51</td>
<td>19.1</td>
<td>146</td>
<td>79.6</td>
</tr>
<tr>
<td>Gulf Total</td>
<td>554</td>
<td>246.5</td>
<td>558</td>
<td>225.3</td>
</tr>
</tbody>
</table>

1978; Kelly 1965; Odum et al. 1982; Overstreet and Heard 1982). The diet of larval, juvenile, and adult sheepshead was summarized by Benson (1982). Sheepshead larvae usually eat copepods, amphipods, and other zooplankton. Small juveniles eat copepods, mysids, polychaetes, and chironomid larvae; and large juveniles and adults eat blue crabs, barnacles, young oysters, clams, other mollusks and crustaceans, and small fish -- primarily young Atlantic croakers (Odum et al. 1982). The role of the sheepshead in the trophic dynamics of estuaries has not been well documented.

DISEASE AND PARASITES

Sheepshead are hosts of ciliates (Overstreet and Howse 1977), nematodes (Norris and Overstreet 1975), trematodes (Sparks 1957; Hendrix and Overstreet 1977; Deardorff and Overstreet 1981), and isopods (Overstreet 1978), none of which are known to endanger populations of the species.

ENVIRONMENTAL REQUIREMENTS

Temperature and Salinity

Sheepshead have been collected from water at temperatures of 5°C (Christmas and Waller 1973; Perret 1971) to 35.1°C (Johnson 1978). Juveniles and adults were collected in gulf waters with a temperature range of 8.0° to 29.6°C. Dunham (1972) and Tarver and Savoie (1976) collected sheepshead from the Lake Pontchartrain-Lake Maurepas estuarine complex in water temperatures of 10° to 34.9°C.

Sheepshead are euryhaline (Gunter 1956) and have been collected in water at salinities of 5.3 to 25.0 ppt (Perret and Caillouet 1974), 2.9 to 22.5 ppt (Dunham 1972), 0.1 to 9.3 ppt (Juneau 1975), 0.0 to 30.0 ppt (Perret 1971), 0.0 to 9.9 ppt (Tarver and Savoie 1976), and 0.0 to 1.5 ppt (Kelly 1965).

No information on lethal upper and lower thermal limits for larvae, juveniles, or adults has been reported. In the Lake Pontchartrain-Lake Maurepas estuarine complex, sheepshead were most abundant at temperatures of 30° to 35°C and salinities of 5 to 10 ppt (Tarver and Savoie 1976).

Other Environmental Factors

Young juveniles commonly live in grass flats over mud bottoms, whereas adults and older juveniles usually congregate on the bottom or along the shore near rocks, pilings, breakwaters,
jetties, and piers.

Sheepshead were killed during severe oxygen depletion in semi-open and closed canals in coastal Louisiana (Adkins and Bowman 1976), but the minimal dissolved oxygen tolerances for sheepshead are unknown.
LITERATURE CITED


Overstreet, R. M., and H. D. Howse. 1977. Some parasites and diseases of estuarine fishes in polluted...


