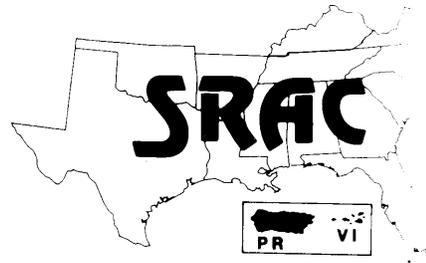


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Red Drum Biology and Life History

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The red drum (*Sciaenops ocellatus*) is a marine fish which naturally ranges from Central Mexico on the coast of the Gulf of Mexico to Massachusetts in the Atlantic Ocean. Red drum have been taken in small numbers by commercial fishermen on the Atlantic Coast for many years, but it has been an important species only on the Gulf Coast. In Texas it has comprised as much as 35 percent of the commercial fish landings in the past.

Recreational fishermen along the Gulf Coast have prized the red drum as a fish that is fun to catch and a real challenge to the angler who fishes the estuaries. During a major part of the entire 20th century there have been conflicts between recreational and commercial fishermen over allocation of the catch. Sport fishermen contend that the commercial catch is so large that it constitutes overfishing while commercial fishermen insist that the sport fishermen lack skill and that they often overfish the stock of red drum during "runs."

State and federal agencies attempted to reduce these conflicts with regulations which often differed between states. This cast doubt on their viability. Size limits, net restrictions and closed season were all tried. Measurements of the success of these regulations were rarely examined and the reasoning behind their adoption seldom specified. By the mid- 1980s regulations proliferated until commercial harvest was eliminated throughout the Gulf. Recreational fishing is still permissible but is highly regulated.

Because there is an unmeasured demand for red drum in commercial channels, aquaculture of these fish has become a moving force in marine areas. In addition, possible use of this fish for aquaculture in inland areas where saline water is available is under study and adaptation of methods is forthcoming. To fully understand the factors affecting aquaculture production, some knowledge of natural conditions is needed.

Spawning

Males court the females prior to spawning, and drumming may be a major stimulus to spawning. There is

considerable nudging and driving of the females as observed in aquariums, tanks and ponds.

Normally the spawning peak is in September or October, although spawning has been recorded in August and December as well. In the laboratory only simulated fall photoperiod and temperatures have induced spawning. On the Texas Coast the peak of spawning generally is about October 1.

Spawning apparently occurs in the vicinity of bay-gulf passes. Larvae have not been found more than 12 miles from the beach nor have they been reported from the bays. Actual spawning in the Gulf or bays has not been observed.

Hatching and larval development

After spawning the eggs and larvae are carried by Gulf surface currents to estuarine nurseries. Subsurface currents also may be involved in certain estuaries. The eggs hatch in 18 to 25 hours depending primarily on water temperature. The hatched larvae continue to float in the water, and the yolk sac is used for food for 2 to 3 days. At this time the larvae has developed mouth parts, no

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scales and no fins. At this life stage the larvae is very sensitive and will not tolerate poor water conditions.

Temperature and salinity affect the rate of larval development. Larvae hatched in warmer fall months reach juvenile stages in as little as 3 weeks. In cooler late fall months as much as 6 weeks maybe required for hatching. In years when an early cold spell reaches the Gulf, little survival has been documented.

The larvae develop at different rates even under the most controlled conditions. Because fin development seems more a result of size than age, wide variations in activity are apparent. The reason for this difference in growth is not readily apparent. It maybe a genetic difference but is more likely a factor of which fish feeds first. Those getting a head start will probably always be larger then their slower siblings.

Development of juveniles

Juveniles differ from adults in that the tail fin is pointed in juveniles and slightly concave in adults. Large black blotches are evident on the sides and back of juveniles at about 4 inches, but most of these disappear when the fish reaches about 6 inches in length. Adults have a long body shape with a blunt head and a mouth slightly behind the snout.

Juveniles utilize estuarine nurseries. None have been collected in the offshore gulf, but they may occasionally be found in the surf zone. This absence from the surf zone makes capture of juveniles for study or stocking purposes practically impossible.

Though larvae have little tolerance for low salinities, juveniles are quite tolerant, and this tolerance increases with age. Estuaries from the Laguna Madre in Texas to the Atlantic Chesapeake Bay contain juveniles. In Texas juvenile abundance is similar from Galveston Bay with salinities as low as 13 ppt to the Lower Laguna Madre with salinities as high as 40 ppt.

Distribution of juvenile red drum in these estuaries is poorly understood. Apparently they prefer shorelines, shallow waters and seagrass beds. Open bay areas are poor collecting sites. At the same time juveniles have been collected over all types of vegetated and unvegetated bottom, near municipalities and industries, and in marshes, channels and rivers. Largest numbers are usually found near the edges of seagrass beds on nonvegetated bottoms, which maybe due in part to the collecting gear available.

Immature red drum apparently stay in the estuaries with movements correlated to temperature and salinities. Most are caught along shorelines and in shallow water, with very few collected in open bays. In Texas it is reported that catches near deep holes increase just prior to the passage of cold fronts, but generally do not leave the "home" estuary. Most of the activity seems to occur during nighttime hours. Reports from former commercial fishermen indicate that the fish are very wary and avoid nets. Any sudden movement or sound is sufficient to make the fish move from an area.

Adults

Red drum emigrate from the estuaries when sexually mature. This may occur as early as 3 years of age but may be delayed until 6 years. Size is apparently not a major criteria affecting this movement. Adults are very rare in the estuaries and bay systems. Some reports indicate that they may be found at least 70 miles from shore but most occur within 5 miles of the Gulf shore.

Adults apparently feed throughout the water column, but are primarily bottom feeders. Most reports indicate that their primary food is benthos, although larger fish will feed heavily on surface schools of fish. Apparently the major fish utilized is menhaden. This generalized feeding behavior should be recognized by aquaculturists. It should also be recognized that red drum have been

reported to feed on all types of prey at various times. Size of the mouth may regulate the size of the preferred prey. Reports indicate no differences in food preferences between males and females.

Parasites and diseases

At least 30 organisms have been found on or in wild populations of red drum. Many of these maybe due to their habits of feeding on a variety of prey. Little data or documentation on the effects of these organisms is available. From observation, it appears that these fish are not heavily parasitized.

Egg production

Females are estimated to produce over 500,000 eggs annually, but reports of 3.5 million per female have been made. Unfortunately, there is little evidence of the age at which red drum may cease spawning.

Regulation

Because of a lack of region-wide statistics, federal and state regulations are based on harvest data of questionable reliability particularly for recreational fisheries. Recreational fishery began in the early 1900s. Prior to that time commercial catches in the Gulf ranged from 1.5 to 3.0 million pounds annually. This catch rate continued until about 1970. Subsequent catches by recreational and commercial fishermen increased rapidly with reports as high as 20 million pounds during the early 1980s.

Because it was concluded that red drum were overfished and had been overfished for many years, both federal and state waters were closed to commercial fishing. These regulations are expected to continue through the 20th century. Some states have adopted regulations which will make the sale of red drum illegal unless they are from an aquacultural installation. This condition favors aquacultural production of red drum for the future.

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