Maryland Sea Grant
RESEARCH NOTES

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REPRODUCTIVE SUCCESS OF CHOPTANK RIVER, MARYLAND STRIPED BASS IN A HATCHERY SITUATION

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Eastern striped bass are anadromous fish that spawn in freshwater rivers and spend most of their adult days migrating along the Atlantic coast from Maine to North Carolina. It is estimated that some 90 percent of these mature striped bass are born in the tributary rivers of the Chesapeake Bay, where they are commonly called rockfish.

In recent years, the population has been in marked decline. Commercial harvests in the Bay have dropped from an average (until 1974) of around five million pounds to less than two million pounds in 1979. Brief fishing bans have been imposed by state authorities, but commercial harvesting during the spring spawn run remains strong because consumer demand and market prices have risen despite the depletion of stocks.

Because striped bass are favorites for recreational and commercial fishermen in several states, their decline resulted in 1979 in the enactment of emergency federal legislation intended to support research into the causes of the decline.

George Krantz's hatchery work was one of the first attempts to observe the spawning process and the eggs and larvae born of this troubled species.

The Editors

Fishery biologists have long recognized that fish from the Chesapeake Bay resist producing viable eggs by stimulated ovulation. In 1979, fish taken from the Choptank River posed this problem once again.

Adult striped bass (*Morone saxatilis*) from the Choptank River, Maryland were evaluated as brood stock for a research hatchery operated by the University of Maryland at Horn Point Environmental Laboratory. Striped bass were collected from the river by fishing with drifting gill nets. All female fish used in the study were large (over 70 cm fork length) and were from the 1970 and 1968 year classes. Male fish ranged from 30 to 52 cm fork length. Female fish were examined by the catheter technique, and 40 of the females were identified as "eligible to spawn." These fish were injected with choronic gonadotrophin to induce ovulation.

An existing oyster hatchery and equipment were modified to hatch the buoyant, floating eggs found in striped bass from the Chesapeake Bay. Conical oyster culture tanks of 250-liter and 1000-liter capacities were converted to vertical flow culture systems receiving ambient river water and/or well water. Water was treated and blended so that any selected temperature and salinity could be delivered to the eggs, larvae, and fry. Eggs were cultured to production scale at 20°C and 0.5 ppt.

Twenty-nine fish ovulated in the expected pattern, but only one fish produced enough viable fry for use in a production hatchery operation (Table 1). Only three other fish produced fry that survived four days after hatching.

Table 1: Results from Induced Ovulation of Choptank River Striped Bass in 1979

Fertile Eggs at 12 Hours	Number of Fish	Eggs Hatched	Fry Produced
0 - 10%	20	4	2
11 - 20%	5	3	2
20 - 30%	3	1	1
> 60%	1	1	1
TOTALS	29	9	6

Samples of eggs from the last 10 fish that were spawned were water-hardened at different salinities, pH, and temperatures in an attempt to increase egg viability. Combinations of salinity (0, 0.5, 1.0 and 2.0 ppt) and pH (7.5, 8.0, 8.3) at 5°C above and below ambient river temperatures produced no major differences in egg viability. The variation in salinity did produce statistically significant differences in egg diameter among the samples from the same female fish. Fresh water induced the development of the largest eggs: 3.3 mm with a mean diameter of 2.2 mm in the sample. At 0.5 ppt, eggs were all less than 2.8 mm with a mean of 2.1 mm. At 2.0 ppt eggs ranged from 0.9 mm to 2.5 mm with a mean of 1.7 mm. The effect of salinity on striped bass egg diameter during water hardening may explain the observed differences in egg size among various river systems within the Chesapeake Bay.

Recognizing that physical handling of the fish and eggs could have induced the observed low egg viability, it is still probable that the performance of striped bass eggs under laboratory conditions reflects the present performance of eggs in the river systems of the Chesapeake. Reduced egg viability should be considered as a factor responsible for recent low levels of recruitment in the Chesapeake Bay striped bass fishery.

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