

HADDOCK SPAWN IN CAPTIVITY

For the first time in the U.S., haddock are spawning in captivity--at the Narragansett (R.I.) Laboratory of the NMFS Northeast Fisheries Center.

Haddock, "scrod" on the restaurant menu, is a traditional and valued foodfish. Once king of the New England groundfish industry, the haddock has been reduced by heavy fishing and poor spawning success in recent years.

Haddock spawn during March or April in the bottom waters off New England. The first time haddock spawned in an aquarium was in 1967; it was an accident. The water-cooling unit in a marine laboratory in Aberdeen, Scotland, broke down and the water temperature in a tank began to rise. A night watchman was the first person in marine research to observe the courtship and spawning act of haddock.

The Narragansett Project

The Narragansett Laboratory obtained 12 sexually mature haddock from Bob Nickerson, a Chatham, Mass., longline fisherman. The fish were placed in experimental tanks on February 17, 1972, and held at a temperature of 40 degrees (fahrenheit) for two weeks. After that, the temperature was increased slowly a fraction of a degree each day.

Dr. Geoffrey C. Laurence, who directed the experiment, reported: "As the temperature increased, the females enlarged noticeably. On the afternoon of March 3, there were no eggs in the water. When we came to work the next morning, there were eggs in the water; so we knew the fish had spawned." Spawning had begun only two days after the increase in temperature began and continued nightly from March 7 to March 17.

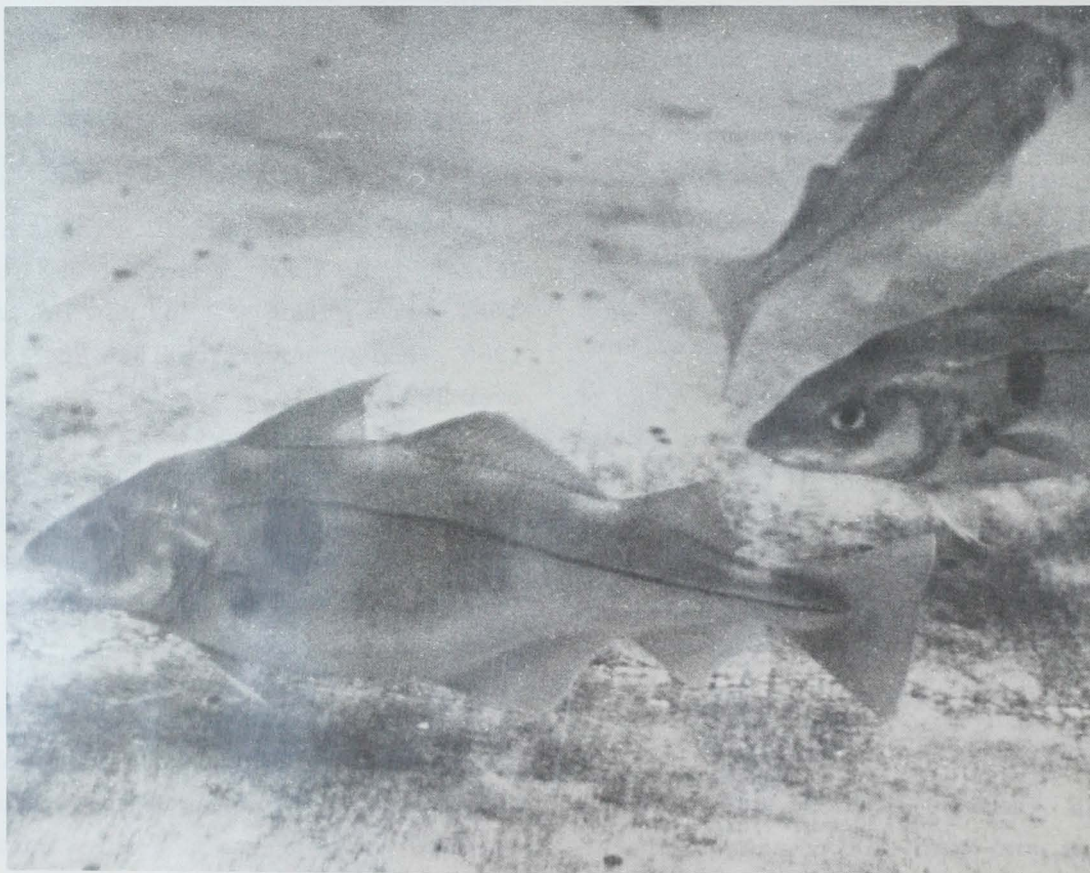


Fig. 1 - These haddock, photographed during day, spawned several nights in succession. It was first time in U.S. that haddock spawned in captivity.

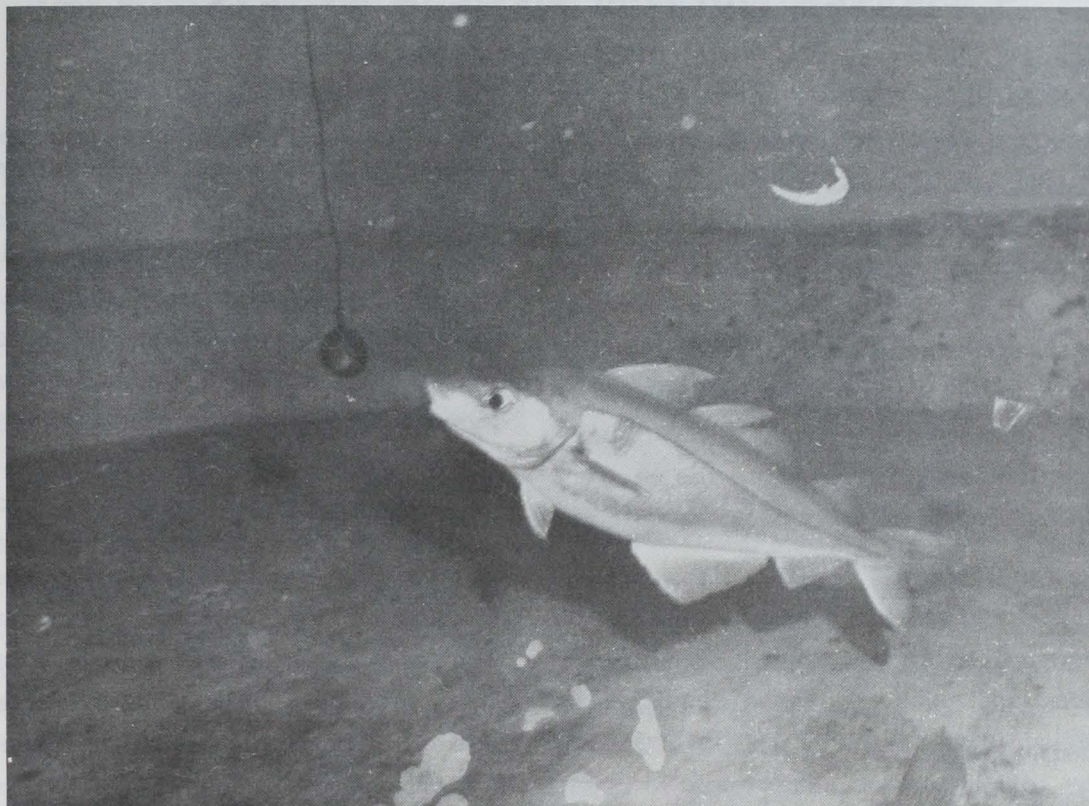


Fig. 2 - Haddock approaches microphone used by scientists to record "clicking" sound made by male during the spawning season. (R. K. Brigham)

At first, only 10% of the eggs were found to be fertilized. When the temperature reached 42 degrees, fertilization improved to 90%.

The amount of eggs also increased. On March 16, observers watched Dr. Laurence draw a fine mesh net twice around the circumference of the 15,000-gallon tank. The operation brought in over a quart of eggs.

Hydrophones and amplifiers were placed in the tank so scientists could listen to the "clicking" sound made by the male haddock during the time of spawning. This sound is produced by special muscles highly developed in sexually mature fish. During courtship activities preceding the spawning act, the sounds intensify. The repetition frequency increases to give a "humming" sound.

Significance of Successful Spawning

The successful spawning of haddock at the Narragansett Laboratory means it will be possible to supply experimental biologists at the Northeast Fisheries Center with large numbers of fertilized haddock eggs of known age. These eggs will be used to study the fish's early life stages.

A single haddock female can produce up to one million eggs. But when the fertilized eggs rise and float near the ocean surface, mortality is high. It is very difficult to detect the actual causes of larval mortality and even to measure this mortality rate in the open ocean.

Research Vessel Surveys

The NMFS research vessel 'Albatross IV' samples throughout the spawning season to learn the distribution and abundance of haddock eggs and larvae on Georges Bank. Biologists at Northeast Fisheries Center headquarters in Woods Hole, Mass., are confident that sufficient sampling at sea will yield valuable clues to factors in the environment that are most important to the survival of eggs and larvae. Then these clues can be used to set up tests under experimental conditions that should reveal even more about cause and effect in larval mortality.

To assess and manage this valuable resource, NMFS scientists say, it is essential to understand the growth process that culminates in the entry of the fish into the "fishable" population.