

Determining the Age of One of the Oldest Living Animals on Earth

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How long can a clam live? This question was the impetus for recent research by the Science Center for Marine Fisheries (SCeMFis), an Industry and University Cooperative Research Center funded by the National Science Foundation with academic sites at the Gulf Coast Research Laboratory, University of Southern Mississippi (USM) and the Virginia Institute of Marine Science (VIMS), College of William and Mary. It turns out, the North Atlantic contains live ocean quahogs (*Arctica islandica*), a species of clam used in most clam chowders, some of which were born before the American Revolution! The majority of clams that are commercially harvested were born in the time period just prior to World War I through the 1960s.

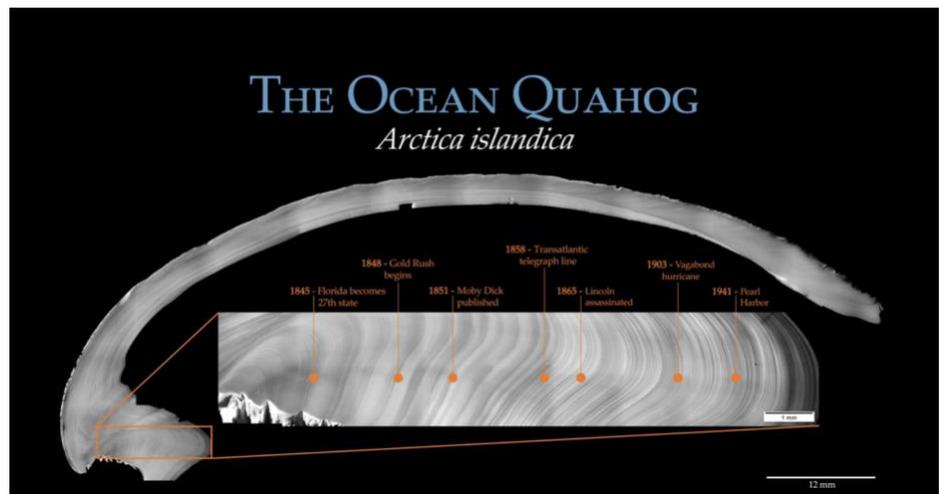


Figure 1 – Historical timeline corresponding to growth of an ocean quahog

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scientists at VIMS developed methods to age these animals by cutting, polishing, staining and counting the growth rings of the shell similar to the way growth rings reveal tree age – but with a twist. “These animals don’t fit any normal growth curve; animals living today off Long Island and New Jersey born after the second world war grew at a rate 2.8 times the growth rate of animals born 200 years ago,” states Dr. Eric Powell, SCeMFis Center Director at USM. He adds, “Moreover, for the older animals, growth has accelerated relative to the growth rate expected for an animal of that age based on the growth trajectory established at birth. In addition, males and females grow at different rates making age determination more difficult. A new growth curve must be developed according to birth date for each site; thus many growth curves are present simultaneously within a local population. No other animal has such complex growth over its population, within its metapopulation, and over time.”

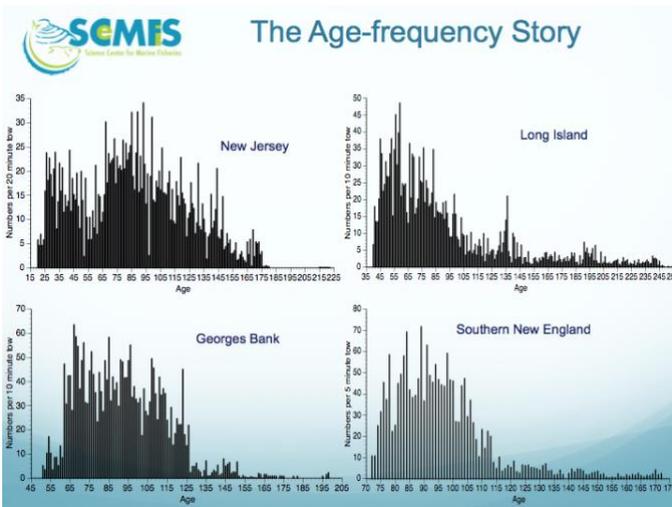


Figure 2 - Age frequency of clams in various locations. Note the age in years.

Clams record their complete life history in their shells. SCeMFIS scientists have collected important information about climatic change and its impact on bottom water temperature for the North Atlantic as measured by trends in yearly growth increments and cyclic oscillations in clam growth patterns. These patterns reflect seawater temperature on the continental shelf over periods in excess of 200 years and may be particularly useful in tracking the influence of long-term cycles such as the Atlantic Multidecadal Oscillation (AMO). Some of these clams have lived through more than 3 of these 60-70 year cycles.

By developing this ageing technique, SCeMFIS has allayed the fears about a fishery being overfished and proved that the harvest of ocean quahogs is sustainable - information which is essential to the determination of fishery management actions and extremely valuable to our industry partners.