

Characterizing the Age Distribution of Two Forage Fish Species

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The challenge of sustainably managing forage fish, fish supporting commercial fisheries and also providing an important food source for higher trophic level predators, 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



Figure 1 - Atlantic chub mackerel (*Scomber colias*)

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. SCeMFIS is pursuing two primary research foci of forage fish research. Each serves to benefit the assessment and management of fish stocks. The first is to describe the fundamental biological dynamics of poorly understood fished stocks and the second is to determine cost-effective and accurate sampling protocols to deliver the best information to the industry and management agencies. A key facet of these research approaches is that the fishery can be more profitable and more sustainable when information used for its assessment and management is of high precision. This is a benefit to the stakeholders (the industry) and managers – to find the most risk adverse strategies to maximize sustainable yield. Dr. Robert Leaf, an assistant professor at the University of Mississippi, is enthusiastic about working with fishing industry stakeholders. He says, “This unique industry and academic partnership allows us to investigate and answer assessment needs of scientific interest to us and of critical need to industry.”

Other forage fishes of great commercial importance and ecological interest are Atlantic and Gulf menhaden. Gulf and Atlantic menhaden support the largest commercial fisheries by weight in the Gulf of Mexico and the Atlantic, respectively. Dr. Leaf and Dr. Geneviève Nesslage, an assistant research professor at the University of Maryland Center for Environmental Science, are conducting an evaluation of current sampling programs used to characterize the menhaden age composition of the catch on both coasts. Such samples from the fishery are a critical component of stock assessments (the statistical and quantitative approach used to determine the status of the fishery and the stock). Samples taken from the fishery are used to help characterize the age distribution of the catch, track good year classes of young fish entering the population, and estimate fishing mortality. A thorough evaluation of sampling protocols on both coasts will determine if sampling levels are adequate to obtain high-precision estimates of the age-frequency and spatial distribution of the catch for these valuable fisheries.

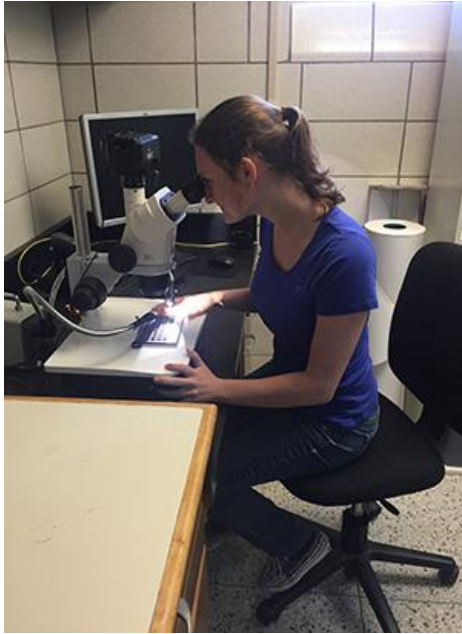


Figure 2 - Taylor Daley, graduate student at USM, studying forage fish age at length

SCeMFIS research encompasses one of the first Northwest Atlantic studies related to age at length and rapid growth of forage fish. Taylor Daley, a SCeMFIS-funded graduate student at the Gulf Coast Research Laboratory has been involved in some of the first calibration studies to determine a relationship between age at length and weight at length for Atlantic chub mackerel, an important forage species for many sport fish. Ms. Daley along with her professor, Dr. Robert Leaf, found that individuals in the Northwest Atlantic grow faster but reach a smaller maximum length than chub mackerel in the Eastern Atlantic.

In addition, research results show that analysis of frozen tissue is a valid method for determination of sex and female maturity during the spawning season. These data inform management on growth and maturity that assists with assessments.

Taylor presented her findings to a global panel that included Spanish, Portuguese, and Canary Islands experts in Atlantic chub mackerel age and growth at the 6th International Otolith Symposium in Keelung, Taiwan and gained membership in the International Otolith Exchange. This information sharing will greatly assist in the development of a Fisheries Management Plan for the U.S. for this forage fish as well as giving SCeMFIS a global reach.

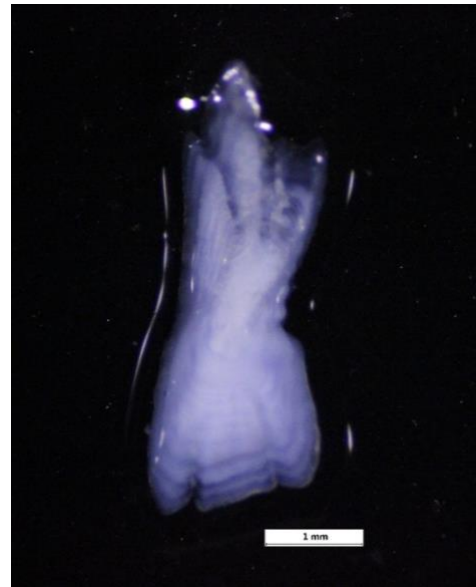


Figure 3 - A stained fish otolith showing age rings