

# Characterization of the Atlantic Chub Mackerel fishery in the mid-Atlantic for 2018

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## Introduction

We continue to work with industry partners (J. Kaelin, Lund's Fisheries and M. Lapp, SeaFreeze Ltd.) to characterize the age and length composition of Atlantic Chub Mackerel(ACM) in the commercial fishery. The goal of this work will be to understand inter and intra annual variation in age and length composition and we will integrate these data with those collected from previous fishery-dependent sampling work. This effort will contribute to a continued understanding of the length and age-composition of harvest and serve to expand the time series of annual length composition.

## Methods

We have requested that both SeaFreeze and Lund's Fisheries collect a random subset of the catch of ACM and keep them frozen at their facility, labeled with the date of collection. We will make one trip to Lund's Fisheries in the late summer/early fall to collect and sample fish (determine length, weight, and collect otoliths) onsite. For those individuals harvested that are of extreme total length (< 25 cm and > 38 cm, TL) otoliths will be collected and fish will be aged. We focus on age determination of these sizes of fish because they are absent from our previous year's sampling and these individuals will be used to inform our length-at-age relationship.

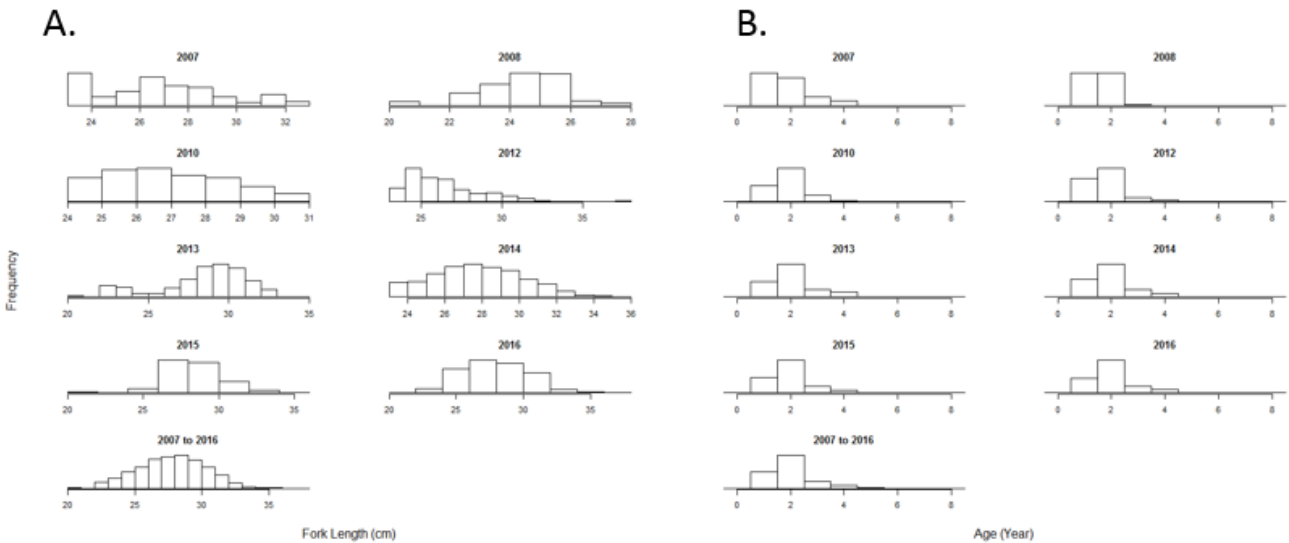


Figure 1. A.) Length (FL, cm) and B.) age composition of Atlantic Chub Mackerel collected (randomly and haphazardly) from commercial fishery partners.

## Stock delineation of Atlantic Chub Mackerel (*Scomber colias*) using otolith shape analysis

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### Introduction

Morphometric analysis of otoliths can be used to delineate fish stocks, characterize population movements, and detect the natal origin of fish (Friedland & Reddin, 1994). Stock delineation is a fundamental aspect of stock assessment and in this study, we seek to determine if stock structure can be detected in Atlantic Chub Mackerel (ACM) using otolith shape analysis. This project addresses assessment needs to provide “adequate scientific information” for the ACM stock.

### Methods

To perform otolith shape analysis on ACM, we have collaborated with scientific personnel involved in age and growth determination in the northwest Atlantic (US mid-Atlantic), central western Atlantic (northern Gulf of Mexico), northeastern Atlantic (Spain, Portugal), central eastern Atlantic (Canary Islands, Azores, Mauritania), and the Mediterranean (GSA06, GSA09). We have obtained digital images of known age ACM from these investigators (Table 1). We will focus our analysis on age-2+ individuals. We will use digital microscopy to evaluate otolith shape to determine and understand if there are detectable differences in the multivariate metric of otolith “shape”. The detection of differences in otolith shape indicate that stock structure may exist. We will use *ShapeR* software package designed to evaluate otolith shape variation among putative fish stocks. Multivariate analysis will be used to evaluate and determine the presence of geographic patterns.

Table 1. Summary of otoliths images, by region, of Atlantic Chub Mackerel age 2 to 4 y.

<b>Location</b>	<b>Region</b>	<b><i>n</i></b>	<b>Status</b>
US mid-Atlantic	northwest Atlantic	289	Images obtained
northern Gulf of Mexico	central western Atlantic	TBD	Working with commercial fishery to obtain samples
Spain (ICES 9aN)	northeast Atlantic	99	Images obtained
Portugal	northeast Atlantic	59	Images obtained
Canary Islands	central eastern Atlantic	104	Images obtained
Azores	central eastern Atlantic	TBD	Working to obtain images
Mauritania	central eastern Atlantic	91	Images obtained
GSA06	Mediterranean	56	Images obtained
GSA09	Mediterranean	17	Images obtained