Characterization of the Atlantic Chub Mackerel fishery and stock (2020 update)

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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. This effort was initiated in 2016 using funding provided by the Science Center for Marine Fisheries. SCeMFiS is a National Science Foundation Industry/University Cooperative Research Center (I/UCRC).

The goal of this work has been to understand inter- and intra-annual variations in age and length composition and we have integrated these data with those collected from previous fishery-dependent sampling work (earlier than 2016). The intention of this effort is to 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

Working with industry partners, 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 and labeled with the date of collection. Depending on the volume of samples, we have made trips to Lund's Fisheries in the late summer/early fall (2016, 2017, 2018) to collect and sample fish (determine length, weight, maturity status, and collect otoliths). In other years, including in 2019 and 2020, we have requested that samples be shipped to the Gulf Coast Research Laboratory.

To respond to the immediate needs of the Mid-Atlantic Council SSC for information of age composition of the harvested stock, I selected a random sample of $n = 40$ individuals collected in 2018 and 2019. This is a subset of individuals from these years' collections (Table 1). Age determination followed the methods outlined by T. Daley and whole otoliths were 'read'. Age estimates for whole otoliths were assigned by counting fully formed annuli at 2X to 5X magnification. Our previous work indicated that age estimates from whole otoliths provided greater between reader precision than the alternative of using sectioned otoliths. In that analysis age estimates of whole otoliths yielded 72% agreement between two readers (T. Daley and NOAA NEFSC staff). The 2018 and 2019 otoliths were read by a single reader (Leaf) and only those otoliths that were of good quality were used for age determination. We have received samples (frozen fish) for 2020 but these have not been processed.

Based on aggregated length-composition information, of all years, the length composition exhibits a slight bimodal pattern with peaks at 25 cm TL and another at 32 cm TL (Figure 1). There is considerable variation in the patterns of annual length composition encountered in the commercial fishery and in general length composition data from a single year do not exhibit a bimodal pattern, instead, the mean of the annual length composition distributions are generally unimodal and either centered or skewed to smaller lengths (e.g. years 2007, 2008, 2012, 2018) or centered or skewed to larger lengths (e.g. years 2007, 2008, 2012, 2014).

Based on the historical analysis of length composition, there is no apparent relationship between the month of harvest and the mean length (FL) of the fish encountered (Figure 3).

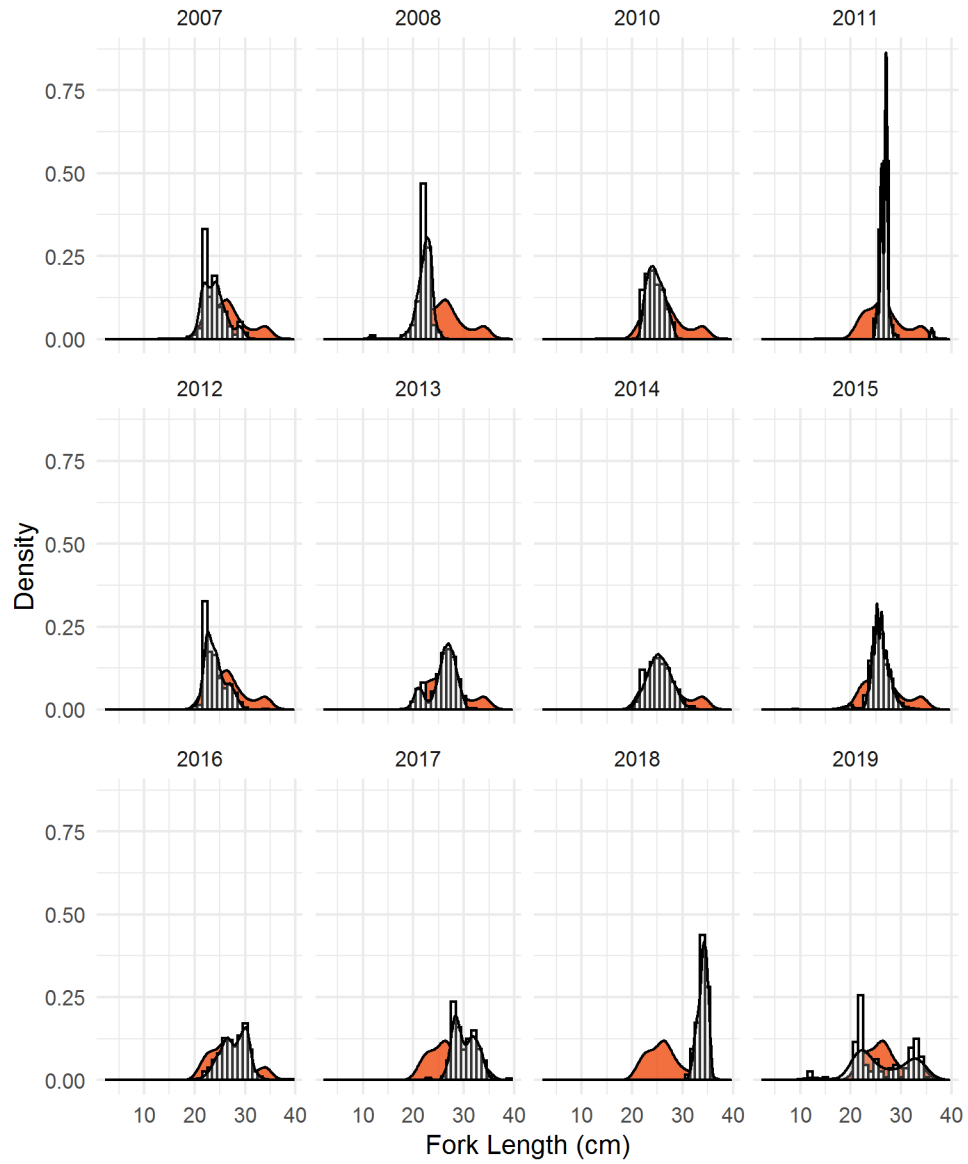| Year	Minimum FL (cm)	Maximum FL (cm)	# Fish Measured	# Age Determined
2007	18.9	29.7	157	0
2008	18.9	25.2	96	0
2010	21.6	27.9	122	0
2011	25.2	36.0	97	0
2012	19.8	34.2	580	0
2013	18.9	133.6	1116	0
2014	19.8	32.4	1352	0
2015	18.9	33.3	906	0
2016	18.9	39.3	2902	329
2017	22.8	39.5	428	108
2018	31.5	36.1	67	32
2019	20.9	34.8	109	25

Figure 1: Length (Fork Length) composition of fish collected from the commercial fishery. The orange polygons are the aggregated (all year) density polygons provided for comparison to the annual (panel specific) length compositions.
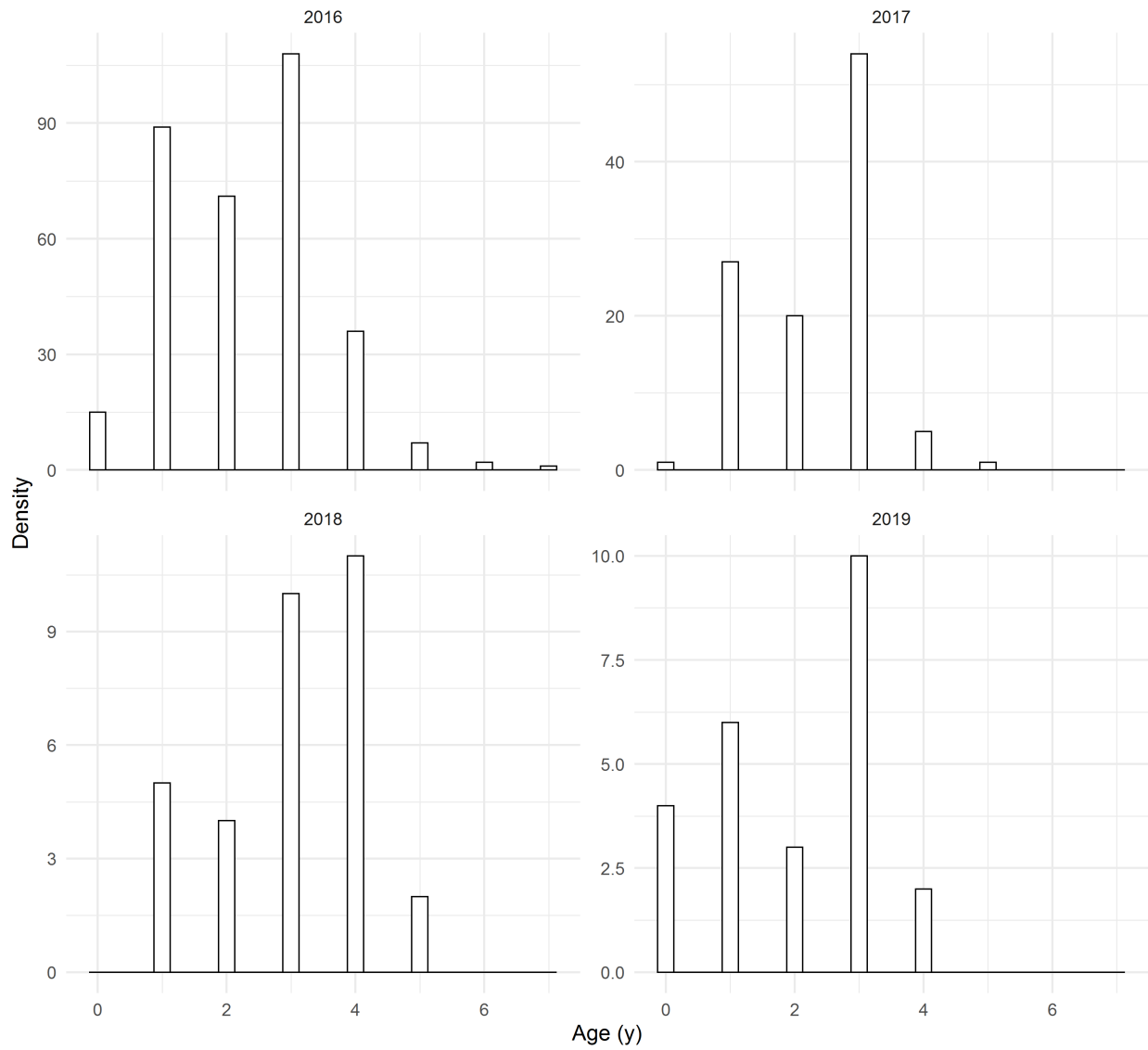
Figure 2: Age composition of fish collected from the commercial fishery. Sample sizes for each year-specific panel found in the table of this report
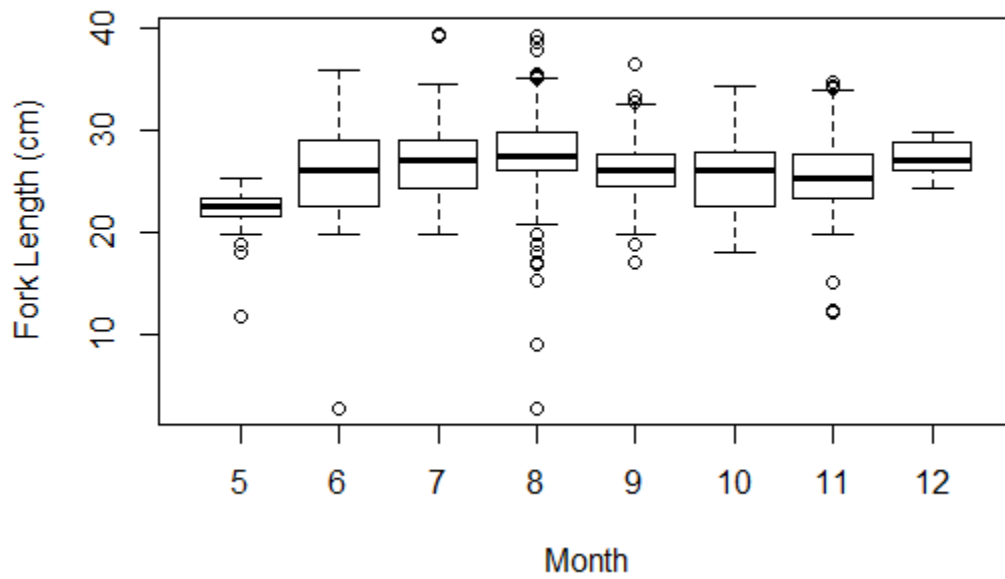
Figure 3: Boxplot of Fork length (cm) of collected Atlantic Chub Mackerel caught during the fishing season.