

A snapshot on composition and distribution of fish larvae across the North Atlantic Ocean

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Abstract. Harith MN, O' Donnell C, Johnston G, Power AM. 2021. A snapshot on composition and distribution of fish larvae across the North Atlantic Ocean. *Biodiversitas* 22: 4496-4504. This study aims to describe the composition and distribution patterns of fish larvae communities across the North Atlantic Ocean. Several cruises were involved in the effort to collect the fish larvae samples. The sampling took place on the east side of the North Atlantic Ocean, towards the mid-Atlantic Ocean, and on the west side of the North Atlantic Ocean, near the eddies approaching Flemish Cap. A total of 9522 fish larvae were collected and identified from these surveys. These larvae came from 79 taxa and 29 families. Referring to the total abundance, considering all the sampled stations, Atlantic mackerel (*Scomber scombrus*) was the most abundant species (38.82% of the total fish larvae abundance), followed by blue whiting (*Micromesistius poutassou*) (15.9%). Referring to the Multi-dimensional scaling (MDS) ordination plots, two major stations clusters separate the on-shelf and off-shelf stations supported by SIMPER analysis. This study provides a snapshot of larval fish concentrations and assembly structure, but current knowledge suggests that the distribution of larval fish assemblages will be highly spatially variable, more research into plume front dynamics and their effects on the region's biota is needed to predict and understand changes.

Keywords: Assemblages, diversity, ichthyoplankton, larval, transatlantic

INTRODUCTION

Studying the species composition, abundance, and spatial and temporal distribution of fish larvae provides valuable data on the locations and seasons of spawning, particularly commercially important species. This knowledge allows researchers to understand the life cycle, behavior, and migration of fish, provides important scientific information to evaluate the reproduction success of different fish, and further state of recruitment and fish stocks that can be used for rational exploitation of fish resources. Early stages of fish development, especially larvae, are the most vulnerable to the changes in environmental conditions; therefore, the study of the state of fish larvae communities helps not only to estimate the reproduction success of fish populations and to predict future catches of commercially important species but also to monitor the anthropogenic impact and climate change in the marine ecosystem (Chesalina et al. 2013)

There are several studies documenting the fish larvae composition on the east side of the North Atlantic Ocean, and most of these studies are done separately in terms of sampling effort (Gowen et al. 1998; Duffy-Anderson et al. 2006; Ibaibarriaga et al. 2007; Giordano et al. 2015; McKinnon et al. 2015). As fish larvae are considered weak swimmers and categorized as part of the zooplankton group, one might say that there are very low or none of the fish larvae could be found, especially off the shelf and the middle of the North Atlantic Ocean. This statement stayed as claims as there was a lack of proper documentation in

terms of publication on the composition of the fish larvae across the North Atlantic Ocean. Thus, the objective of this study is to describe the abundance and distribution patterns of fish larvae communities across the North Atlantic Ocean. The working hypothesis was that the composition pattern of fish larvae present differences between the areas studied according to the hydrographical factors/environmental analyzed. The information might be interesting as the oceanographic feature across the North Atlantic Ocean might influence the fish larvae composition.

MATERIALS AND METHODS

Samples collection and study area

The effort to collect the fish larvae across the North Atlantic Ocean was made through the participation of several cruises. The sampling was assigned as part of several cruises, namely CE14006: Transatlantic Cruise, CE15005: Blue Whiting Acoustic Survey (BWAS 2015), CE15007: Transatlantic Ocean Climate Survey 2015, CE16005: Blue Whiting Acoustic Survey (BWAS 2016), and CE16007: Transatlantic Survey 2016 (Figure 1). The location of the samplings included the side of the North Atlantic Ocean towards the mid-Atlantic Ocean and finished at the eddies area approaching Flemish Cap at the west side of the North Atlantic Ocean (Figure 1). The summary related to all sampling involved are shown in Table 1.