

LAGRANGIAN TRACKING OF LOW SALINITY SURFACE WATERS FROM THE GULF OF LIONS AND ADVECTION OF ANCHOVY LARVAE ALONG THE CATALAN SLOPE (NW MEDITERRANEAN)

A. Sabatés ^{1*}, J. Salat ¹, I. Palomera ¹, M.P. Olivar ¹ and M.L. Fernández de Puelles ²

¹ ICM-CSIC., Barcelona, Spain - * sabates@icm.csic.es

² IEO Balears, Palma de Mallorca, Spain

Abstract

The results of a Lagrangian survey of waters of continental origin from the Gulf of Lions are presented. Three drifters were launched at the edge of the continental shelf around the core of the shelf-slope current and followed up to near Barcelona. The current was carrying surface waters with relatively low salinity from the Gulf of Lions, influenced by Rhone runoff. Monitoring of environmental conditions, planktonic communities and anchovy larvae living in the surface water parcel tracked by the drifters was conducted in order to evaluate the suitability of these waters for the survival of anchovy larvae.

Keywords: NW Mediterranean, continental waters, advection, anchovy larvae, larval growth

Introduction

In the Mediterranean, once the seasonal thermocline has been established by the end of spring, the nutrient content of surface waters is rapidly exhausted and primary production can only be sustained at deeper layers (1). Only at certain places, in conditions of favourable winds for coastal upwelling or near river mouths, there can be some nutrient input into the surface water allowing a relatively high biological production. In the Catalan Sea, the spawning peak of anchovy, *Engraulis encrasicolus*, takes place at the end of spring. High egg and larval abundances are clearly associated with areas of freshwater input (2). During the earliest stages of development anchovy larvae are located near the surface (3). This coincidence is related to: (i) the relative high production of these waters at the end of spring, when the continental runoff reaches its annual maximum, and (ii) the ability of these larvae to survive in a low salinity environment.

The continental shelf of the Gulf of Lions is influenced by water of continental origin from the outflow of the Rhône River. The stratification conditions at the end of spring play a role, favouring a wide spreading of these continental waters, because the surface mixed layer is still very thin. It is, then, not difficult to find these low salinity surface water as far as more than 250 km away from the river mouth, downstream the shelf-slope current (5).

Data

A lagrangian survey was carried out in June 2000, during 10 days in the northern Catalan coast. Three drifters were launched at the shelf edge of the Gulf of Lions, around the core the shelf-slope current, and followed up to near Barcelona, along a path of more than 200 km. The current was carrying surface waters with relatively low salinity from the Gulf of Lions. The objective was to monitor the environmental conditions, planktonic communities and anchovy larvae living in the surface water parcel tracked by the drifters and evaluate the suitability of these waters for the survival of anchovy larvae. The experiment was completed by a general survey of the whole area to compare the situation inside and outside the tracked water.

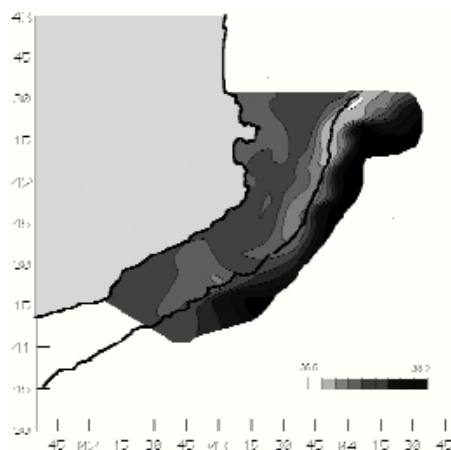


Fig. 1. Surface Salinity distribution showing the trajectory of the drifters along the experiment.

Results

The general surface salinity distribution showed both relatively low salinity and high fluorescence waters over the drifters' path (Fig.1). Concentration of copepod nauplii and copepodites, potential larval fish food, did not show important variations along the experiment. At the starting point of the drifters, high concentrations of small anchovy larvae were detected, which were progressively decreasing in number, while larval size increased along the survey track (Fig. 2). Larval growth rates obtained through otolith microstructure analysis revealed that mean size increased along the path and this corresponded well with the time elapsed from the beginning of the experiment (Fig. 2). This suggests that larval cohorts were growing inside the tracked plume of continental influence.

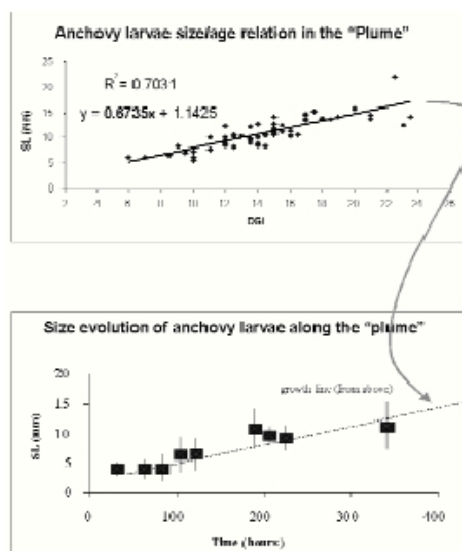


Fig. 2. Anchovy larval growth and mean larval size (\pm SD) along the experiment.

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