DETERMINISM OF LARVAL RECRUITMENT OF *CRASSOSTREA GIGAS* IN MEDITERRANEAN LAGOON.

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Abstract

We bring new items in connection with the origins of the natural recruitment variability of the Pacific oyster *Crassostrea gigas* in Thau lagoon. A poor relationship between " number of larvae" and "number of spat" in 2012 shows a biological lock around oysterculture areas during the metamorphosis in spite of better success of recruitment outside shellfish farming zone. A comprehensive analysis of environmental factors effects and the development of prognosis tools are planned to assist oysterfarmers in rationalization of natural oyster recruitment around Mediterranean lagoon.

Keywords: Bivalves, Aquaculture, Recruitment, Gulf of Lyon

Introduction

Unlike other shellfish farming area of the French Atlantic coast, the Mediterranean basin has never used the possibility of natural catchment for oysters [1,2]. The rising cost of spat associated with very high mortality [3] brings Languedoc producers to consider an in situ production of seed. Since 2010, the interannual variability in recruitment of oysters is analyzed in shellfish farming ecosystems off the Atlantic [1,2] and Mediterranean [4] French coasts by the national Velyger network [5] at the regional level through the project PRONAMED (PROduction de NAissain en MEDiterranée). This project, led by Ifremer and the Regional Committee of the Mediterranean Shellfish in partnership with Cepralmar, is twofold: to advance the understanding of environmental factors controlling the recruitment of *Crassostrea gigas* in a Mediterranean lagoon and identify potential blocking points in the reproductive cycle of this species within this particular environment.

Material and methods

The study focuses on Thau lagoon. The project allowed, in its first phase (2010-2011), the set up of a regional observatory of the natural oyster catchment in farming areas. The second phase (2012-2014) broadens the observatory across the lagoon in and out shellfish farming areas, and involves a thorough environmental monitoring including the study of phytoplankton and zooplankton communities as well as benthic organisms. A review of the reproductive strategy (gametogenesis, synchronization of spawning, quality and quantity of gametes) and the development of cohorts in relation to environmental fluctuations are investigated in this project.

Results and discussion

Our results showed a high interannual variability of settlement intensity in the shellfish farming areas of the Thau lagoon proving that oyster spat may be potentially harvested locally. In addition, the surviving oyster spat better resist the high rate mortality usually observed the following year: the spat captured in the Thau lagoon in 2010 show better resistance to mortality with survival rates of 62 to 78% in September 2011 [5] compared to survival rates observed by the Réseau d'observations conchylicoles (37% survival). Observations in 2012 (figure1) showed that oyster settlement in areas outside shellfish farming zones was important (up to 70 individuals per collector's cup compared to less than 5 individuals).
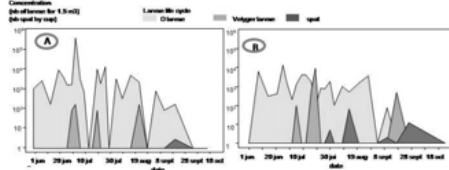

Fig. 1. Larval developppment and spat settlement inside (A) and outside (B)

shellfish farming zones.

These results tend to show that Thau lagoon could host a potential oyster spat catchment area outside the farming zones. The potential of these catchment areas and their exploitability by the Mediterranean shellfish industry needs to be addressed. The second phase of the Pronamed project will attempt to answer this question by analyzing the overall influence of various environmental factors on the natural settlement [6]. An analysis of the dynamics of larval dispersal and connectivity between oyster populations will be proposed based on the model MARS-3D Thau [7,8]. Optimization of cultural practices around the management of collectors will be realized. The physiological quality of the larvae (energy reserves) will also be studied.

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