



MASTS Postdoctoral and Early Career Researcher Exchange (PECRE) Fellowship Final Report

Ana Rodriguez Perez

Host institution: Danish Shellfish Centre (DSC), National Institute for Aquatic Resources of the Technical University of Denmark (DTU Aqua)

Investigation into the larval behaviour and ecology of *Ostrea edulis*

Background:

Europe's native oyster (*Ostrea edulis*) beds once covered vast areas of Europe's coastline and constituted a central ecological and economic resource. Yet today, after centuries of overfishing, these beds are functionally extinct and they are considered one of the most imperilled marine habitats in the world. There is an increasing interest in restoring the native oyster throughout Europe to recover the ecological functions which the European oyster, as a keystone species, provides in the marine environment. However, while the adult life stage of *O. edulis* has received a large amount of scientific attention, there is a lack of knowledge on its larval ecology and hence the dispersal characteristics of this habitat.

This project aimed at investigating *O. edulis* larvae's vertical distribution, swimming speeds and settlement behaviour, with the objective of subsequently informing the parameterisation of hydrodynamic models coupled with larval movement models. The results are expected to better predict dispersion and settlement patterns in this species, and will have the potential to inform planned restoration efforts in selecting restoration sites which can promote larval recruitment and connectivity between restored beds.

Outputs:

1. Completed

1.1. Vertical distribution

The larvae's vertical distribution was investigated by means of two different approaches. In the first approach, the distribution of 20-40 larvae was accurately quantified throughout the larval life history in light, darkness, as well as with and without food conditions. In the second approach, about 1000 larvae were observed throughout their life history in beakers and their distribution was estimated at regular time intervals.

1.2. Swimming speeds

Swimming speeds were recorded in 50 cm tall aquariums during all larval life stages, and at two temperatures, 13°C and 25°C.

1.3. Settlement behaviour

Larvae were presented with a range of settlement treatments ranging from very favourable to less favourable, and their behaviour was observed for 72h at regular time intervals.

2. Expected

2.1. Modelling

The observed larval behaviour and swimming speeds will inform the parameterisation of hydrodynamic models coupled with larval movement models to predict dispersion of *O. edulis* larvae from planned restoration sites.

2.2. Publications and conferences

It is anticipated that the results of this fellowship will be published in peer-reviewed journals and presented at the MASTS Annual Science Meeting, as well as in at least one international conference.

Future plans enabled by PECRE:

The collaborative work with DSC will continue in the summer of 2018, when at least one more experiment will be carried out at this centre. Moreover, the native oyster beds of the Limfjord, which is located just outside of the DSC, are most likely going to be sampled for biodiversity analysis.

Benefits to the MASTS community:

The research will inform the planned restoration efforts of *O. edulis* in UK, and possibly in Germany and the Netherlands. This may both increase the resilience of the restored beds by increasing their connectivity, and enhance the sustainability of fishable stocks through potential larval supply from the restored beds. It is expected that the planned restoration efforts of *O. edulis* will result in a healthier and more biodiverse local marine environment, which is aligned with the core vision of MASTS. Moreover, it is hoped that more MASTS researchers will be able to take advantage of the excellent facilities and knowledgeable staff at the DSC, as they are very willing to host further researchers.