AQUACULTURE AND ENHANCEMENT OF GONAD PRODUCTION IN THE SEA URCHIN *Paracentrotus lividus*. PRELIMINARY RESULTS

A. Pombo[1*], A. Raposo[1], R. Ramos, P. M. Santos[1], P. Albano[1]; T. Baptista[1], S. C. Gonçalves[1,2], C. Tecelão[13], R. Ganhão[1], M. M. Gil[1]; J. L Costa[4], S. M. F. Ferreira[1,5]

[1] MARE—Marine and Environmental Sciences Centre, ESTM, Polytechnic Institute of Leiria, 2520-641 Peniche, Portugal
[2]MARE - Marine and Environmental Sciences Centre, Department of Life Sciences, Faculty of Sciences and Technology, University of Coimbra, 3004-517 Coimbra, Portugal
[3] Linking Landscape, Environment, Agriculture and Food Research Unit (LEAF), Instituto Superior de Agronomia, University of Lisbon, Tapada da Ajuda, Lisbon, Portugal
[4]MARE - Marine and Environmental Sciences Centre, Faculdade de Ciências da Universidade de Lisboa, Campo Grande, 1749-016 Lisboa, Portugal
[5]CFE - Centre for Functional Ecology, Department of Life Sciences, University of Coimbra, Apartado 3046, 3001-401 Coimbra, Portugal.
E-mail: ana.pombo@ipleiria.pt

Abstract

The present study aims to establish the rearing conditions for the edible sea urchin *Paracentrotus lividus.* Several other studies were developed with *P. lividus* and other sea urchins that might have high potential for aquaculture and commercial fisheries. This aquaculture research project will last 36 months and is part of a multidisciplinary project called "Ouriceira Aqua: Aquaculture and Enhancement of Gonad Production in the Sea Urchin *Paracentrotus lividus*", funded by the Operational Programme MAR2020 and coordinated by MARE-IPLeiria (Portugal). In this project, the main goals are broodstock conditioning and optimization of gonadal growth. The enhancement of *P. lividus* gonad production and quality improvement will be investigated, by using artificial diets and manipulating zootechnical parameters , in order to obtain larger gonads, with desirable colour, texture and flavour. Also, the project intends to achieve the gonads' maturation to produce viable gametes, establish protocols for optimization of the fertilisation, embryonic development and larval rearing, plus developing diets for the different stages of *P. lividus* life cycle (with microalgae, macroalgae and artificial diets). Moreover, the project involves the optimization of rearing technology, namely of the structures for the larval rearing, settlement and growth.
Regarding the potential aquaculture of *P. lividus*, preliminary results showed advances in fertilisation protocols and emphasised that temperature should be manipulated to improve the larval production. Regarding the enhancement of gonad production, some fresh vegetables, that were not previously used, can improve the productive process and gonadal quality. Gonad colour is one of the major factors that can influence the marketability of sea urchins. The effects of fresh and jellified diets have been studied to determine which new ingredients would provide optimal gonad colour and, at the same time, a high gonadosomatic index.
The project Ouriceira Aqua seeks to evaluate the biological potential of the activities previously referred, the technological development of sea urchin *P. lividus* farming and to improve the gonad production in aquaculture systems. In this way, the project will contribute to develop and create tools for the sea urchin farming industry. *P. lividus* is a highly priced sea urchin and its rearing and/or gonad enhancement can contribute to Portuguese and European aquaculture. This sea urchin can be an alternative for diversification of aquaculture industry, showing so far a great potential for its expansion.

Acknowledgements

This project has the financial support of Operational Programme MAR2020 through the project 16-02-01-FMP-0004: Ouriceira Aqua: Aquaculture and Enhancement of Gonad Production in the Sea Urchin (*Paracentrotus lividus*). This study had the support of

Fundação para a Ciência e Tecnologia (FCT), through the strategic project UID/MAR/04292/2013 granted to MARE - Marine and Environmental Sciences Centre.