New approaches for aquaculture and mollusc research as study shows cryopreserved mussel larvae can survive and develop to adult mussels

A long-term study funded by the ASSEMBLE Plus project has shown that adult mussels can grow from cryopreserved larvae without compromising the quality of the next generation's offspring, neither for cryopreservation nor post-thawing development of them.

The Mediterranean mussel *Mytilus galloprovincialis* is one of the most farmed molluscs worldwide. This is the first time *M. galloprovincialis* spat produced from cryopreserved larvae were able to develop into adults at the same growth rates as control individuals, be cultured in a natural environment, and even reach average commercial size at the same time as control mussels obtained from non-cryopreserved larvae. Additionally, the viability of the produced adults is apparently unaffected by the cryopreservation process, with fertility and offspring quality comparable with those of control mussels.

Dr Estefania Paredes, Universidade de Vigo, who led the research team that designed the cryopreservation protocol said,

"Shellfish aquaculture needs the development of new tools such as this to reduce its reliance on natural spat collection whilst improving good practices and efficiently increasing production. The results signify strong evidence for the suitability of this cryopreservation method for use in mussel aquaculture and in research, where animals must be in optimal health."

Details of the cryopreservation protocol are published in the open access Scientific Reports (August 2022): Heres, P., Troncoso, J. and Paredes, E. (2022). Long-term study on survival and development of successive generations of *Mytilus galloprovincialis* cryopreserved larvae. *Scientific Reports* 12, 13632. https://doi.org/10.1038/s41598-022-17935-0.

Jesus Troncoso checking the mussels growing to adults in ropes after cryopreservation of the larvae. © Jesus Troncoso.

Juvenile mussels (from cryopreserved larvae) settled in ropes with their growth being checked. © Pablo Heres and Estefania Paredes.

Notes for Editors

ASSEMBLE Plus's Joint Research Activity 2 (JRA2) Cryobanking Marine Organisms, addresses a constraint in the exploitation of marine genetic and biological resources, namely the current paucity of capability for preserving these resources ex-situ with guaranteed genetic, phenotypic and functional stability. JRA2 has developed reproducible cryopreservation methodologies for various life-stages of a range of marine macro-organisms and cryo-recalcitrant microorganisms. The results will improve and expand the availability of biological resources for Transnational Access at significantly reduced costs. ASSEMBLE Plus began in October 2017 and will run until September 2022. The project is coordinated by Sorbonne Université.

Image 1: Jesus Troncoso checking the mussels growing to adults in ropes after cryopreservation of the larvae. © Jesus Troncoso.

Image 2: Juvenile mussels (from cryopreserved larvae) settled in ropes with their growth being checked. © Pablo Heres and Estefania Paredes

About ASSEMBLE Plus

For more information about the project, please visit assembleplus.eu or email assembleplus_ta@embrc.eu. Follow @ASSEMBLE_Plus on Twitter for regular updates from the project.

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