BIM EMFAF Work Programme Project Report 2023

BENEFICIARY:	Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER:	23/SPIS/DIS-BG011-BR070
NAME OF PROJECT:	**Sustainable Development of Mesopelagic Resources**
IMPLEMENTATION PERIOD:	1st January to 31st December 2023

Project Scope

Mesopelagic organisms represent one of the largest unexploited resources left in the world's oceans, with a recent biomass estimate at 10 billion metric tons. From 2019 to 2023 BIM, Marine Institute (MI) and Teagasc have been involved in MEESO, an international €6m H2020 project, with 23 project partners from 11 countries. The new tools and technologies, as well as assessment and management roadmaps, developed in MEESO will help establish the trade-offs between exploitation, sustainability, and viability of the resource, and identify options for its governance (www.meeso.org). During 2022, BIM and MI conducted a collaborative national project that focused around a 12-day mesopelagic research cruise on the new RV Tom Crean to complement the outputs from MEESO and to increase Ireland's understanding of proximate mesopelagic resources. In 2023 a three-year project was approved for BIM to further build on the international MEESO H2020 project and the national collaboration with MI and Teagasc.

Objectives

- To continue to collect mesopelagic acoustics and biological data opportunistically on routine acoustic surveys and on dedicated surveys as ship time is available.
- To develop multi-frequency acoustic analytics to identify target species of mesopelagic fish in the deep scattering layers in the mesopelagic zone.
- To develop statistical analyses to provide robust abundance estimates for the target species of mesopelagic fish from the acoustic surveys. This will include using geostatistics and Generalized Linear Mixed Effect Models, and any other appropriate statistical modelling approaches.
- To analyse the relationships between the mesopelagic fish abundance and ecosystem drivers.
- To continue building a dedicated DNA reference database of mesopelagic fish species.
- To use eDNA in situ (on board the RV) to produce fish community profiles from distinct acoustic layers in conjunction with the collection of acoustic data.
- To assess the ability of eDNA data to yield semi-quantitative estimates of fish biomass in the context of mesopelagic communities.
- Develop methodologies to combine net sampling and eDNA to facilitate the identification of the target mesopelagic species.
- Develop food web modelling for the mesopelagic zone.
- To carry out product development on key resources to assess ingredient opportunities. These appraisals will determine the product applications, techno-functional properties and value of ingredients derived from mesopelagic.
- To communicate outputs to key stakeholders (DAFM, industry) through meetings and workshops regarding development of the knowledge base, understanding the biology at a species level, biomass, ecosystem considerations, development potential if any, and management considerations.

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Outcomes

This the first year of the three-year project. The initial focus has been on the organising of specific mesopelagic surveys to collect and analyse acoustic data, which should eventually enable abundance estimates to be determined for Mueller's pearlside *Maurolicus muelleri*, the predominant mesopelagic species found off the west coast of Ireland. In addition, the opportunistic collection of mesopelagic data and samples from other long-established scientific surveys (e.g. blue whiting) is providing further valuable insights, including the scope to interrogate historical acoustic data to build a valuable time series for these resources. State-of-the-art eDNA analysis has also commenced and will enable further resolution of community profiles within deep scattering layers, and associated food web modelling will further enhance understanding of relevant ecosystems. Stakeholder engagement with industry and attendance of relevant international conferences are also important elements of the project to enhance collaboration and ensure a science-first approach is taken to sustainable development of these resources.

Summary of Project Spend

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Total Approved Costs	€330,000
Total Eligible Expenditure	€329,974
EMFAF Eligible Expenditure	€164,987
Exchequer	€164,987

Project Partners: Marine Institute, Teagasc Food Research Centre

Report by: Michael Gallagher

Date: January 2024

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