September 2023 BIM Whelk Bait Project – **IRG Briefing** MFRC ATU

CONTEXT

The *BIM Whelk Bait Project* has been ongoing in ATU Galway since February 2022. The overarching aim of the project is to address supply challenges involving commercially valuable bait species for the economically important whelk fishery in Ireland. Formulated bait attractiveness was assessed and enhanced in a laboratory setting prior to initial deployments of formed baits from inshore vessels at sea.

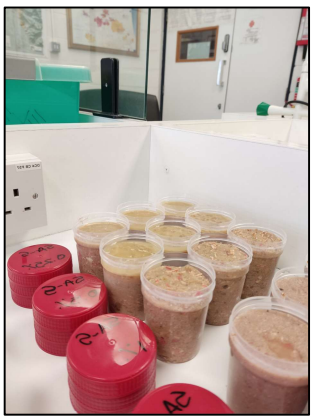
This project has built upon work previously conducted by NOFIMA in Norway, where the status of development for a sustainable bait alternative for the whelk fishery in Ireland with the current state of the art (SoTA) at Technology Readiness Level Scale TRL 2 "*Technology concept formulated*". The project here has progressed this to TRL 4 "*Technology validated in lab*", with an opportunistic start at TRL 5 "*Technology validated in relevant environment*".

INDUSTRY ENGAGEMENT

Industry engagement and buy-in was central to progressing this project. A comprehensive Industry Reference Group (IRG) composed of industry representatives, processors, fishers, researchers and other interested bodies and stakeholders was formed. ATU and BIM aimed to meet with the IRG bimonthly to discuss updates where input has continuously helped inform and progress throughout the duration of this project along with driving the main key exploitable results.

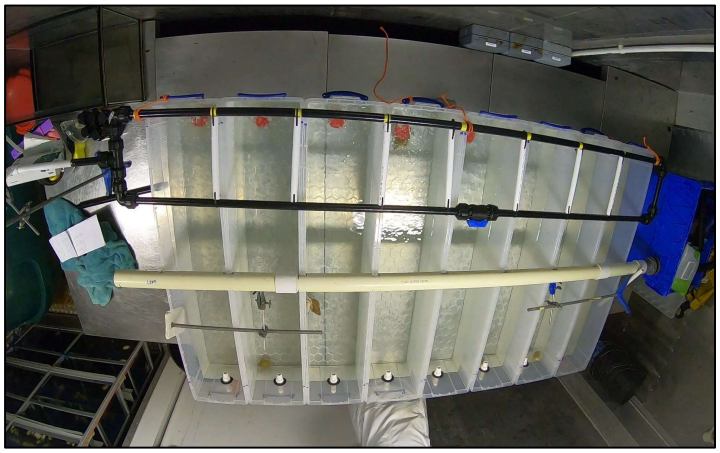
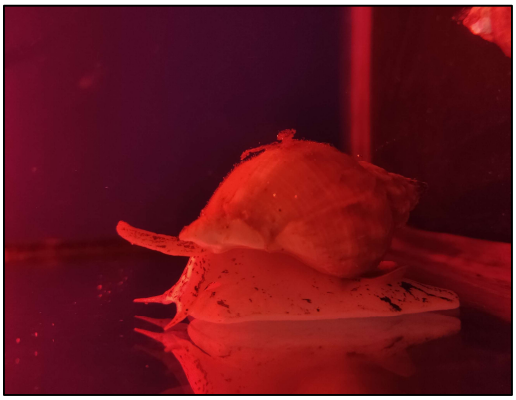
BAIT MAKING

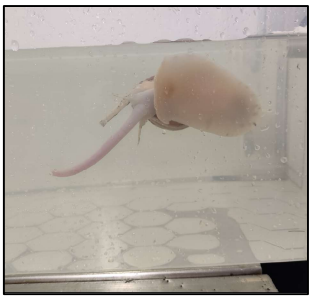
Formed bait performance was optimised as a result of varying inclusion rate of the binding agent and raw material volume. The inclusion rate of the binder alters the distribution of the odour plume, therefore this needs strict monitoring.



BEHAVIOUR

An artificial holding environment was used to successfully house and hold live whelk collected from the fishery prior to testing in a trialling environment designed to facilitate laminar flow. Laminar flow imitates the underwater tidal current. The trialling environment was designed to carry bait odour plume emanating from a sample to the downstream whelk (similar to the hydrographic dynamics manipulating the odour plume coming from a fishing pot).

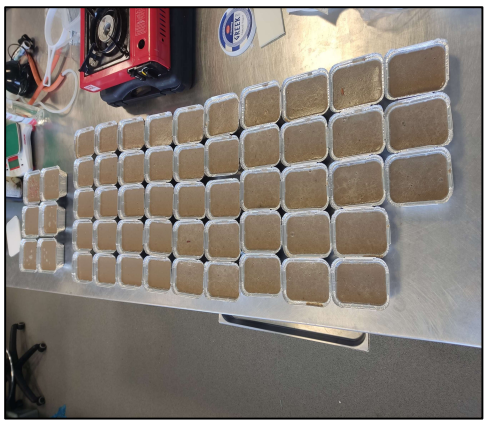



WATER CHEMISTRY

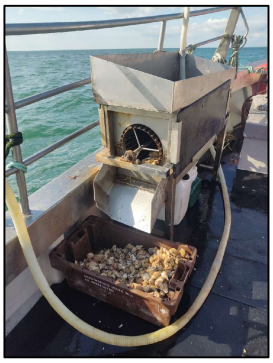
Collaboration with Teagasc has lead to the further characterisation and hydrolysation of bait material aiming to describe attractive properties to be further included within a formed bait.

FISHING

Engaging with industry partners has permitted synergistic fishing efforts arising from the generous support of interested vessels permitted formed bait testing in their intended environment. Fishing locations included productive areas out of Wicklow and Howth in the Irish Sea and less intensively fished ground in Killary Fjord, County Galway.







RESULTS AND CONCLUSION

The main message from industry is that a sustainable bait alternative for the whelk fishery in Ireland needs to be practically usable, economically affordable and sustainably available. Key exploitable results within the scope of this project are as follows:

- The most promising food binding gelling agent which successfully held raw bait material together is Kappa Carrageenan, permitting prolonged soak times (24/48-hour stability) without the need of containment or significant storage costs.
- Green crab baits performed well relative to the traditional brown crab bait paired with dogfish with regards to stimulating foraging behaviour in a laboratory setting and attracting whelk to pots at sea.
- Provisional fishing trials have helped to improve formed bait design and compare catch rates between a formed bait and traditional bait configurations used in the fishery.
- Further bait material characterisation conducted by Teagasc aims to describe attractants which stimulate whelk foraging behaviour in greater detail.

FURTHER INVESTIGATION?

The development of a sustainable alternative bait for the whelk fishery in Ireland could be progressed further by:

- Optimising the usability (handling, preservation, storage requirement) of a formed green crab bait
- Further ingredient characterisation for a deeper understanding of bait attractants is necessary
- Optimising the production process and bait ingredients (i.e. cost, supply chain, volumes and turnaround times)
- Conducting comprehensive fishing trials to enable robust and rigorous testing of baits during later stages of development

The proposed development will be best achieved through close collaboration between ATU, BIM and the fishing and processing industry.