Climate-Driven Changes in Gelatinous Zooplankton and Trophic Dynamics: Implications for Sustainable Salmon Farming

FIR UM
vitan til varandi aling

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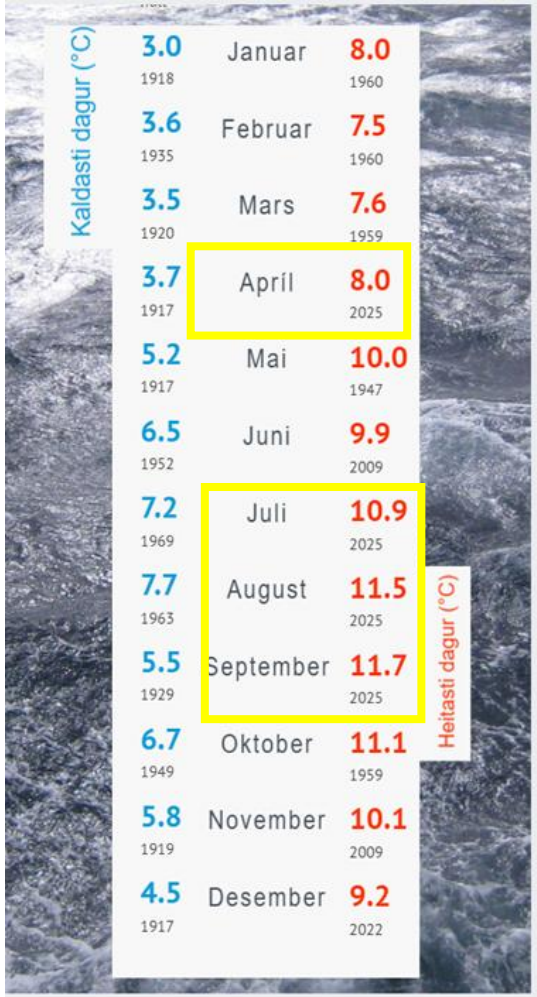
31/10/2025

Are jellyfish blooms a consequence of climate change or part of global oscillations?

- **Rising sea temperatures** may contribute to **more frequent and intense jellyfish bloom events**
- **Continuous Plankton Recorder surveys** show **increased detection of gelatinous material** since the early 2000s (*Licandro et al., 2010; Condon et al., 2013*)
- **Limited long-term data** and **inconsistent monitoring** make it difficult to distinguish **climate-driven trends** from **natural variability**

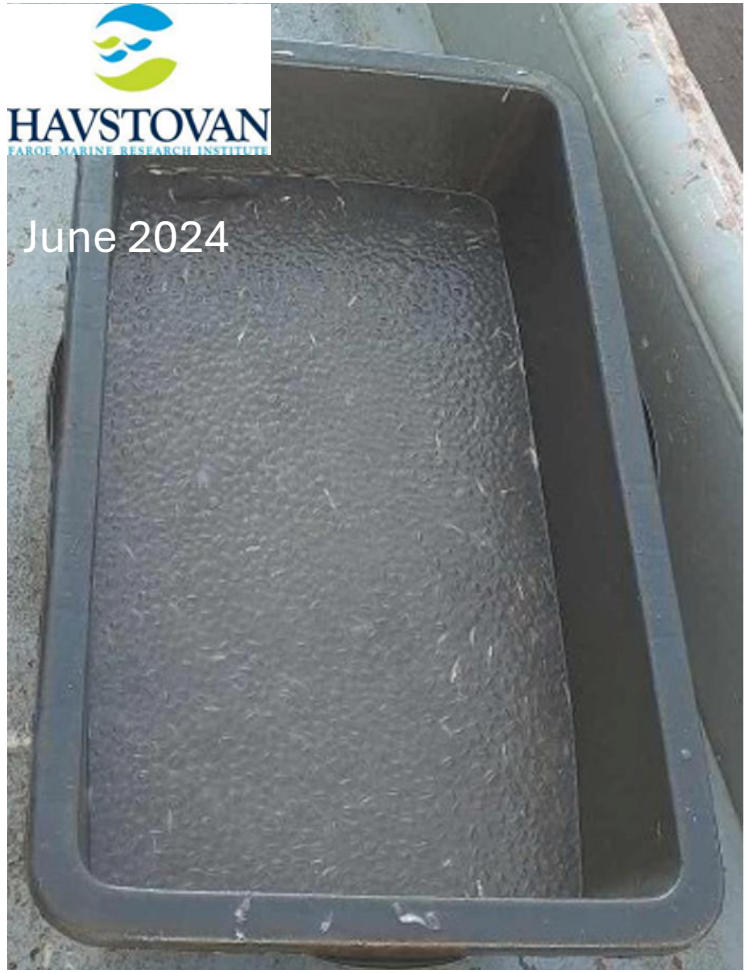


Kaldasti og heitasti dagur í hvørjum mánaða við Oyrargjógv ella Mykines, og hvat ár hetta var mátað. Havstovan

Clinton, M., Ferrier, D. E. K., Martin, S. A. M., and Brierley, A. S. Impacts of jellyfish on marine cage aquaculture: an overview of existing knowledge and the challenges to finfish health. – ICES Journal of Marine Science, 78: 1557_ 1573

Using existing datasets to capture trends in abundance

Juvenile fish survey

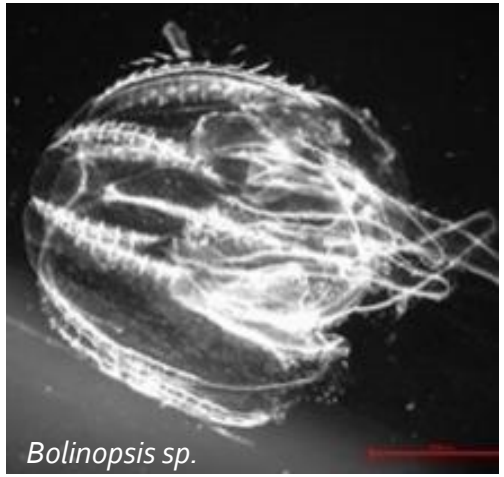


Salter et al. in prep

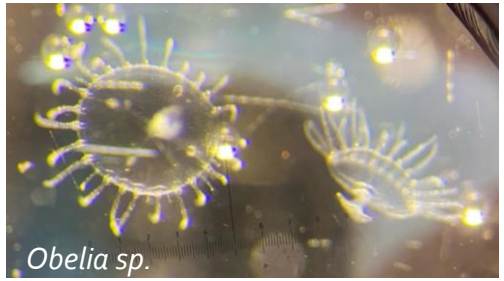
- Conducted annually since 1983 during a 2-week period in June
- Gelatinous biovolume is a bycatch but can be extremely abundant
- Likely reflects *Pleurobrachia sp*. population

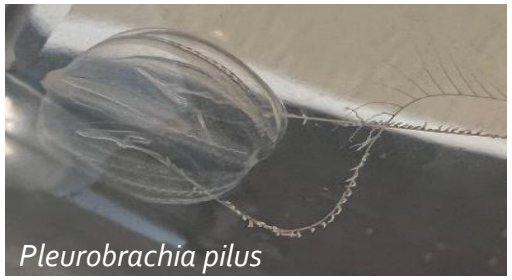
  -Robust structure stays intact in trawls

Fjordseries monitors small fragile (mostly) hydrozoan species


Bolinopsis sp.

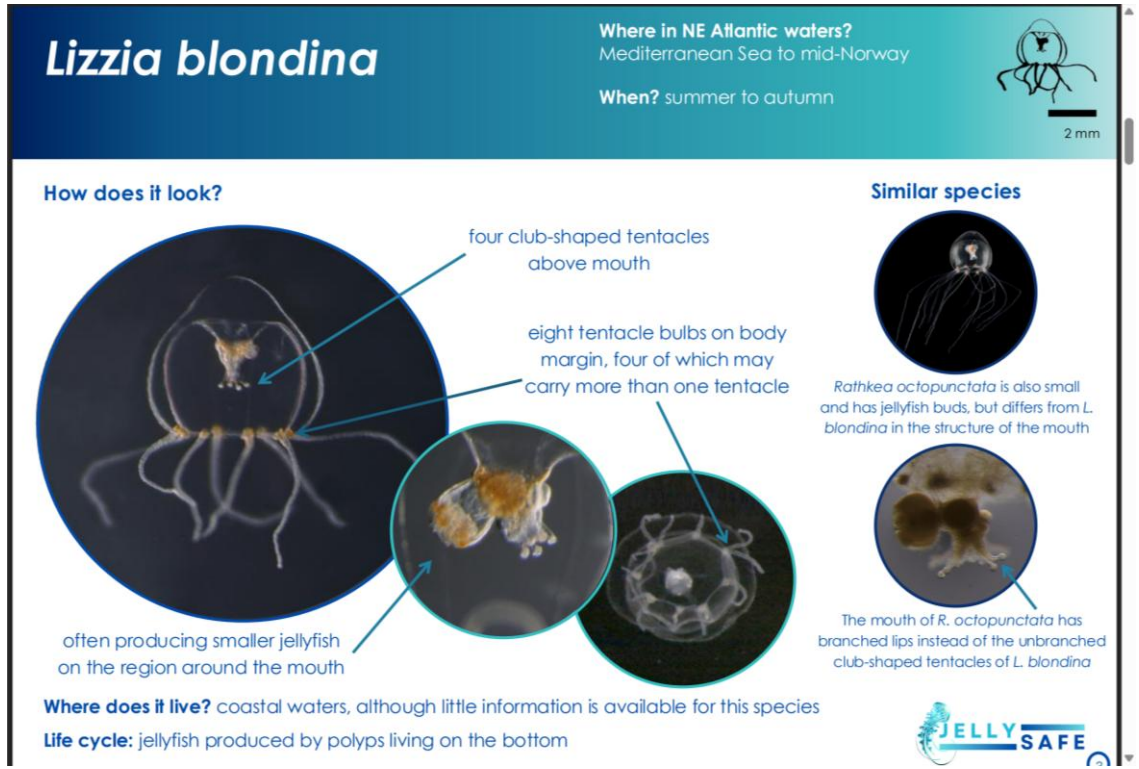
Clytia sp.

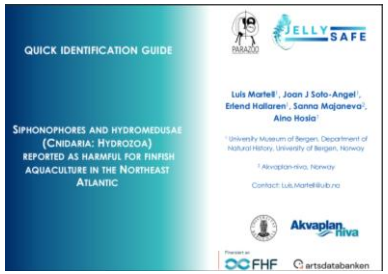

Obelia sp.


Pleurobrachia pilus

Vang et al. in prep

Aquaculture risk species not observed (yet) in Faroese waters





Citizen Science is useful for monitoring Jellyfish blooms
High year to year variability and patchy distribution

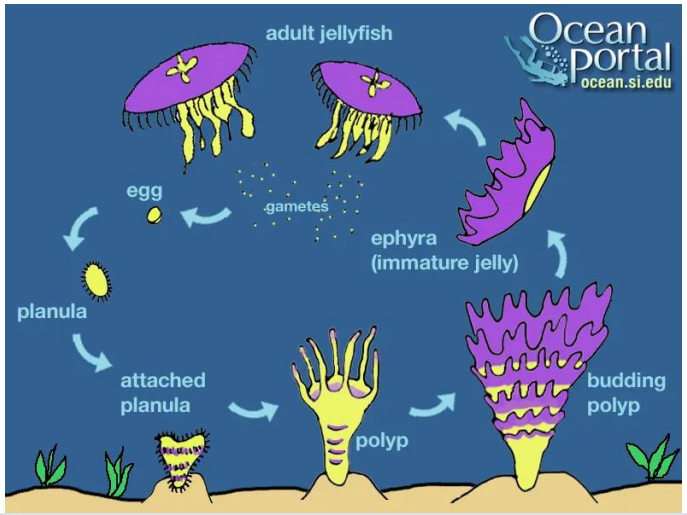
2024 dominated by Ctenophores

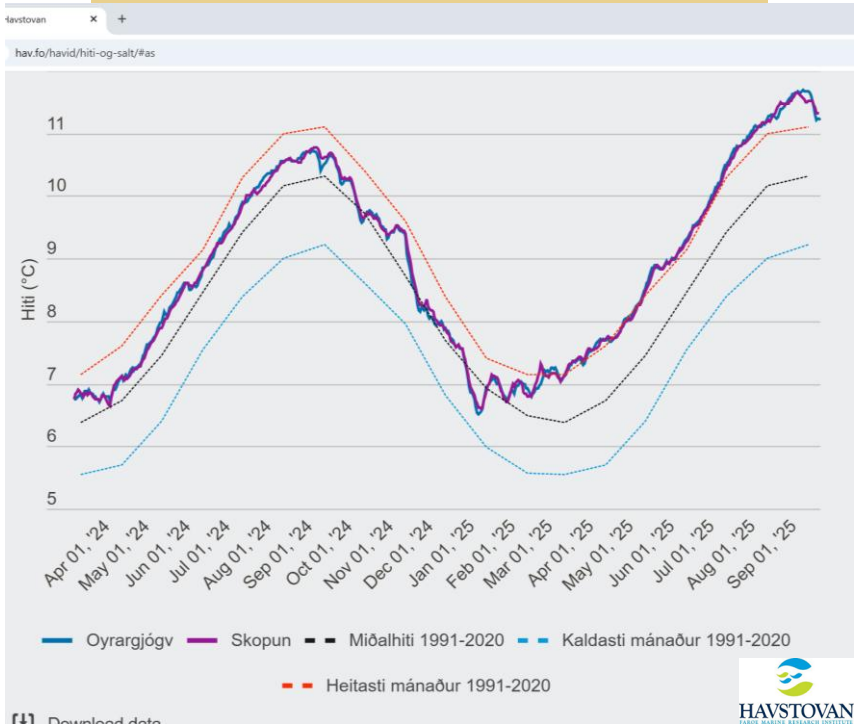
2025 dominated by Scyphozoans

)

2025 Environmental conditions may have favored Scyphozoan blooms

- Warm sea temperatures promote over-winter survival of polyps and release of ephyra
- Thrive in low oxygen
  (reduces benthic competition for polyp stage)
- Outcompete other zooplankton predators
  (Ctenophores, fish, etc)
- Ingest 400-750% of its body weight/day
- Dense aggregations can remove majorityof zooplankton from their surroundings within just a few days



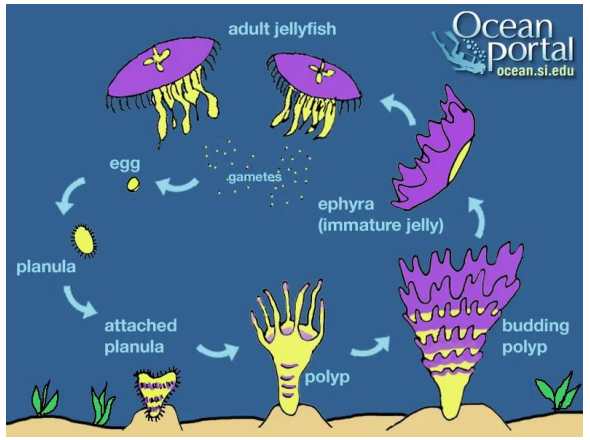


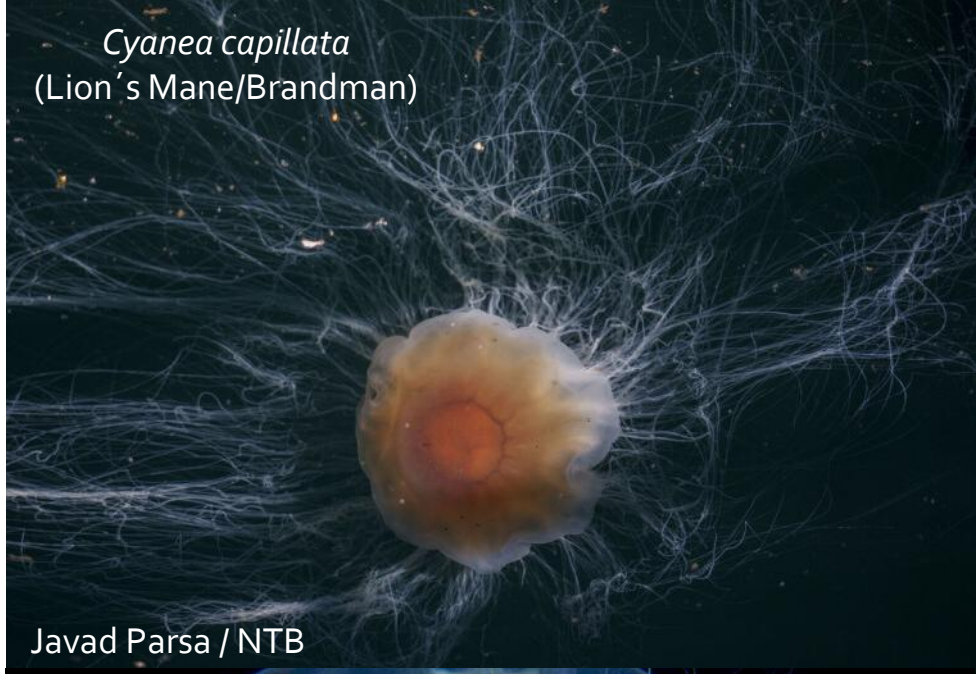
Mapping benthic polyp beds could be the key to summer risk assessment for large species with coastal reproduction

-Warmer temperatures promote overwintering and release of ephyra

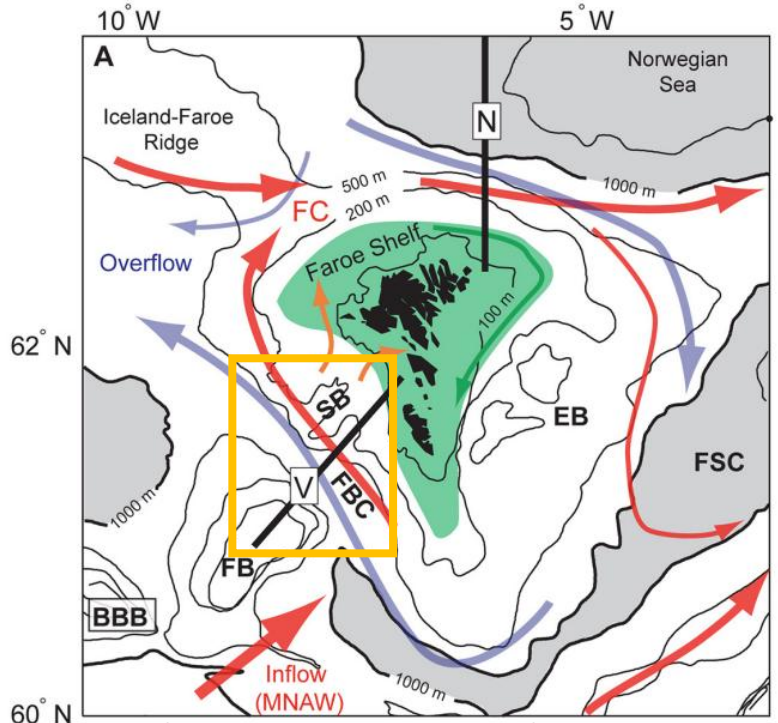
-Model where the currents will carry them

Challenge: Lion´s mane polyp beds have never been located…where are they coming from?





Warm Modified North Atlantic Water mass (MNAW) inflow carries *Apolemia sp*. and potentially other risk species



Ofstad LH et al (2022) doi: 10.3389/fmars.2022.823066

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Important to be able to distinguish between *Apolemia uvaria*, *Agalma elegans*, and *Nanomia cara* for aquaculture risk assessment

Apolemia uvaria

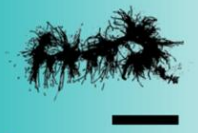
Nanomia cara

Apolemia sp.

String jellyfish

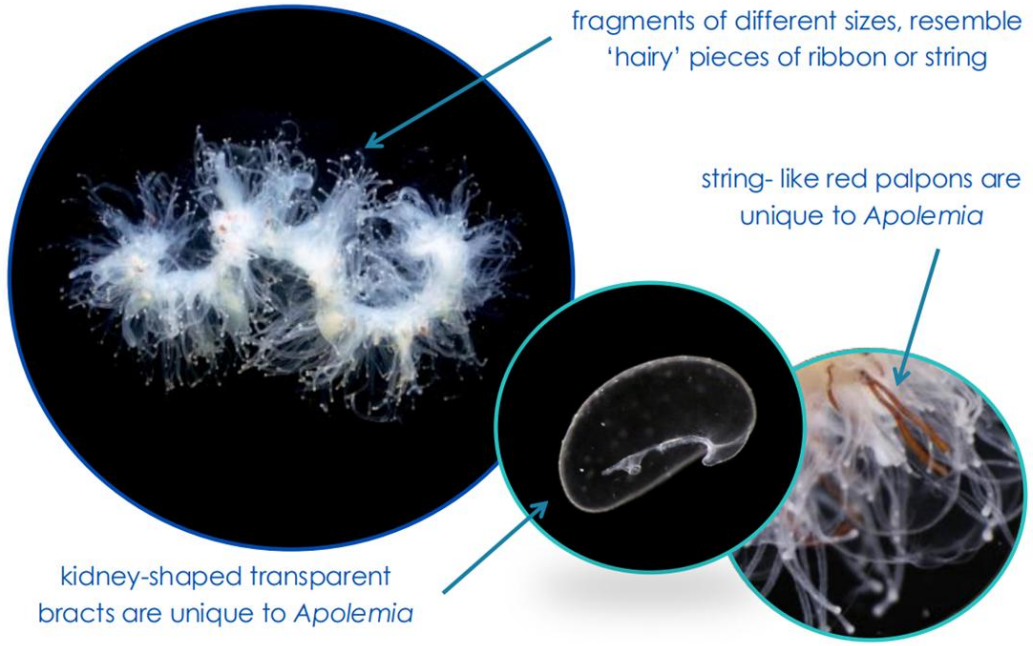
Where in NE Atlantic waters? Celtic, North, and Norwegian Seas; Faroe Isles

When? more common and abundant in autumn in Norway

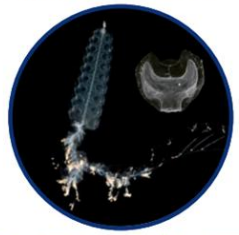


Fragments variable, from 2 cm to >1 m

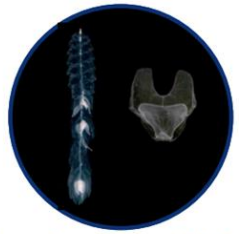
How does it look?



Similar species



Nanomia cara has smaller, more fragile colonies with a row of swimming bells at the front



Agalma elegans has relatively robust colonies with a row of swimming bells at the front

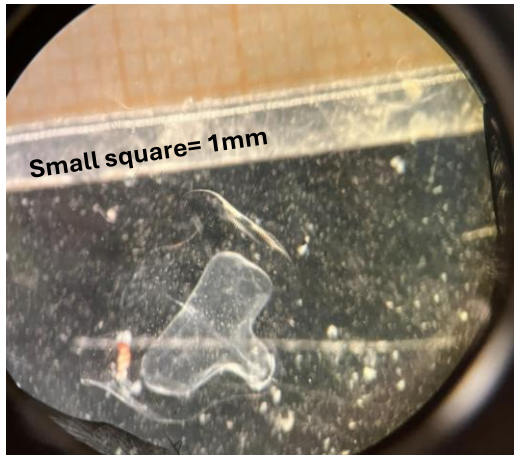
Where does it live? fragments are common in coastal waters, at all depths

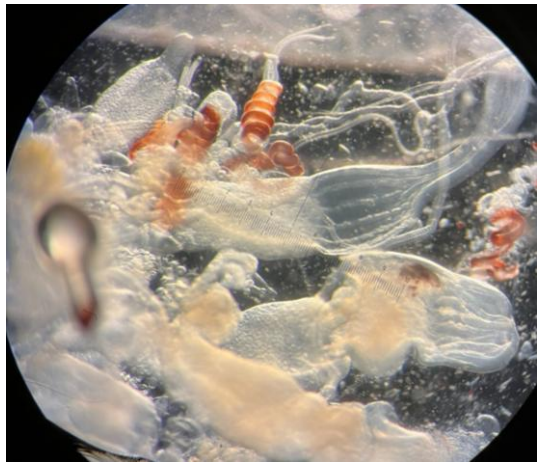
Life cycle: always in water column

JELLY SAFE 10

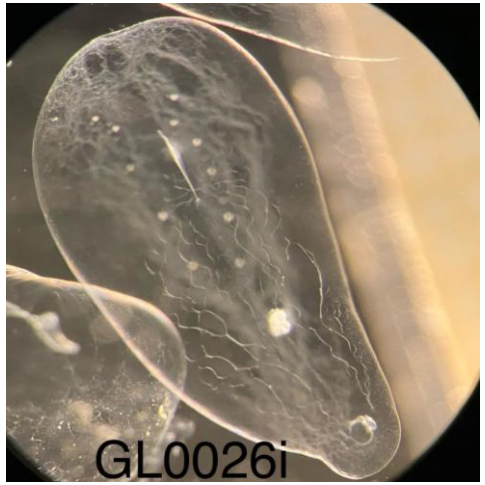
https://doi.org/10.5281/zenodo.17303147

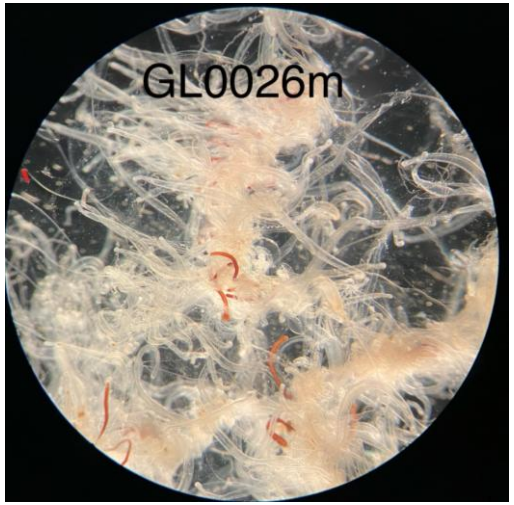
Agalma elegans (05/11/2025)





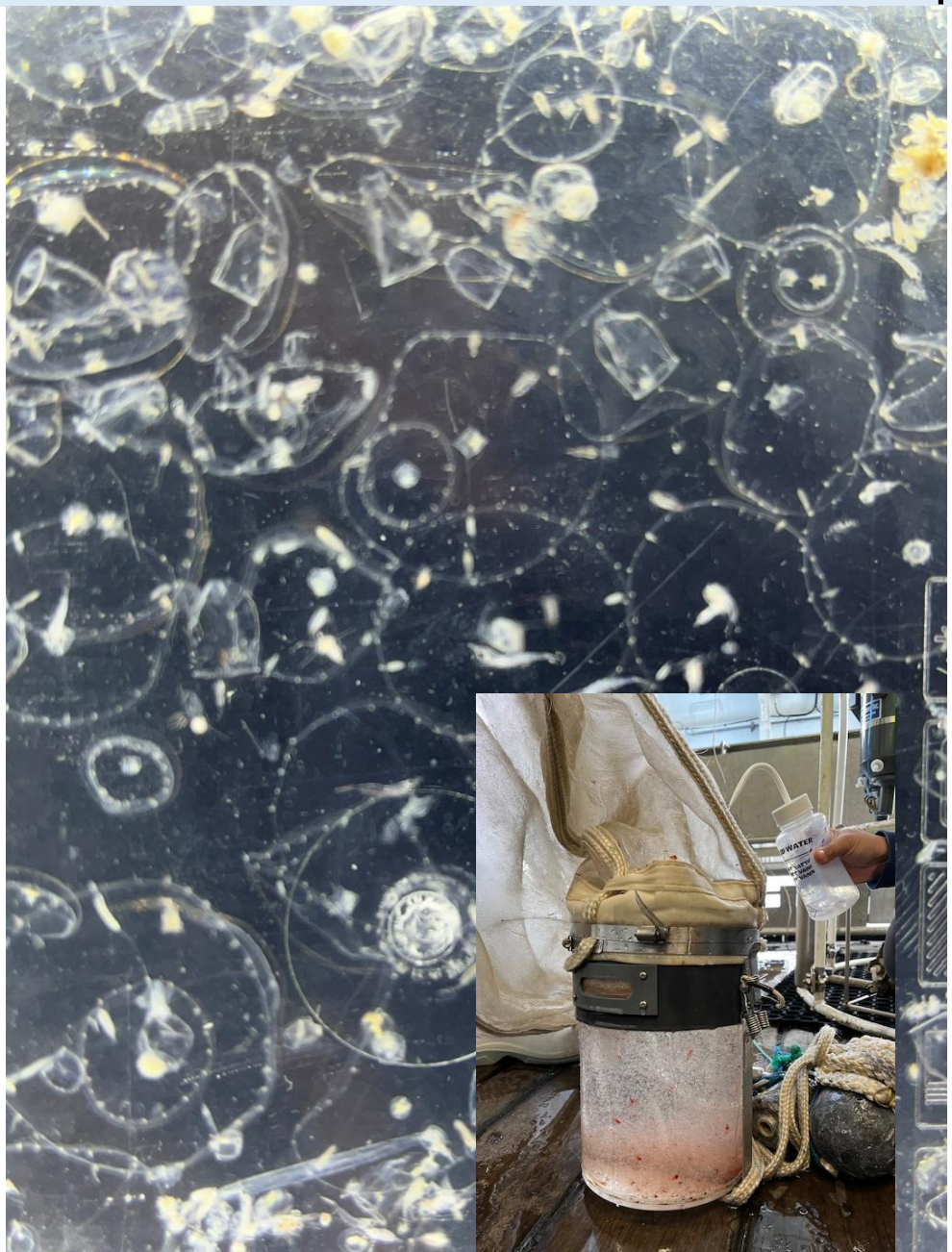
Apolemia sp. (13/11/2024)

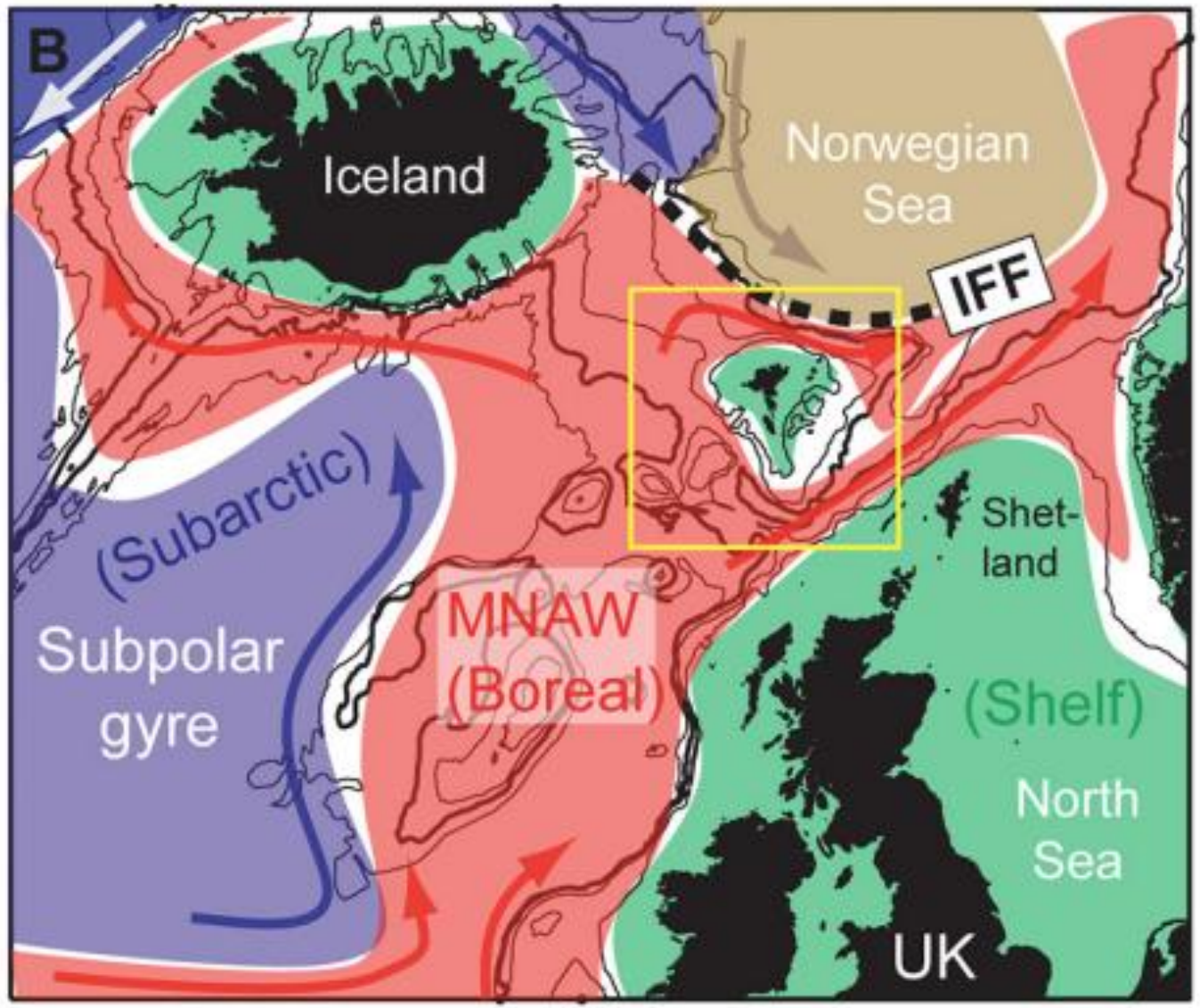




Microscope images: Amanda Vang and Eirikur Danielsen

Risk assessment needs local monitoring + understanding climate patterns + predictive modeling





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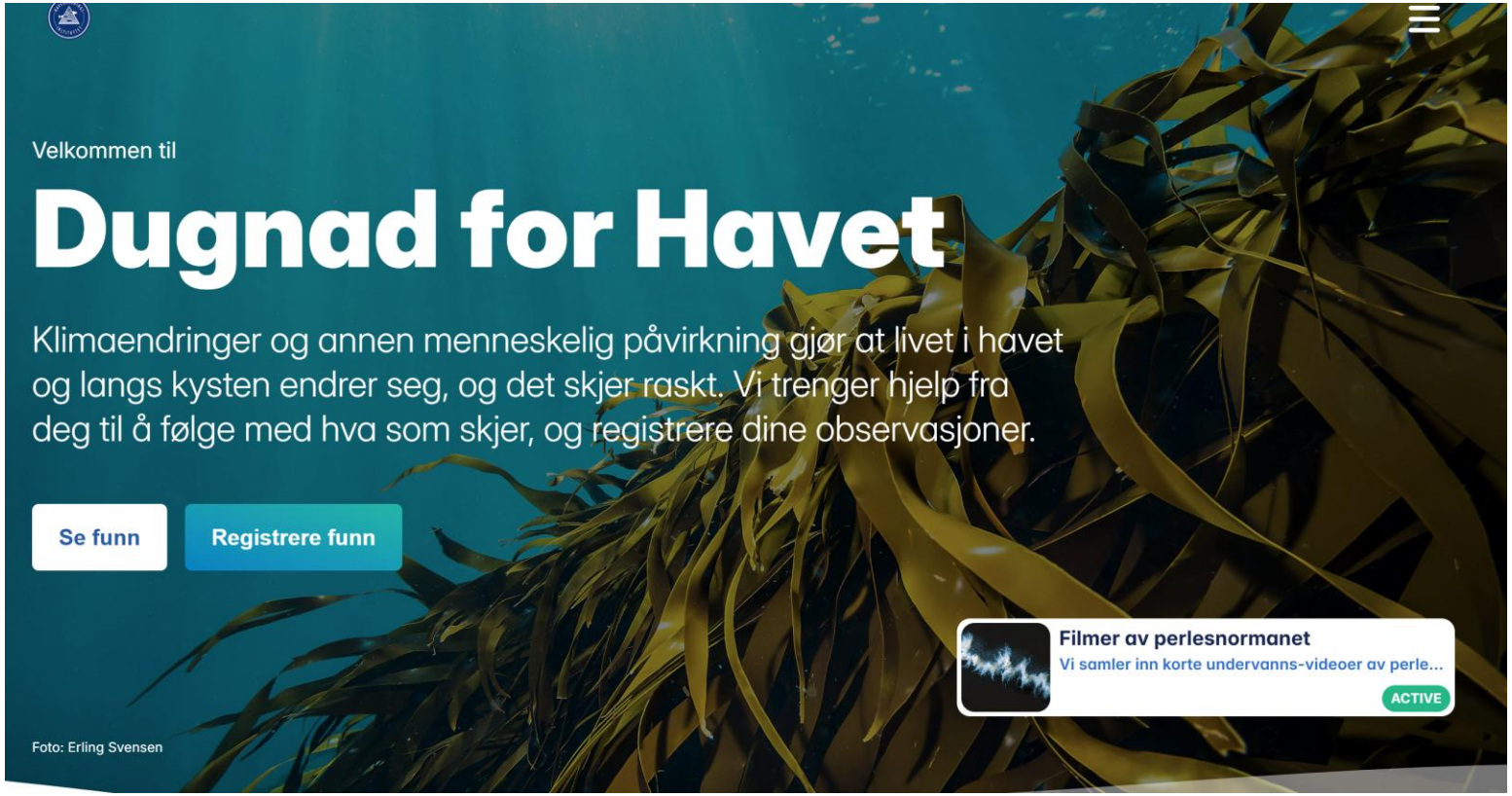
We share the same ocean and need to work together with neighboring countries to understanding ocean transport of risk species like *Apolemia sp.*



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