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THE UNIVERSITY of EDINBURGH
Royal (Dick) School of Veterinary Studies

Making the Most of the Science

Tim Regan, PhD

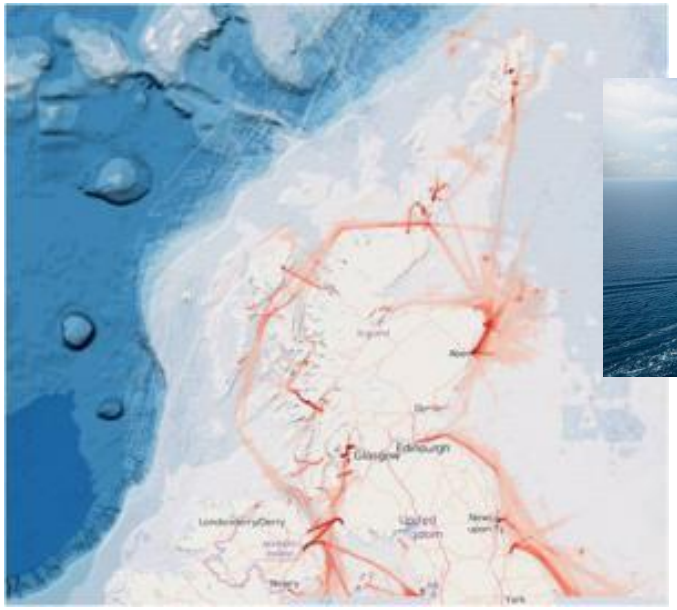
BBSRC
bioscience for the future

Scottish Shellfish Sector Resilience

- Market Pressures

Scottish Shellfish Sector Resilience

- Market Pressures
- Competition for space



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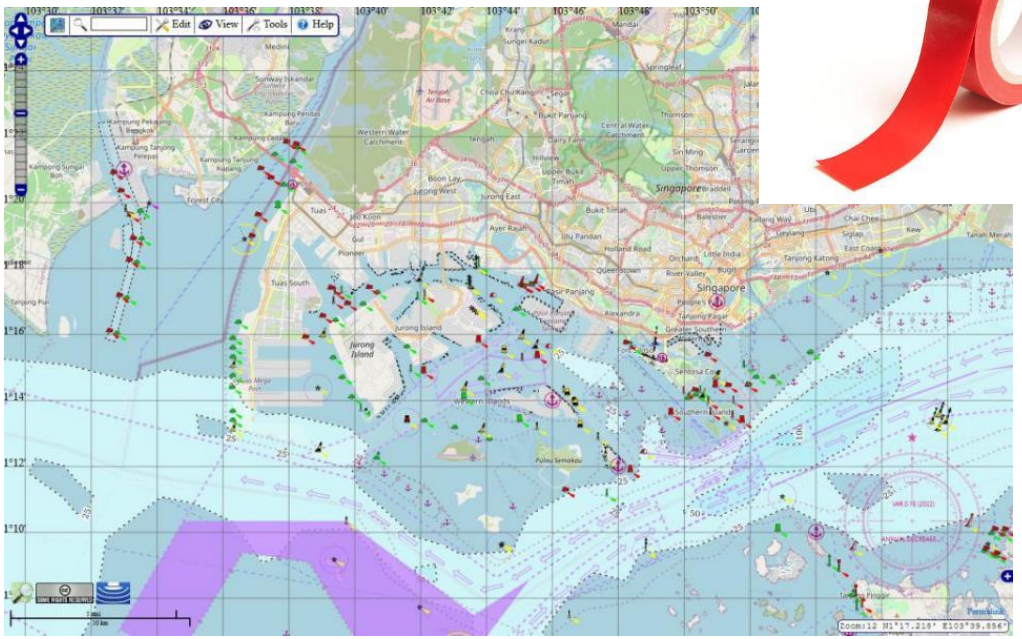
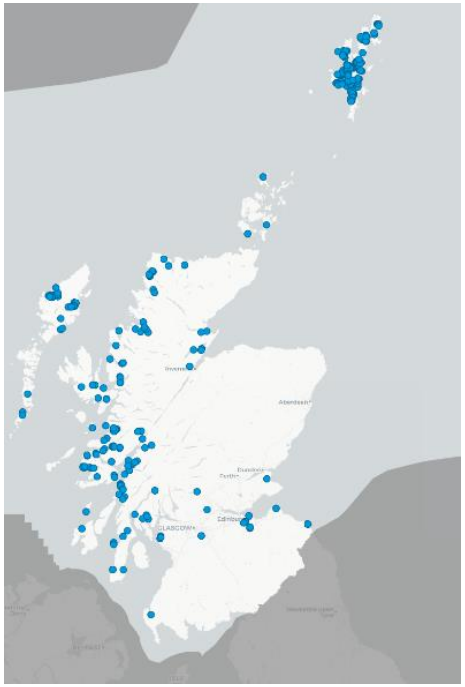
Scottish Shellfish Sector Resilience

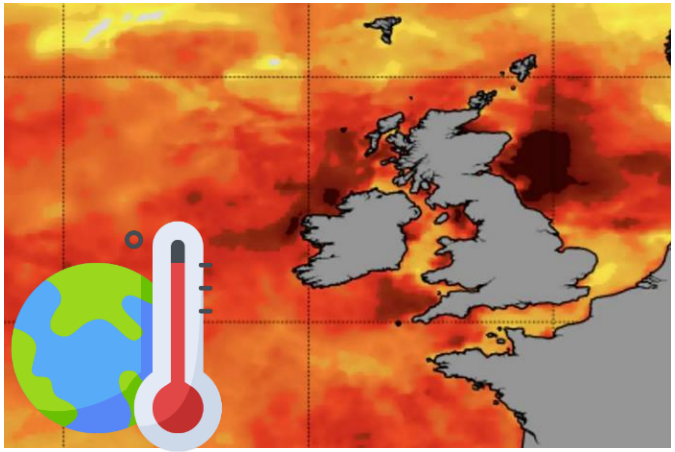
- Market Pressures
- Competition for space
- Licensing





Scottish Shellfish Sector Resilience

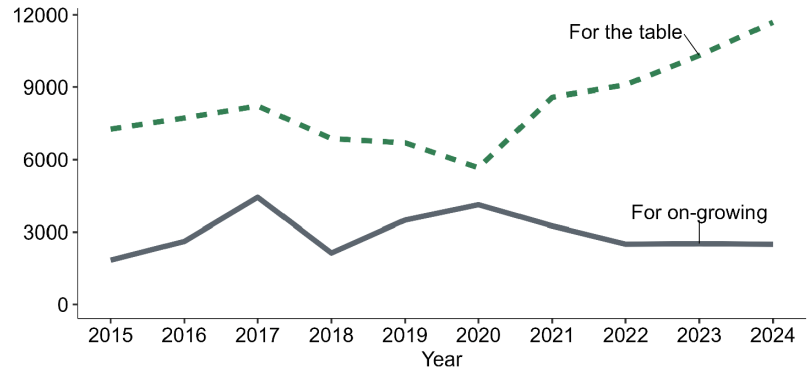
- Market Pressures
- Competition for space
- Licensing
- **Environmental change**: Storms and new diseases.



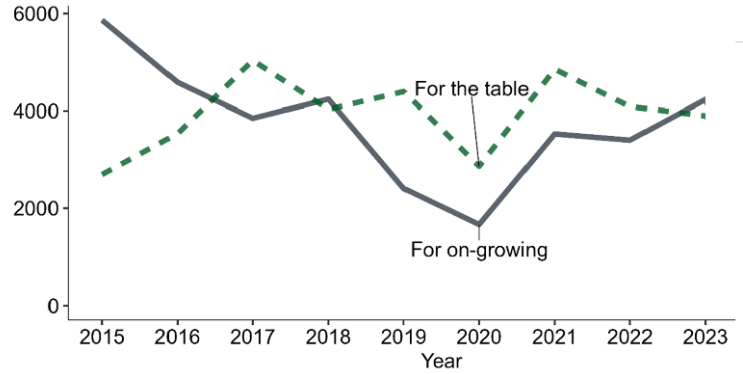
Scottish Shellfish Sector Resilience

- Despite:
  - Market Pressures
  - Licensing
  - Competition for space
  - Environmental change: Storms and new diseases.

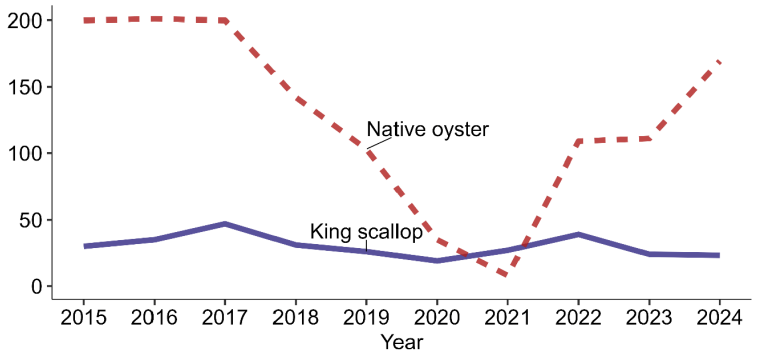
Common mussel production in tonnes



Pacific oyster production in thousands of shells.

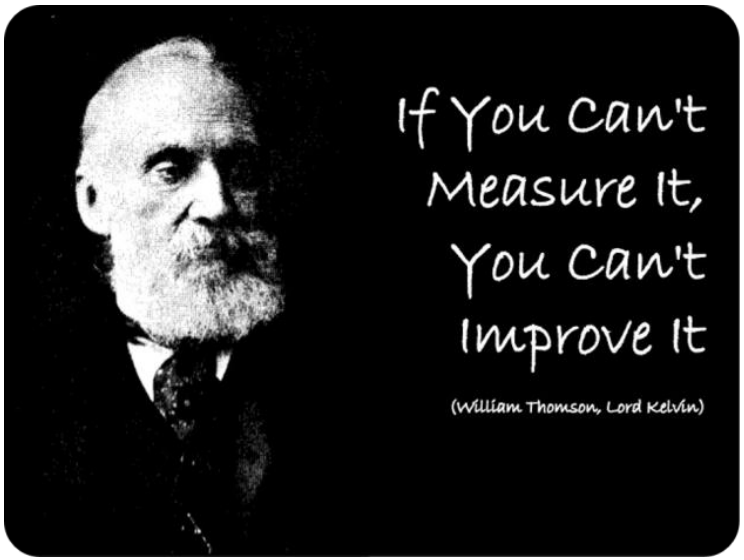


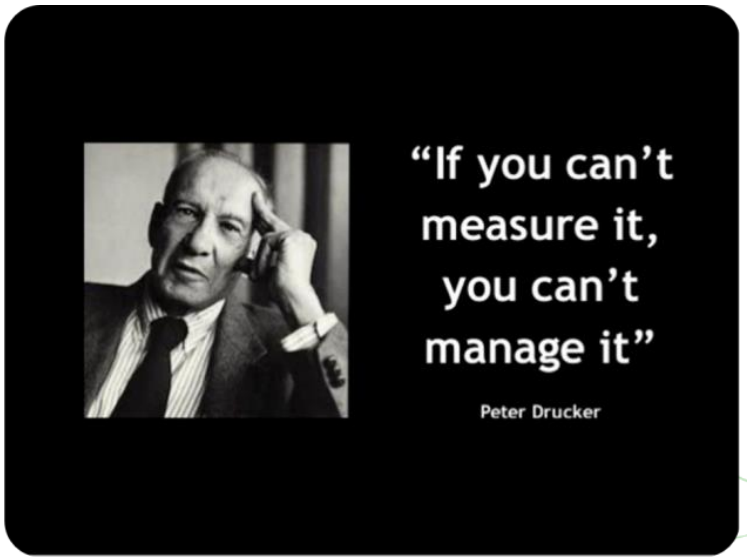
Number of other species production in thousands of shells.



Potential … and limitations of science

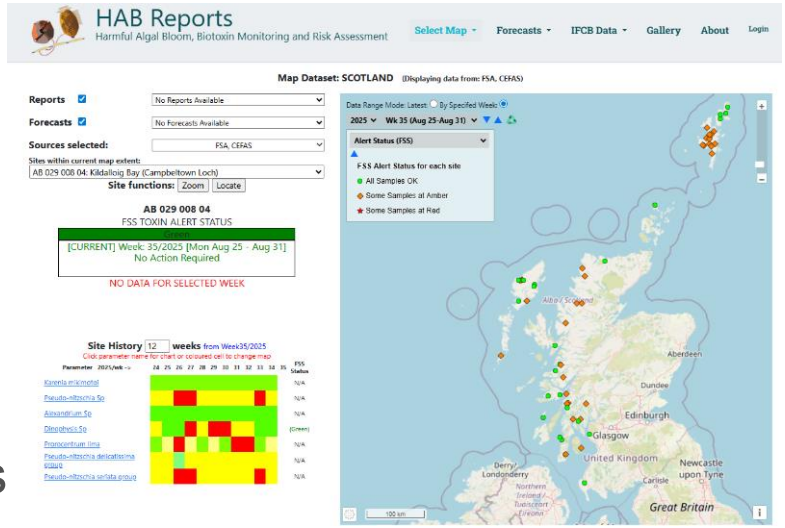
- Models are only as good as the underlying data,
- Molecular tools don't change husbandry overnight,
- Funding is a bottleneck.
- **Science can't remove uncertainty, but it can help us manage it better.**

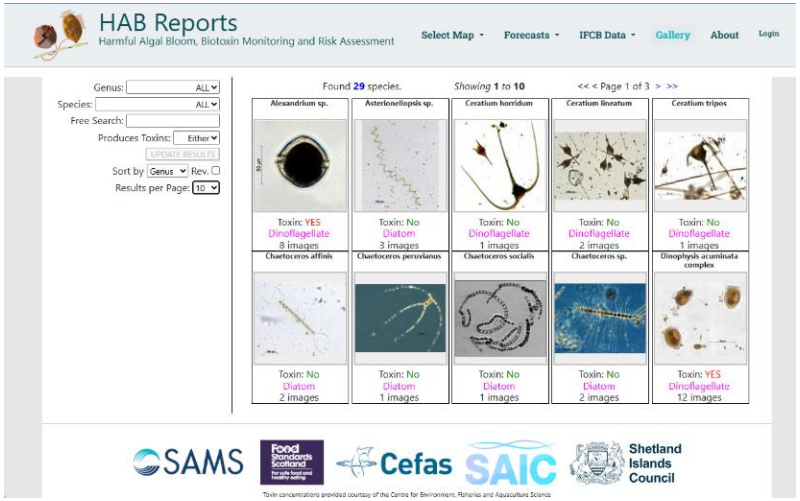


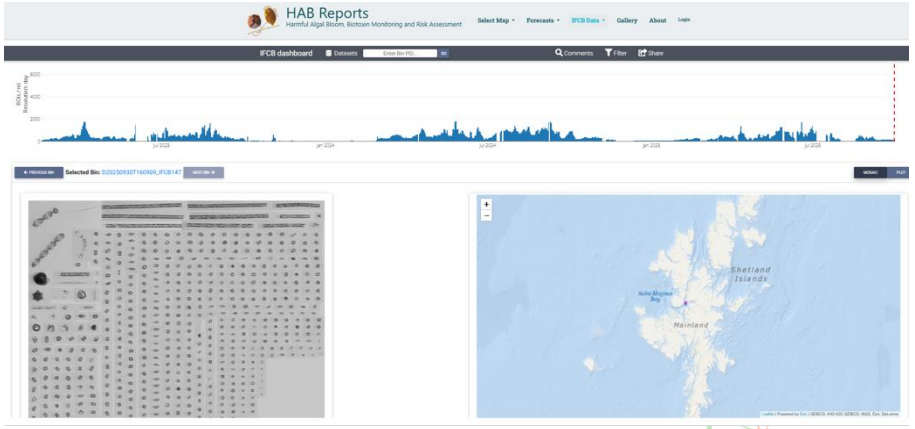


Innovation to Implementation at home

- Models & Monitoring:
  Using data on food availability, currents, and water quality to predict HABs
  https://www.habreports.org/#
- Real-world monitoring data to help with increasingly unpredictable environments

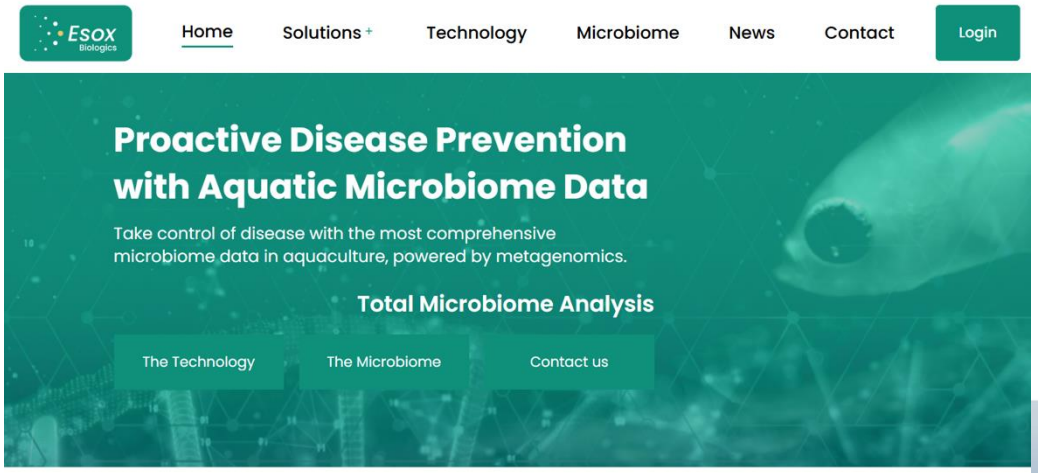






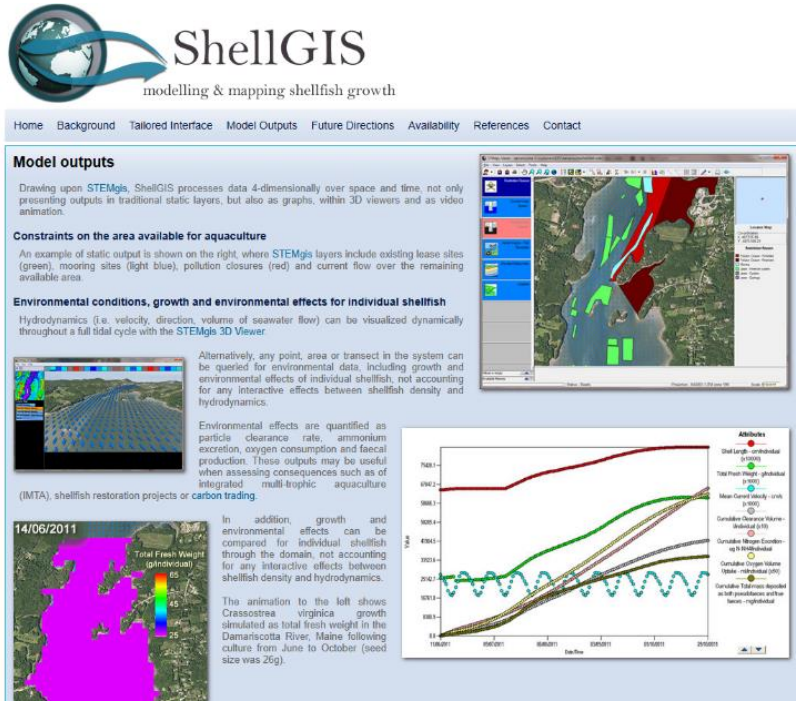
Innovation to Implementation at home

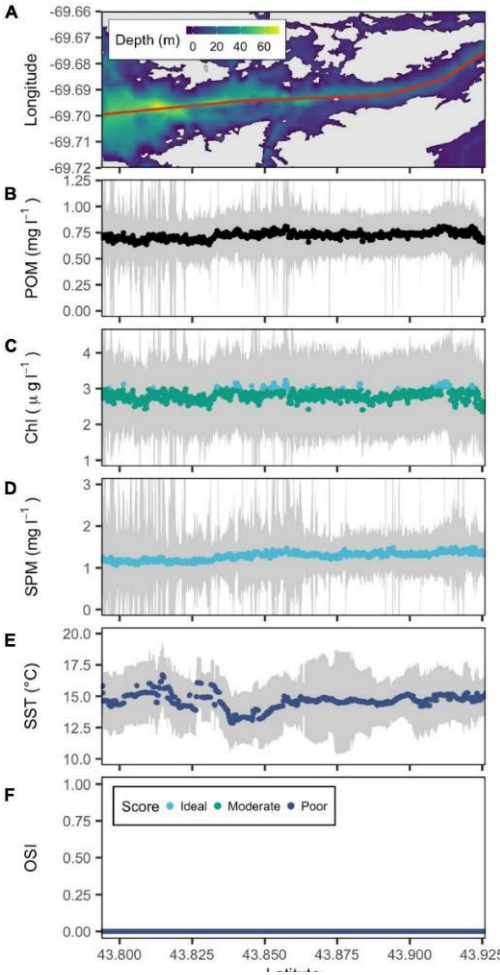
- Monitoring Microbes:
  - Microbiome mapping
  - What is a healthy/unhealthy microbiome profile?



Innovation to Implementation abroad

- Optimising site choice (Gulf of Maine, USA)
- Efficient use of space, predictions for sales, manage environmental challenges.

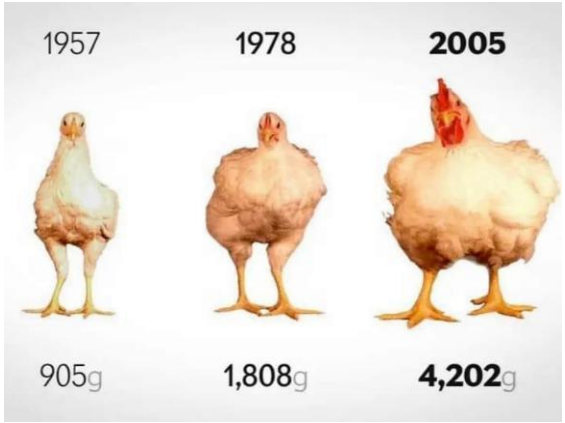




Oyster aquaculture site selection using high-resolution remote sensing: A case study in the Gulf of Maine, United States B Jiang, E Boss, T Kiffney, G Hesketh, G Bourdin, D Fan, DC Brady
Frontiers in Marine Science 9, 802438

Innovation to Implementation abroad

- **Selective breeding programmes:**
  - Sydney rock oyster (Aus) [**growth**]
  - Pacific oyster (France, NZ, China) [**growth, disease resistance**]
  - Greenshell mussels (NZ) [**growth, heat tolerance**]
  - Hong Kong oyster (China) [**growth, disease resistance**]
  - Hard clam (USA) [**disease resistance**]



Innovations at home – genetic selection

- Selection in native (flat) oyster for growth and *Bonamia* resistance

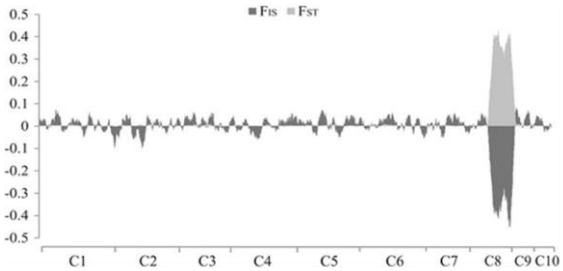
Evolutionary Applications

ORIGINAL ARTICLE | Open Access

A single genomic region involving a putative chromosome rearrangement in flat oyster (*Ostrea edulis*) is associated with differential host resilience to the parasite *Bonamia ostreae*

Inés Martínez Sambade, Adrian Casanova, Andrés Blanco, Manu K. Gundappa, Tim P. Bean, Daniel J. Macqueen, Ross D. Houston, Antonio Villalba, Manuel Vera ... See all authors

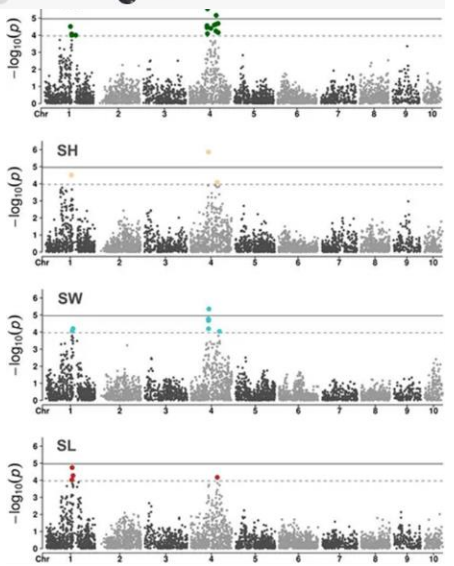
First published: 05 July 2022 | https://doi.org/10.1111/eva.13446 | Citations: 10



Sambade IM et al. Evol Appl. 2022 Jul 21;15(9):1408-1422. doi: 10.1111/eva.13446.

Genome-Wide Association and Genomic Prediction of Growth Traits in the European Flat Oyster (*Ostrea edulis*)

Carolina Peñaloza, Agustin Barria, Athina Papadopoulou, Chantelle Hooper, Joanne Preston, Matthew Green, Luke Helmer, Jacob Kean-Hammerson, Jennifer C. Nascimento-Schulze, Diana Minardi, Manu Kumar Gundappa, Daniel J. Macqueen, John Hamilton, Ross D. Houston, Tim P. Bean



Front. Genet., 15 July 2022, Sec. Livestock Genomics
Volume 13 - 2022 https://doi.org/10.3389/fgene.2022.926638

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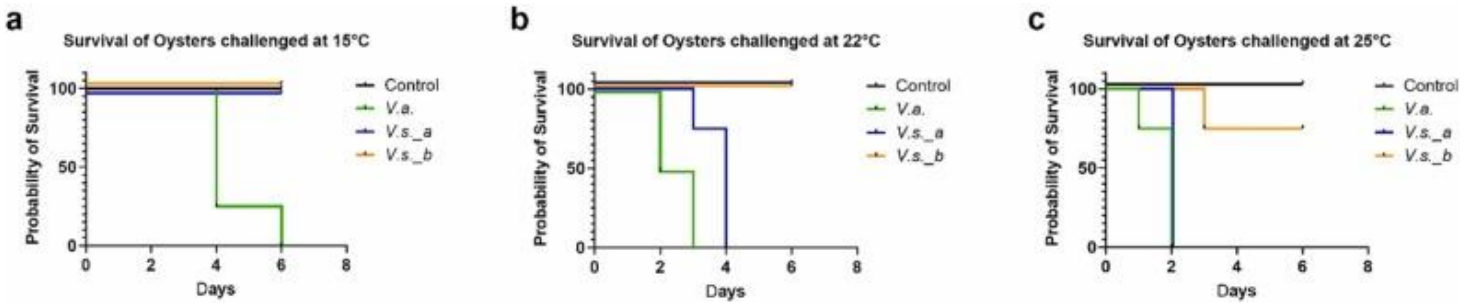
Innovations at home – pathogen identification

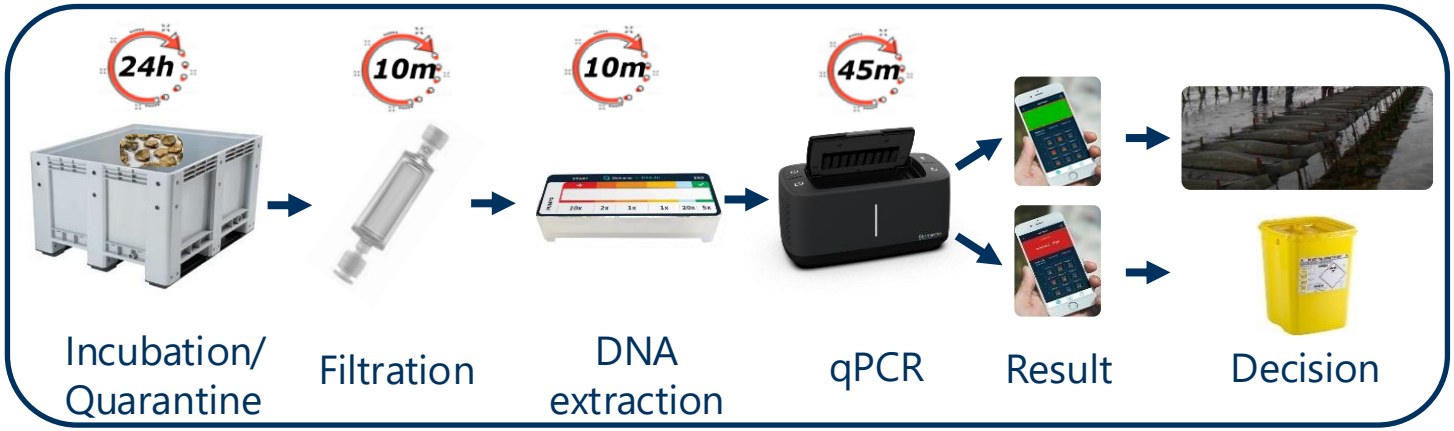
Aquaculture Reports
Volume 39, December 2024, 102480

Scottish oyster mortality event and association with *Vibrio aestuarianus*

Tim P. Bean, Hannah Farley, Jennifer Nascimento-Schulze, Tim Regan



Innovations at home – pathogen detection



UK SEAFOOD INNOVATION FUND

SAIC

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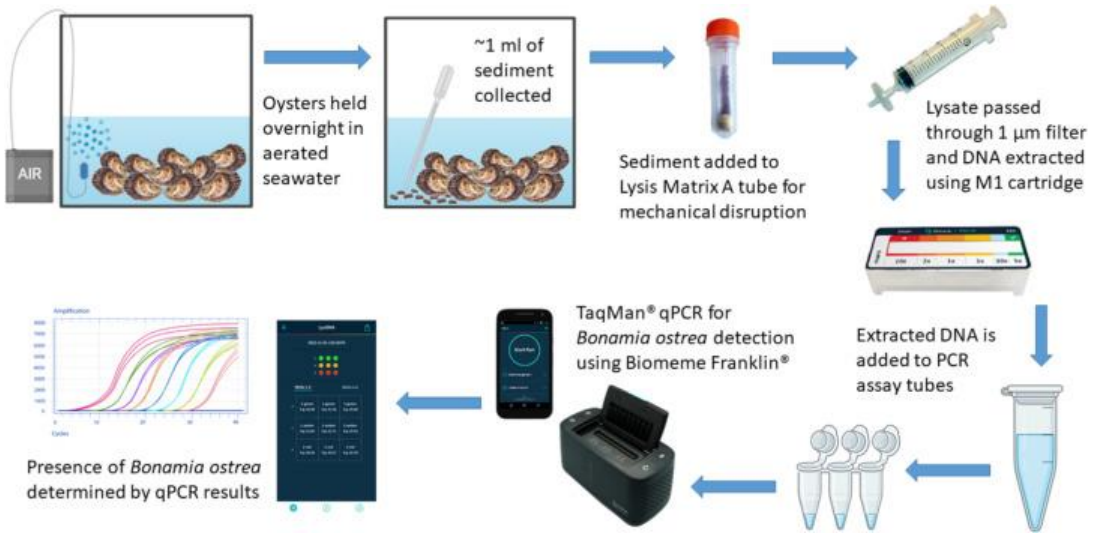
Innovations at home – pathogen detection

Innovations at home – pathogen detection



ELSEVIER

Aquaculture
Volume 599, 15 April 2025, 742153

Non-invasive detection method for *Bonamia ostreae* infected *Ostrea edulis*

Tim Regan [a], Lavanya Vythalingam [a], Jennifer Nascimento-Schulze [a], Owen Paisley [b], Alain Karmitz [c], Nuala M. Hanley [d], William G. Sanderson [d], Tim P. Bean [a]

UK SEAFOOD INNOVATION FUND

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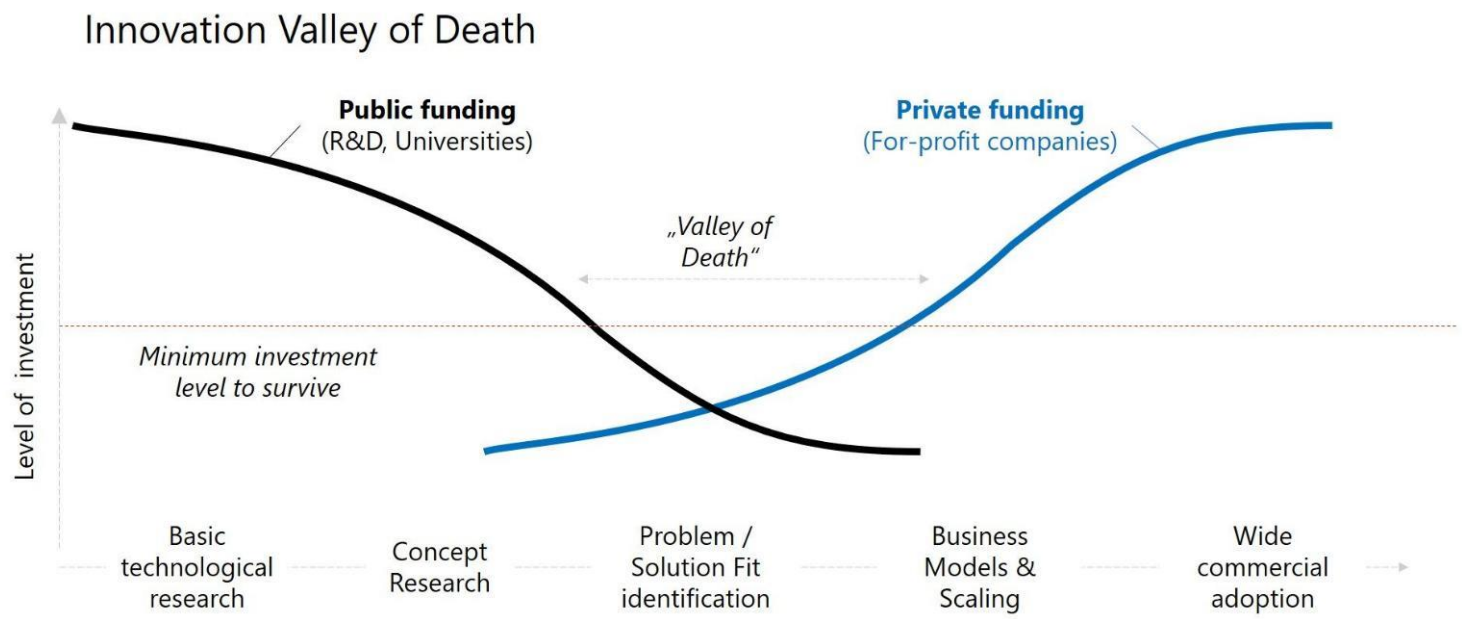
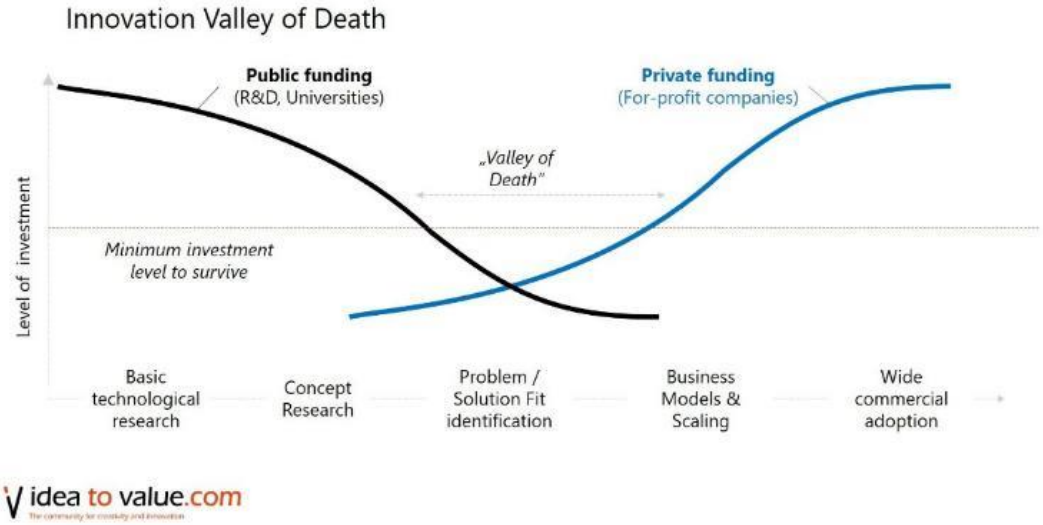
The Valley of Death



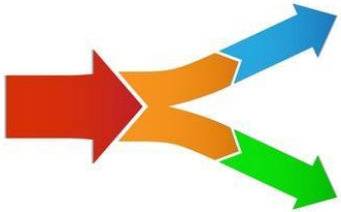
idea to value.com
The community for creativity and innovation

The Valley of Death

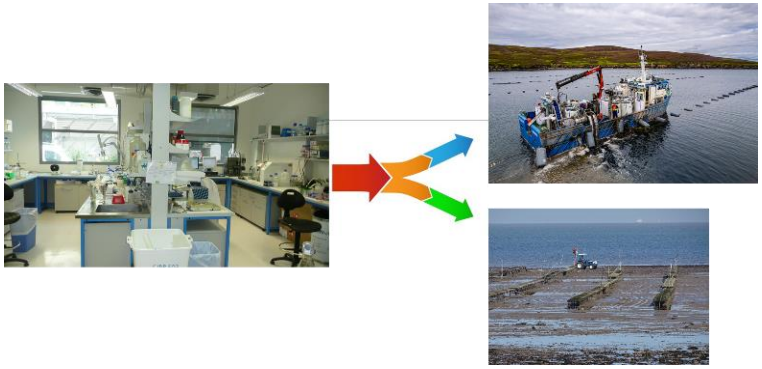
- Most often, academics can come with an idea…
- …but it's rarely possible (or appropriate!) for scientists to take these ideas through to commercialisation following publication.



Systemic problems and frustrations

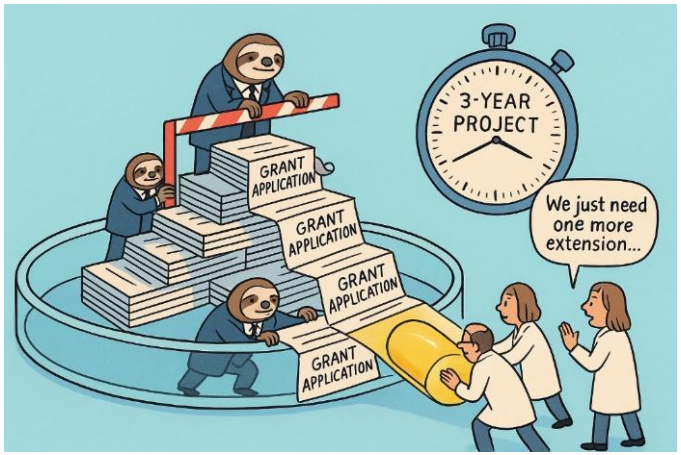


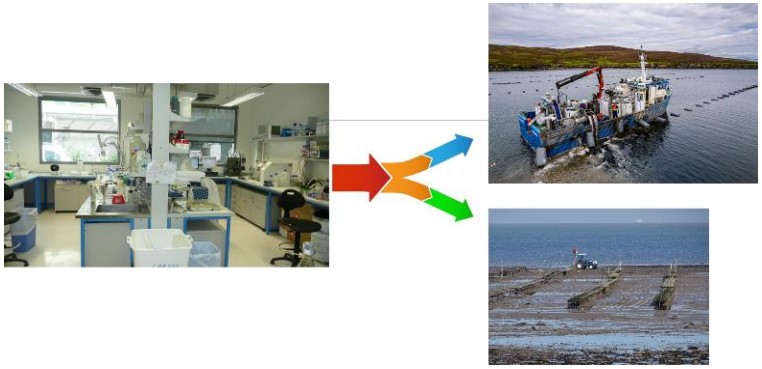
Systemic problems and frustrations



- Funding tends to favour “blue sky” work, not applied solutions.
  - Fundamental questions about the mechanics of life itself…
  - Academic pursuits – not always directly linked to a real world application.

Systemic problems and frustrations



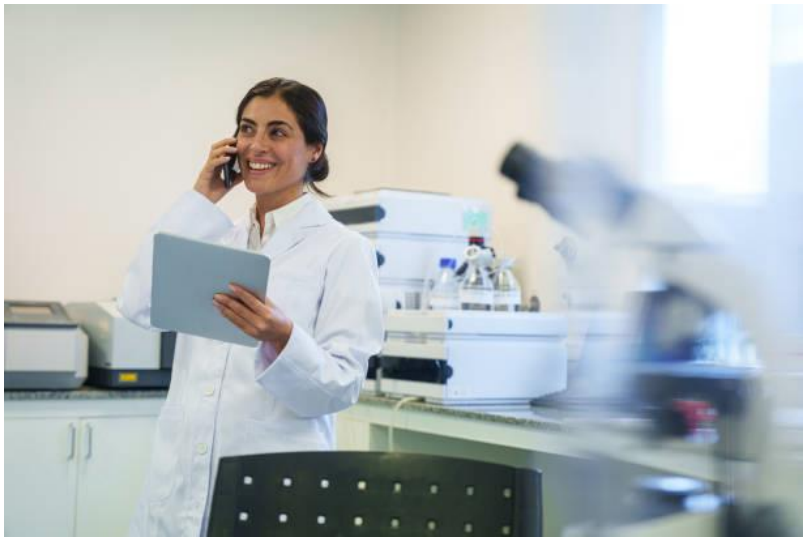


- Researchers face their own challenges:
  - limited resources,
  - slow regulatory processes,
  - short-term projects.

- **These barriers make it difficult to carry science through to tools the industry can use.**

Scientists…

- …are generally happy to tell people everything they know and enjoy hearing questions.
- …are open to approach by email (and sometimes even by phone!).



Scientists…

- …are generally happy to tell people everything they know and enjoy hearing questions.
- …are open to approach by email (and sometimes even by phone!).
- …often have easy access to (smaller) funds that can be used for "**Pilot Experiments**" (e.g. diagnostics).
- Big projects, however, take months or years to build.
- Bridging the gap from "**Pilot Experiment**" to "**Big Project**" is where PIs spend most of our efforts…
- These make careers, fund our labs and Uni's, and can have the biggest impacts…**IF** they are successful.

Roslin Reports…

Summary of results from the survey featured in July issue

Kallen Sullivan, Ambre Chapuis, Tim Regan and Tim Bean

Oysters in Edinburgh cont.

To add to the happy ambience at the event it was further good news to hear that Dr Tim Regan had been awarded a Fellowship post at the Roslin Institute. (This can be seen as the equivalent to the tenure track in the USA system) and is a highly competitive process. Funded by the Roslin Institute at the University of Edinburgh, applicants have to undergo a very rigorous selection process. This applies to both the candidate, of which there were 60 in this round, and also to the topic they plan to research. Tim Regan's area will be shellfish immunology and how benefits can accrue between salmon/ shellfish culture and seaweed/shellfish culture. This effectively means that research input from Roslin on farmed shellfish has doubled. Bruce Whitelaw, Director of the Roslin Institute said "The appointment of two new aquaculture group leaders at Roslin, including Tim Regan who will study shellfish immunology, demonstrates our ongoing commitment to supporting aquaculture through cutting edge research and development."

We will hope to hear more of Dr Regan's plans in a future issue of The Grower. Tim Bean also added, "There may be future events like this….we are currently trying to plan out how we can make it work in other locations."

Pictured above; before their presentations, from left, Pr Bill Sanderson , Dr Tim Regan and singer, Gareth Jone who led the audience in an oyster song!

Photo credit JHBrow

Pictured above; Dr Tim Regan explains some of the work they are doing on shellfish which made familiar to we

Above, from left; Chrissy Ma Brian Reid , The Grower

Workshop assessi… mussel population…

Tim Regan, Roslin Institute, U…

Jildou Schotanus and Jacab Cappelle of I… Wageningen took advantage of the Neel…

NSA Baltimore 202…

Tim Bean and Hannah Farley… Edinburgh)

The end of March marked the 115th annua… of the National Shellfisheries Association in … Maryland. The conference was well attended … first time the association has met since the beg… the pandemic. Over the course of the conferen… range of different species were covered … oysters, mussels, shrimp, clams, scallops, sea… the Maryland famous blue crab.

The meeting opened with an interesting … Marissa Bass of Yale University. She added a… element to the meeting with presentation of … publication '*Conchophilia: Shells, Art and C… Early Modern Europe*'. This kicked the confere… a good start and a range of varied talks span… genetics to life on the farm followed across th… days.

There seems to have been an explosion o… hatcheries in the USA in the past few years, …

Summary of Presentations from World Aquaculture Society Triennial Conference in New Orleans, USA 2025

Tim Bean, Ambre Chapuis, Jiaqi Wang and Zexin Jiao, The Roslin Institute, University of Edinburgh report

Pictured above from left; *Zexin Jiao, Dr Tim Bean, Jiaqui Wang, Dr Ambre Chapuis and Dr Tim Regan*

This summarises key presentations from the World Aquaculture Society 2025 Triennial; the largest global aquaculture conference, which occurs every three years.

Detection of spat

David Ernst (Bigelow Laboratory, Maine): developed environmental RNA (eRNA) assays to detect *M. edulis* larvae in seawater based on gene expression specific to

To make the most of the science:

- **Science won't save us on its own.**
  It takes efforts of growers, scientists, and regulators combined to ensure the discoveries and innovations will translate into practical tools that support the long-term resilience of the industry.

- **Government and stakeholders need to back translational funding**
  Moving from promising science to real changes on farms.

- **Scientists need to stay grounded**
  Engaging directly with industry to keep our efforts relevant.

- **Growers – keep talking to scientists!**
  Don't wait for us to come to you.

Confronting Challenges in the Shellfish Industry:
Skills for Effective Research Communication and Engagement

Confronting Challenges in the Shellfish Industry Workshop #2: Skills for Effective Research Communication & Engagement

Oban, Scotland | 30 September – 1 October 2025
Hosted by the Roslin Institute, University of Edinburgh
in partnership with the Association of Scottish Shellfish Growers (ASSG)

Are you a UK-based early- to mid-career researcher working in aquaculture, marine science, environmental policy, or science communication?

This in-person workshop, focused on building your science communication and engagement skills, is a unique opportunity to expand your professional network, engage directly with the UK shellfish industry, and explore how your research can help shape public understanding and perception of shellfish production and sustainable aquaculture.

Following a highly successful workshop in 2024, the 2025 edition of the annual Confronting Challenges in the Shellfish Industry workshop will continue to build bridges between academic researchers and industry professionals. Participants will benefit from structured support in developing skills essential for writing collaborative research proposals, fellowship applications, and designing and delivering activities to promote their research to stakeholders and the public - all of which are valuable for researchers seeking to create impact within and beyond academia.

Day 1 | 30 September 2025, 12.00 - 21.00 (includes lunch & networking dinner)

- Welcome and networking activities
- Discussion of current industry challenges and research opportunities in shellfish farming
- Facilitated sessions on science communication and public engagement skills and developing your (research) message

Day 2 | 1 October 2025, 09.00 - 11.30, prior to ASSG conference

- Group collaboration session to generate ideas for effective engagement with the public and/or industry
- Guidance on building partnerships and developing strong proposals for future funding and research impact
- Preparation for engagement with industry and policy stakeholders during the ASSG annual conference

This workshop is funded with generous support from the Association of Scottish Shellfish Growers and the Roslin Institute, University of Edinburgh via a BBSRC Institute Development Grant. Spaces are limited and **the application deadline is 11.59pm on 22 August 2025**.

Interested in attending?
Scan the QR Code or apply here:
https://forms.gle/2jzSzjeQxe6RqDeT7

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ROSLIN

Thank you

Roslin Aquaculture Team

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The Royal (Dick) School of Veterinary Studies

SAIC
Sustainable Aquaculture Innovation Centre

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Scottish Shellfish

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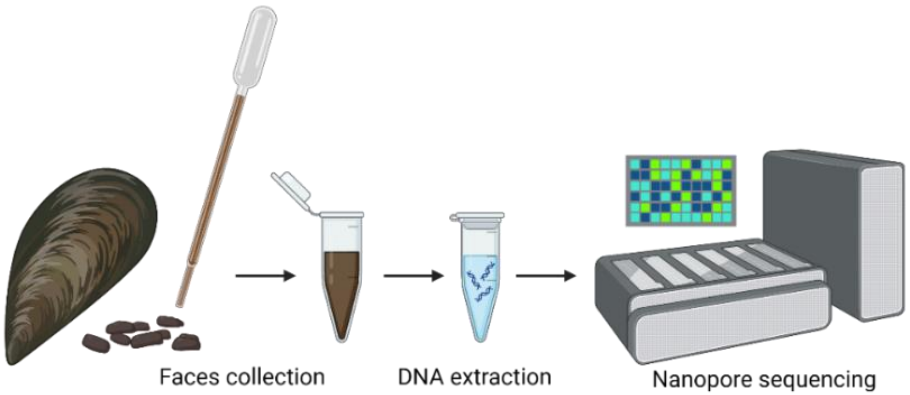

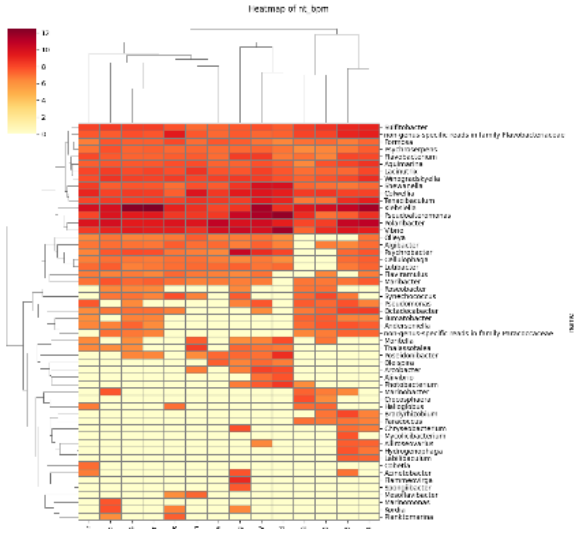

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Scottish Shellfish

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