



# PROJECT NEWSLETTER #1

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FOREWORD BY

# Luca Bargelloni

Project Coordinator



As EUAqua.Org completes its first year, it is a pleasure to reflect on the strong foundations that have been established across the project. Since the official start in January, the consortium has focused on aligning scientific objectives, setting up robust management and communication structures, and initiating the core research activities that will shape the coming years.

During this initial phase, significant progress has been made across all work packages. Key experimental designs have been defined, pilot studies and modelling approaches have been launched, and early coordination among partners has ensured that research on selective breeding, feed efficiency, resilience, welfare and consumer behaviour is developing in a coherent and integrated way. These early efforts are essential to delivering innovative solutions for sustainable and organic aquaculture in Europe.

Equally important has been the emphasis on communication, dissemination and collaboration. The project's visual identity, website, social media presence and this first newsletter mark important steps in making EUAqua.Org visible and accessible to a wider audience.

In parallel, the project has actively engaged in clustering activities, becoming part of two complementary collaboration frameworks — AquaConnect and the BlueFeed Cluster — and contributing to joint discussions and webinars with other Horizon Europe initiatives.

This first year has also demonstrated the value of our diverse consortium, bringing together expertise from universities, research institutes and industry partners across Europe. I would like to sincerely thank all partners for their commitment, openness and collaborative spirit, which have been instrumental in moving the project forward.

Looking ahead, EUAqua.Org will build on this solid groundwork, advancing experimental activities, strengthening cross-project cooperation, and continuing to translate scientific progress into meaningful impact for the aquaculture sector. I look forward to the next phases of the project and to the continued collaboration that will help shape the future of sustainable and organic aquaculture in Europe.

A handwritten signature in black ink that reads "Luca Bargelloni". The signature is written in a cursive, flowing style.

Prof. Luca Bargelloni



## Enabling Technologies for Advanced Selective Breeding

Within Work Package 1 – **Enabling Technologies for Advanced Selective Breeding**, researchers are working to improve the reliability of genomic prediction models used in aquaculture breeding programmes. A key objective is to develop models that remain accurate and stable across generations, populations and strains — a major challenge in genomic selection research.

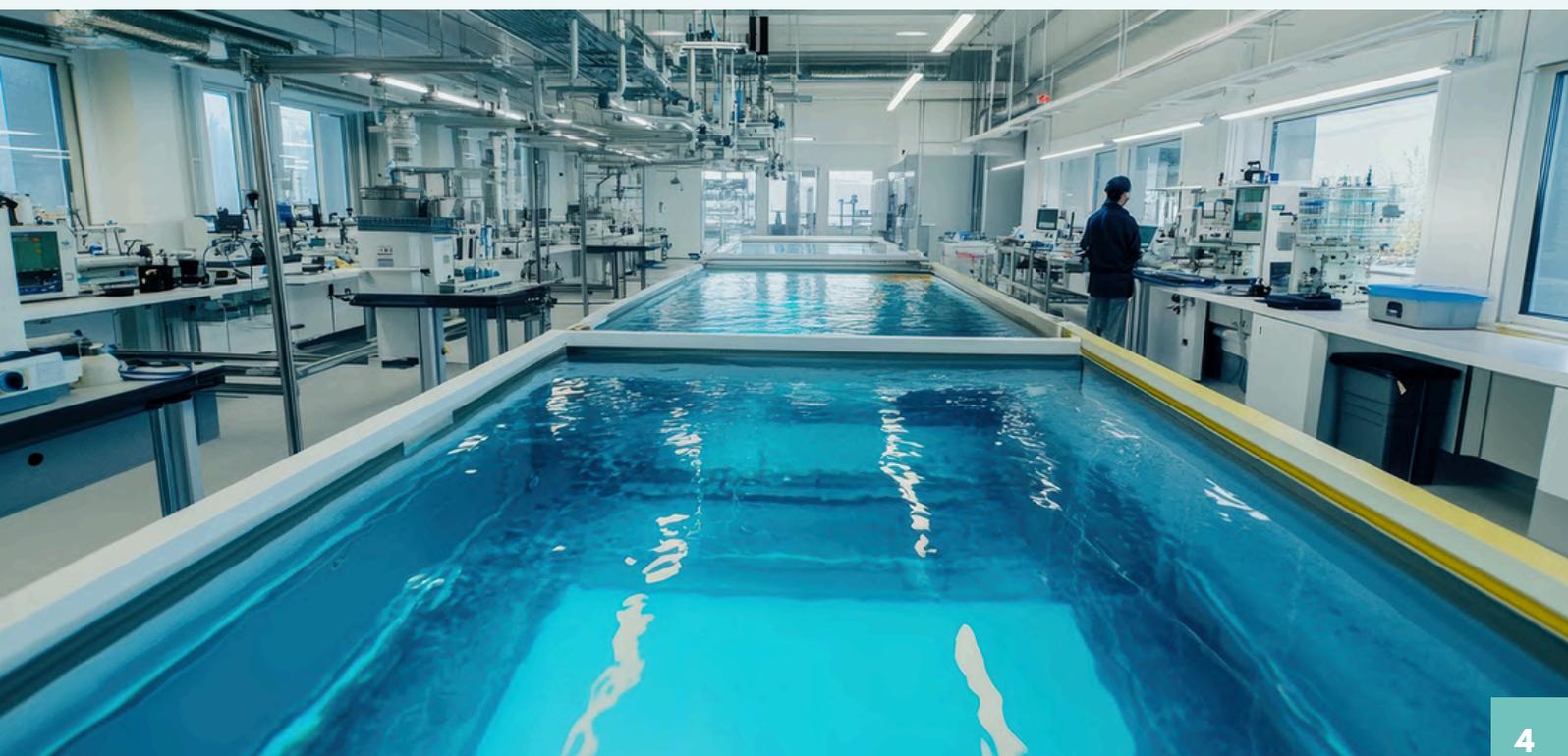
Recent results are now available for one of EUAqua.Org’s target species, the European sea bass, focusing on resistance to viral nervous necrosis (VNN). Using genomic data generated within the Horizon Europe project AquaFAANG, the team explored whether prioritising genetic markers based on functional genomic information — such as regions of the genome involved in gene regulation — could improve prediction accuracy.

To test this, genomic prediction models were evaluated under realistic breeding conditions that mimic prediction across distantly related populations. Markers located in active regulatory regions of the genome (including promoters and enhancers) were compared to markers in inactive genomic regions.

The findings show clear benefits from incorporating functional information. Genetic markers located in active regulatory regions significantly improved prediction accuracy, with gains of up to 21% when known causal variants were included. Even when these variants were excluded, models based on functionally informed markers often outperformed the control. Similar positive trends were observed for non-coding variants.

The team also evaluated advanced machine-learning and deep-learning approaches, which performed particularly well when focusing on regulatory regions active across multiple tissues. In addition, a deep-learning framework was used to predict the functional impact of non-coding variants, further supporting the value of integrating genomic and epigenomic information into breeding strategies.

Overall, these results demonstrate that incorporating functional genomic data into selective breeding programmes can enhance the accuracy and robustness of genomic prediction. This approach represents an important step towards more efficient and sustainable breeding strategies for European sea bass and other aquaculture species.





## Using AI to Better Understand Salmon Feeding Behaviour

As part of the project, researchers at the Institute of Aquaculture, **University of Stirling** are supporting the development of innovative tools to improve fish feeding efficiency and welfare. Their work focuses on managing fish trials at the University's Marine Environmental Research Laboratory (MERL), in collaboration with project partner Visifish.

The trials are designed to support the development of artificial intelligence (AI) technology that can monitor feeding behaviour in Atlantic salmon (*Salmo salar*). A key challenge has been validating the AI system by reliably identifying individual fish underwater, ensuring that each feeding event is linked to the correct animal.

To address this, the research team used Visible Implant Elastomer (VIE) tags—small, non-toxic coloured markers injected into the fins of the fish. These tags remain visible underwater and allow each fish to be identified using a unique colour combination. An initial pilot study tested suitable colours and confirmed that the tagging method did not affect fish health, achieving 100% survival.

Following this, a larger trial was carried out using underwater **video cameras** to capture high-quality footage of feeding behaviour. Fish were stocked at different densities to determine the optimal conditions for AI analysis. The resulting recordings provided Visifish with the data needed to train their AI model and helped identify the most suitable stocking levels for accurate monitoring.





Fish	Dorsal	Caudal - High	Caudal - Low
101	Green	Red	Red
102	Red	Green	Green
103	Red	Green	Green
104	Red	Green	Green
105	Red	Green	Orange
106	Red	Green	Orange
107	Red	Green	Orange
108	Red	Green	Red
109	Red	Green	Red
110	Red	Green	Red
111	Red	Red	Green
112	Red	Red	Green
113	Red	Red	Green
114	Orange	Orange	Red
115	Orange	Orange	Red
116	Orange	Orange	Red
117	Red	Red	Orange
118	Red	Red	Orange
119	Red	Red	Orange
120	Green	Green	Green
121	Green	Green	Green
122	Green	Green	Green
123	Green	Green	Orange
124	Green	Green	Orange
125	Green	Green	Orange

Fig 1. An Example of fish tagging locations and panel of potential colour combinations.

The knowledge gained from these trials will feed into upcoming, larger-scale studies. These will apply the AI system developed by **Visifish** to explore links between feeding behaviour, fish genetics, and feed efficiency, particularly when fish are fed novel organic diets. The team is also continuing to refine tagging and monitoring methods, with a strong focus on fish welfare and improving the accuracy of AI-based observations.



## Optimising Feeding Observation with Vision AI

During the first year of the project, partners at **VISIFISH** focused on developing a Vision AI pipeline to better understand how fish density affects the observation of feeding behaviour in realistic tank conditions. Multi-camera video systems were installed, recording at high speed and covering most of each tank, allowing detailed monitoring of both fish movements and feed pellets during feeding events.

Separate detection and tracking processes were applied to fish and pellets, with all data systematically stored for analysis. To ensure meaningful comparisons between tanks with different stocking densities, the team introduced density-aware metrics that account for partial camera coverage. This approach enabled fair comparisons across tanks stocked with 25, 50, 75 and 100 fish, providing a practical framework for analysing pellet visibility and fish–pellet interactions.

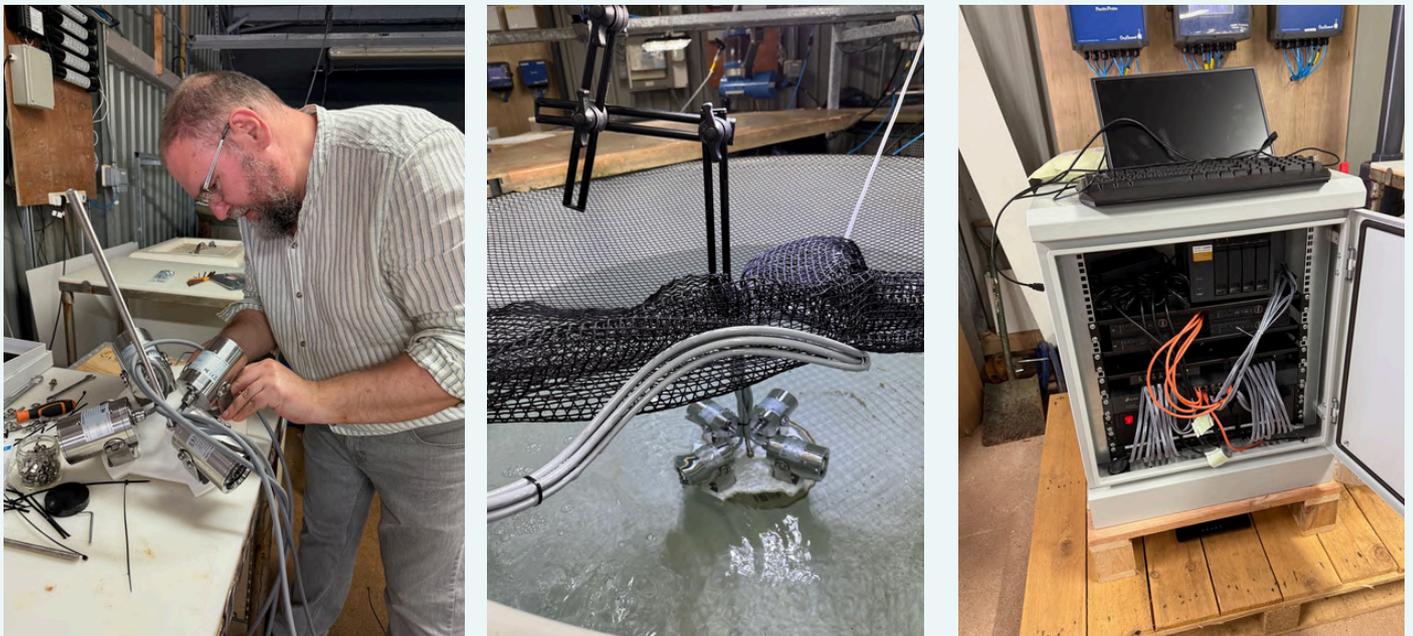


Fig 2 Multi-camera Vision AI system installed for high-speed monitoring of feeding behaviour in experimental tanks.

Key results showed that feeding-related signals can be reliably captured up to a certain visible fish density. Tanks stocked with around 50 fish offered the best visibility of feed pellets, while 75 fish per tank produced the strongest behavioural interaction signals. At higher densities, observation quality declined due to crowding and visual occlusion.

These findings turn early technical testing into clear, practical guidance for trial design. The validated methods and density limits identified during this first year will directly support the design and configuration of the main feeding trials planned for 2026.



## Advancing Feed Efficiency Research

In 2025, the **University of Barcelona (UB)** strengthened its contribution to the EUAqua.Org project with the addition of **Roger Solà**, who joined the team as a PhD candidate. Roger is actively involved in the experimental work carried out by UB within Work Package 2 (WP2): Selective breeding for feed efficiency, supporting several key project activities.

Throughout the year, the UB team actively engaged with the wider EUAqua.Org consortium. In September 2025, team members participated in the European Aquaculture Conference in Valencia, where they met with project partners to exchange updates and discuss progress across work packages.



Fig 3. EUAqua.Org partners at Aqua Europe 2025, Valencia

Strong coordination within WP2 has been a priority. Since January 2025, ten regular coordination meetings have taken place between WP2 partners, involving either the full group or specific task teams. These meetings have supported the planning, development and alignment of ongoing activities.

Sampling for trials using organic feeds in seabream and rainbow trout (Task 2.2) is scheduled for January and February 2026. For the experiment assessing individual feed efficiency in salmon (Task 2.1), preliminary studies have already been completed to optimise camera placement, tank setup and fish density. The main experiment is planned for summer 2026. These trials involve close collaboration between partners, with researchers travelling to experimental sites to work alongside local teams.

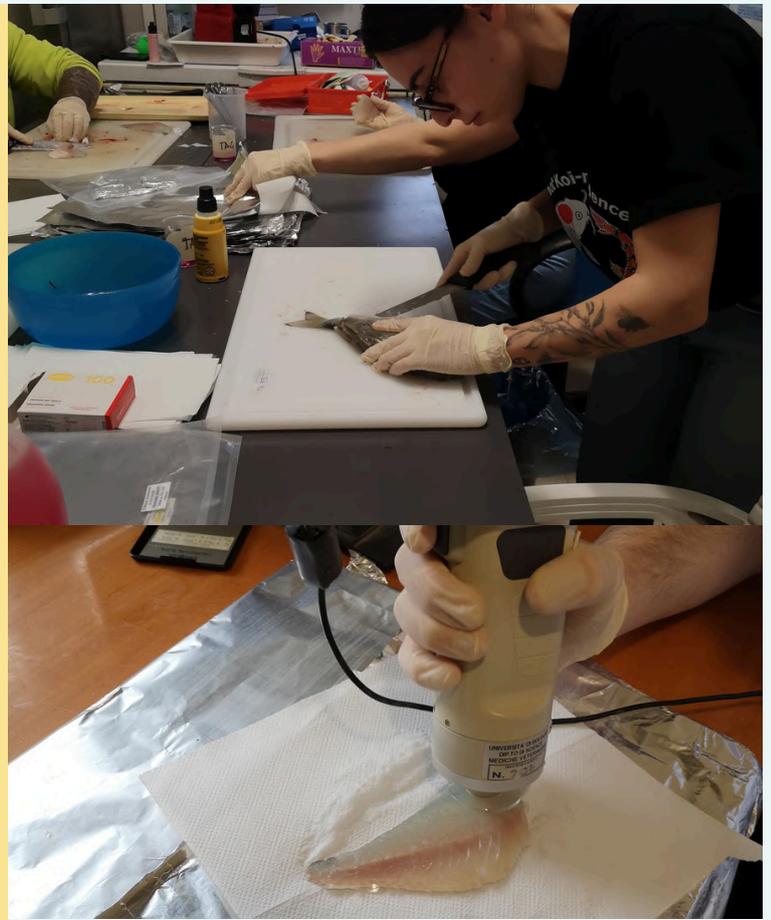


Fig4. Sampling in Bologna



Fig 5. Meeting in Barcelona (Biology Catalanian Society)

In addition to experimental work, WP2 activities were presented to a wider scientific audience. On 28 November 2025, an overview of the use of artificial intelligence and stable isotope analysis for selective breeding based on feed efficiency was shared at a local meeting in Barcelona, organised by the Biology Catalanian Society, focusing on innovation in aquaculture and the role of AI and Big Data.



## Improving Fish Health Through Innovative Disease Models

Within **Work Package 3**, partners are working to strengthen fish health by developing innovative disease models designed to identify naturally resilient individuals. Selecting fish that are less susceptible to infectious diseases — and less likely to spread them — has the potential to reduce disease outbreaks in aquaculture systems and, consequently, decrease the need for antimicrobial treatments.

Over the past year, the consortium has focused on designing a new infection model that applies epidemiological approaches to better understand and predict disease resilience. During outbreaks, fish do not respond uniformly: some individuals become infected more easily, some are more resistant, and others may act as “super-spreaders,” transmitting the disease more widely within the population. The new disease challenge framework aims to identify these differences at the individual level, enabling the potential integration of resilience and infectivity traits into selective breeding programmes.

By selecting fish that are both less prone to infection and less likely to transmit pathogens, aquaculture operations could significantly reduce infection rates and limit the occurrence and spread of disease. This would ultimately contribute to improved fish welfare and reduced reliance on antimicrobial treatments.





In this first year, partners (UEDIN, UNIPD, IRTA and VIF) have primarily worked on developing the theoretical framework and refining computer-based epidemiological models. In the coming year, the research will move into experimental validation, with disease challenges conducted using optimised designs and bacterial strains engineered through recombineering techniques to allow precise tracking of individual transmission patterns.

In parallel, another task within WP3 focused on an infectious challenge in rainbow trout using the bacterium *Yersinia ruckeri*. During this trial, fish were sampled and monitored using camera-based behavioural recording systems. The objective is to identify new behavioural indicators and early predictors of health status, enabling earlier detection of infection and supporting improved fish welfare management.

Together, these activities represent an important step toward more resilient aquaculture systems that combine selective breeding, epidemiology and innovative monitoring tools to enhance health, sustainability and welfare.



## Understanding Consumer Perceptions of Organic Aquaculture

During the first year, researchers at the **University of Bologna (UNIBO)** focused on building a solid understanding of how consumers perceive aquaculture products, with particular attention to organic aquaculture (WP4). This work was based on an in-depth review of scientific and technical literature, as well as insights from three Horizon Europe projects related to aquaculture.

The review examined key factors shaping consumer behaviour, including drivers and barriers to consumption, willingness to pay, the role of labelling, consumer awareness, and the impact of information and behavioural interventions. Overall, the findings show that consumer acceptance of aquaculture products is influenced by a mix of values, sensory experience and information. Products perceived as environmentally sustainable, respectful of animal welfare, healthy and good-tasting tend to be preferred, especially when supported by credible certification schemes and positive past experiences.

At the same time, several challenges remain. Consumers may express concerns about intensive production systems, off-flavours, lack of transparency in labels, higher prices, and limited awareness of organic aquaculture or emerging systems such as aquaponics. These barriers highlight the importance of clear and trustworthy communication in shaping expectations and building consumer confidence.





The review also confirms that consumers are generally willing to pay a premium for aquaculture products carrying organic or sustainability labels, particularly when combined with claims related to traceability, local origin or small-scale production. Health-conscious and environmentally engaged consumers show the strongest interest, while price sensitivity and retail context continue to influence purchasing decisions.

The insights gathered during this first year will serve as the theoretical foundation for the next phase of the project, informing the design of labelling strategies and awareness campaigns that will be tested with consumers through virtual choice experiments.



## Communication, Dissemination and Impact

Since the start of the project, our partners at **WRG Europe** focused on building a strong and recognisable public presence for EUAqua.Org, ensuring that project activities and results are clearly communicated to a wide range of audiences (WP5).

A complete **project brand identity** has been developed and is now in use. This includes the project logo, colour palette and fonts, alongside a suite of communication materials such as an introductory presentation, poster, roll-up banner and flyer. In addition, templates for documents and presentations have been prepared and shared with partners, supporting consistent and professional communication across all project activities.

A key milestone has been the creation of a dedicated, modern **project website**, which serves as the main hub for EUAqua.Org information, news and updates. Website content management is now in place, and the site is complemented by active social media channels, helping to communicate project objectives, progress and outputs to both specialist and non-specialist audiences.

**WRG** has also developed a **Clustering Plan**, identifying related EU-funded projects and initiatives, including key contact points, where collaboration and knowledge exchange are envisaged. This supports stronger connections across the European aquaculture research and innovation community and helps maximise project impact.



EUAqua.Org is a research project funded by Horizon Europe that is advancing innovative breeding for sustainable and **organic** European **aquaculture**

EUAqua.Org is actively engaged in two complementary project clusters: the **AquaConnect Cluster** and the **BlueFeed Cluster**. The **AquaConnect Cluster** brings together the projects Locality, INNOAQUA, IGNITION, Cure4Aqua, and GrinnAqua, focusing on shared challenges and opportunities in sustainable and circular aquaculture. In parallel, EUAqua.Org is part of the newly established **BlueFeed Cluster**, which includes NeoGiANT, ActFast, SwitchFloc, POLYPUFA, and MicroBioms4Soy, with a strong emphasis on feed innovation, biomass utilisation and biotechnology.



Fig 6. Bluefeed and Aquaconnect clusters webinar announcements

EUAqua.Org has taken an active role in both clusters, contributing to coordination meetings and already participating in joint webinars organised within these collaborative frameworks. These activities support knowledge exchange, strengthen synergies across projects, and enhance the collective impact of Horizon Europe research and innovation actions in aquaculture.

In addition, WRG has contributed to Task 4.1, led by the University of Bologna (UNIBO), which focuses on understanding the role of labelling and information on aquaculture products. This collaboration supports the alignment of communication activities with consumer awareness and perception research within the project.

Together, these actions ensure that EUAqua.Org is well positioned to share its work, engage stakeholders, and build impact throughout the project lifetime.

# Strengthening Synergies with Sister Project SelectOrganic



EUAqua.Org is pleased to be working closely with its sister project **SelectOrganic**, a Horizon Europe initiative that shares a strong focus on advancing selective breeding strategies for organic aquaculture.

Given the complementary objectives of the two projects, collaboration between the consortia has been identified as a priority to maximise impact, avoid duplication of efforts, and strengthen the visibility of research outcomes at European level. Initial coordination meetings have taken place to explore areas of alignment, including breeding methodologies, sustainability approaches, and dissemination activities.

Both projects are currently planning joint initiatives in the areas of communication and dissemination, and consumer preference studies, including potential co-organised webinars, cross-promotion of key results, coordinated conference presence, and the development of shared technical content. These efforts aim to foster knowledge exchange, reinforce scientific dialogue, and provide clearer, stronger messages to stakeholders across the aquaculture value chain.

By working together, EUAqua.Org and SelectOrganic seek to enhance the collective impact of EU-funded research in organic aquaculture, contributing to more resilient, efficient, and sustainable breeding systems for the sector.



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