

BreamHOLOBIONT: Holistic phenotyping of evolutive/adaptive features in fish farming. The gilthead sea bream holobiont: from pangenome to metagenome (PID2023-146990OB-I00)

Global warming is already a serious challenge for the aquaculture industry, becoming necessary to understand how the genetic variability and phenotypic plasticity of cultured fish can contribute to minimize the impact of global warming, promoting at the same time the transition to a more ethical and sustainable aquaculture. To this end, we proposed the simultaneous assessment of different omic approaches, including the assemblage of host with many other species living in or around it, which constitutes the holobiont unit. Attention will be focused on gilthead sea bream, an economically important farmed fish with a recognized plasticity, exemplified by its hermaphroditic, euryhaline and eurythermic nature with a high rate of gene duplications. The specific objectives of the PhD student within the BreamHOLOBIONT project will be to develop and adapt new tools of welfare assessment based on integrative transcriptomic/epigenetic approaches, behavioural microbiomics and pan-tissue master clocks of biological age with the potential to disclose new fish Welfare Audits. Such approach will contribute 1) to underscore how the host transcriptome and epigenome are changing on a seasonal basis; 2) to evaluate how mild-hypoxia pre-conditioning and dietary interventions can contribute to increase the range of temperature tolerance: and 3) to integrate behavioural and multi-omics data to unravel the inner plastic response of sea bream holobiont from a probabilistic multi-layer approach.

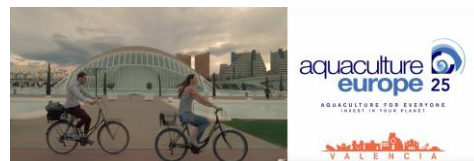
Thesis on “Multi-omic phenotyping of thermal tolerance of fish”. The research lines of Doctorate Programs of “Ciencia y Tecnología de la Producción Animal” or “Biotecnología” of the nearby Universidad Politécnica de Valencia provide competences in fish physiology and nutrition, food biotechnology and the use of genomic and bioinformatic tools. The PhD Student will benefit from the Courses on project-related subjects within the CSIC Training Program. Current 2024 Plan offers, for instance, courses on Bioinformatics applied to metagenome data, -omic tools in aquaculture, Scientific English and Communication abilities. Otherwise, the scientific-technical service managed by IATS Nutrigenomics group, “Biotechnological Platform of Fish Nutrition, Health and Welfare” will instruct the student on specific omic techniques.

Nutrigroup (<https://nutrigrup-iats.org>) and IATS is a welcoming infrastructure for several national and foreign researchers and students. Permanent contact with staff of research centers and international companies generate a proper environment for the exchange of scientific ideas. The student will also take advantage of the participation of the group in the Program CSIC MOMENTUM (1 PREDOCT + 1 POSTDOCT) and two scientific-technical collaboration networks CSIC-HUBS (CONEXIONES-CSIC): GENOMA and Biología Computacional y Bioinformática (HubBCB) that will allow interactions with research groups involved in the study of genome/epigenome aspects or experience in computational biology and bioinformatics.

RESEARCH, TRANSFERENCE AND DIVULGATION EXPERIENCES
NUTRIGENOMICS GROUP, IATS-CSIC

PROMOTIONAL VIDEOS:

- Cooperación Española. AECID. La Antigua 2023/Guatemala. Coordinator Program Nutrition & Health, Jaume Pérez-Sánchez. AUTOMATIZATION & DIGITALIZATION.
- MARINE SCIENCES. NEXT GENERATION UE Project. Coordinator Comunitat Valenciana, Jaume Pérez-Sánchez (2022-2025).
- AQUACULTURE CONGRESS - EAS2025 Valencia – Hosting IATS-CSIC (Jaume Pérez-Sánchez). Expected attendance more than 3,000 Delegates.



- Aerial view of IATS infrastructures

