

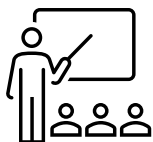
Invitation to Scientific Insights Seminar

Lecture by Dr. Thomas Lecocq



- Associate Professor (senior lecturer) in Animal Biology and Ecology
- Team leader
- PhD Sciences (HDR)
- ❖ Laboratory Animal and Agroecosystem (L2A, formerly URAFPA)
- ❖ Faculty of Science and Technology, University of Lorraine, France

Title:



“Towards Rational Design of Fish Polyculture Systems: Integrating Ecology, Traits, Modelling and Stakeholder Knowledge”

Date:



Wednesday, 23 September 2026
12:30–13:15

Place:



FFPW USB, Zátíší 728, Vodňany
Large meeting room

Light refreshments provided



Dr. Thomas Lecocq**23 September 2026****12:30–13:15****Title and abstract of the lecture:****“Towards Rational Design of Fish Polyculture Systems:
Integrating Ecology, Traits, Modelling and Stakeholder Knowledge”**

Fish polyculture has long been used to diversify production and improve resource use, explaining why it remains an active field of aquaculture research. However, research practices and objectives vary considerably across regions and production systems. To characterize these trends and identify current research priorities, we conducted a systematic review of fish polyculture research published between 1968 and 2023. The analysis revealed strong geographical specificities, but an overall predominance of two- or three-species combinations in freshwater pond systems, alongside regional specificities in production systems and species combinations. Research objectives primarily focus on improving production performance and water quality, whereas economic performance, environmental impacts, product quality, and animal welfare receive comparatively less attention.

The main levers used to achieve all of the objectives are species composition, relative species proportions, and stocking densities. However, manipulating these levers is particularly challenging in aquaculture because of the exceptionally high diversity of fish species that could potentially be combined. The resulting combinatorial problem makes comprehensive experimental screening of possible species combinations and management strategies impractical.

To address this challenge, we developed an integrative workflow for the selection, validation, and optimization of new fish polycultures. The approach combines *in silico* assessments of abiotic compatibility, predation risk, and functional resource-use complementarity with socio-economic information and stakeholder knowledge to identify promising candidate combinations. These candidates are then experimentally validated using multi-criteria assessments of production performance and fish welfare, before modelling and pilot-scale implementation are used to optimize and refine the most promising systems.

This framework provides a pathway to move from empirical species combinations towards a more systematic and participatory design of diversified, sustainable, and resilient fish polyculture systems. Further developments are needed to account for interactions with non-fish species and thereby integrate polyculture within broader production communities, such as IMTA, integrated aquaculture-agriculture, and aquaponics systems, as well as to incorporate pathogen spillover risks and improve the prediction and assessment of environmental impacts.

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