RÉPUBLIQUE FRANÇAISE
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INRAE AgroParisTech université PARIS-SACLAY

UMR**1313**

GenAqua

Animation
Delphine Lallias
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Overall activity
Mixing genetics and physiology to obtain robust and efficient fish in various and fluctuating environments
Since 2016, we also work on the bee.

Outstanding results -
Estimation of economic and environmental breeding values for selected traits
- Genetic architecture of key traits for sustainable aquaculture: knowledge production and transfer to stakeholders.
- Coordination of the European infrastructure project AQUAEXCEL2020

Paris-Saclay University member

université PARIS-SACLAY

Doctoral schools : ABIES
(Agriculture, Food Science, Biology, Environment, Health)

SAPS **SAPS Member**
(Animals Sciences Paris-Saclay)

Animal Genetics and Integrative Biology (GABI)
Genetics and aquaculture

Scientific questions

1- Genetic architecture of efficiency traits

We focus on efficiency traits that will improve the economic pillar of sustainable development but also environmental and societal pillars.

- **Feed efficiency**
  Linked projects: H2020 Embric, PerformFish, AquaImpact.
- **Disease resistance**: genetic and functional bases of viral and bacterial disease resistance.
  Linked projects: H2020 Aqua-Faang ; FEAMP SG-Truite and Gènesea.
- **Fatty acid profile in muscle**
  Linked project: FEAMP OmegaTruite
- **Resource allocations**: interactions between efficiency traits and functional traits (health, immunity, stress response, behaviour, reproduction …). Theme being developed.

2- Physiology and genetics of responses to environmental and rearing stress

We combine physiological, behavioral, genetic and epigenetic approaches to study responses to different stressors.

- **Adaptation to new diets,** especially plant-based diets.
  Linked projects: FUI Ninaqua, FEAMP AntiOb
- **Adaptation to temperature**, environment sensitivity and **epigenetics**, genetic variability of epigenetic marks.
  Linked projects: H2020 AQUAEXCEL2020, FEAMP Epicool.
- Long-**term consequences of early events**: consequences, including transgenerational, of exposition to thermal stress or pollutants.
  Linked projects: Sushifish, Ephemare, PlasticSeine
- **Genetic and environmental determinism of sex**: genetics of spontaneous maleness (trout), identification of neo-males with genomic predictions ; links sexual phenotype–expression/modification of candidate genes or epigenetic marks (seabass)
  Linked projects: FEAMP Neobio, 3S, ERANet Sushifish, H2020 AQUAEXCEL2020

Centre
Île-de-France - Jouy en Josas - Anthony

Domaine de Vilvert
78350 Jouy en Josas

Suivre nos actualités
https://www6.jouy.inrae.fr/gabi
Twitter : @UMR_GABI

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Research facilities:

- INRAE experimental facilities: PEIMA (Sizun) and IERP (Jouy en Josas), Ifremer Palavas
- Original genetic resources developed by the team.
- Bioinformatics team of GABI, Sigenae and genomics core facilities: GeT-Plage, @BRIDGe, Gentyane

Collaborations and partners

Professionnal partners for fish and bee selection: SYSAAF (French syndicate of poultry and fish breeders), ITSAP- Institut de l'Abeille (bee institute), breeders

INRA scientists, specialists of biological functions (nutrition, physiology, immunology …)

Ifremer, CIRAD

Wageningen University, South Bohemia University (Czech Republic), Luke (Finland)

3 – Management of selected populations:

- **Genomic selection**: interest and optimisation of genomic selection for different traits and different species (trout, seabass and seabream)
  Linked projects: FEAMP SG-Truite and GèneSea, two 'CIFRE' PhD
- **Modelling of breeding programs for bees**: setting up efficient breeding programs to improve production (royal jelly, honey), bee behavior and health.
  Linked project: Beestrong
- **New technologies for reproduction**: transplantation of stem cell and cryoconservation.
  Linked project : FEAMP Biogerm

We are also still developing genomic ressources.

Expertises :

Aquaculture ; Quantitative genetics ; Modeling ; Physiology ; Behaviour ; Selection ; Trout ; Seabass ; Seabream ; Carp ; Bee.

Recent publications: All publications : https://www6.jouy.inrae.fr/gabi

Alfonso S et al.. 2019. Examining multi- and transgenerational behavioral and molecular alterations resulting from parental exposure to an environmental PCB and PBDE mixture. Aquat Toxicol. 208, 29-38

Besson M. et al. 2019. Combining individual phenotypes of feed intake with genomic data to improve feed efficiency in sea bass. Frontiers in Genetics, 10-219.

Callet T, et al. 2018. Detection of new pathways involved in the acceptance and the utilisation of a plant- based diet in isogenic lines of rainbow trout fry. PLoS One. 13, e0201462.

D'Ambrosio J. et al. 2019. Genome-wide estimates of genetic diversity, inbreeding and effective size of experimental and commercial rainbow trout lines undergoing selective breeding. Genet Sel Evol. 51, 26

Fraslin C et al. 2018. Quantitative trait loci for resistance to Flavobacterium psychrophilum in Rainbow.

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