

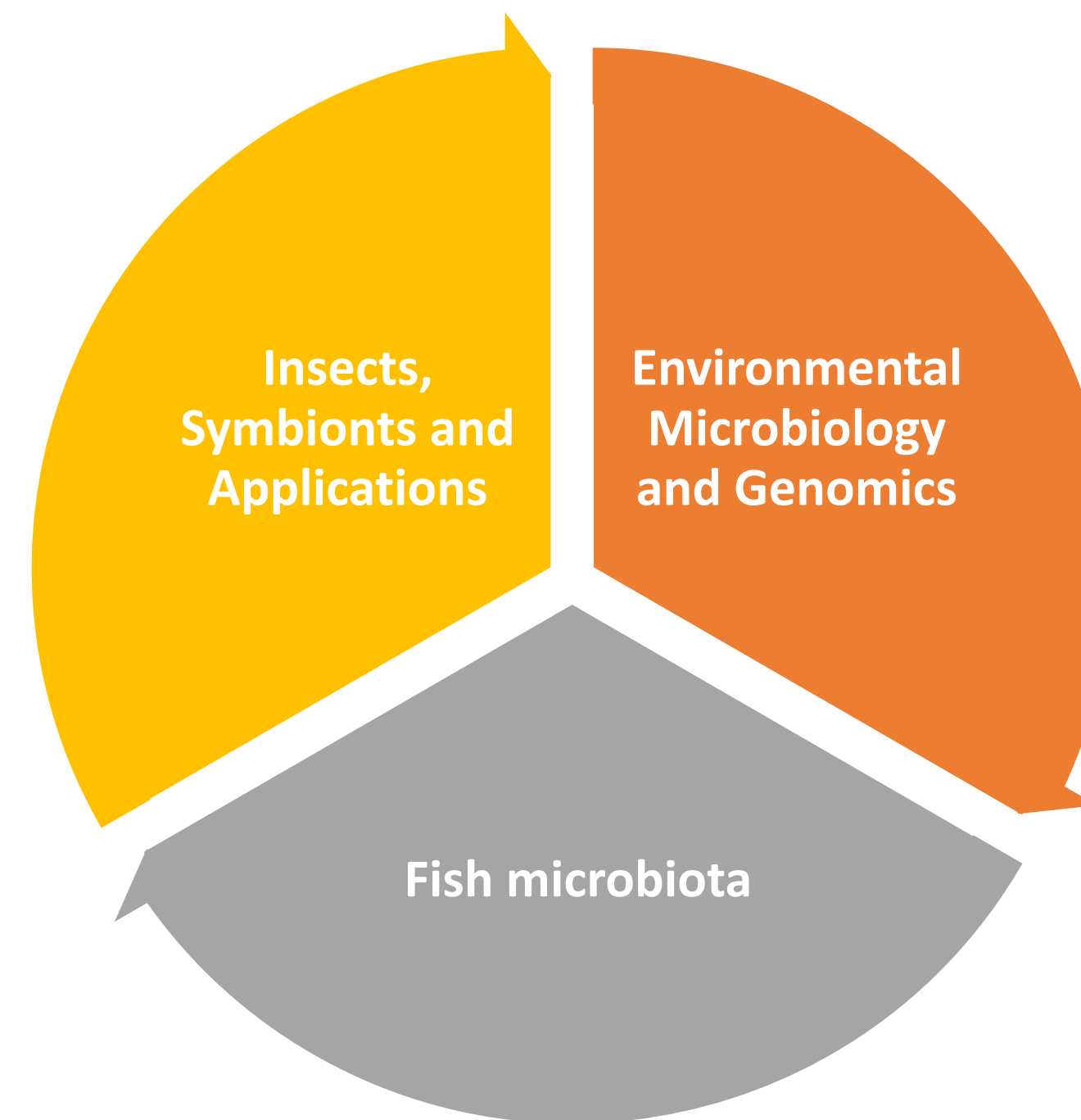


Study of the Biosphere: from genes and genomes to organisms and applications

Department of Environmental and Natural Resources Management, University of Patras, 2 Seferi St, 30100, Greece

INSECTS, SYMBIONTS AND APPLICATIONS

- The first line of research is focused to insects of agricultural importance such as aphids, the Mediterranean fly, various species of *Bactrocera*, and also to insects that carry disease vectors such as tsetse flies.
- It is known that many arthropods harbor a wealth of symbiotic bacteria exerting strong effect on host adaptation and therefore host evolution.
- The MGeM lab has shown the coexistence of two *Wolbachia* genomes in *Glossina* spp., the first in the bacterial cell localized in the ovary, and a second one as a big insertion into multiple sites of the nuclear DNA of *Glossina*. This has been shown using advanced *in silico* analysis but also classical molecular biology tools and transmission electron microscopy and confocal fluorescence microscopy. This work was published in **Science** (2014).
- Another aim of the lab is to develop control methods that are environmentally friendly. Under this initiative the reproductive parasite profile of over 150 different aphid populations, more than 5,000 samples of tsetse fly, and over 600 samples of *Bactrocera* sp. have been analysed.
- Spiroplasma* was recently identified as a new symbiont in tsetse flies with a putative mutualistic role for *Glossina fuscipes fuscipes* proposed.
- Currently, we are examining how diet, irradiation, and the adaptation process influences the bacterial profile in the gastrointestinal tract of *Ceratitis capitata*, *Zeugodacus cucurbitae*, *Anastrepha fraterculus* etc.



FISH MICROBIOTA

- Finally, there is a great interest for exploiting the beneficial bacterial from the gastrointestinal track of fishes used in **aquaculture**. For this reason, a study has been initiated for *Sparus aurata* and *Dicentrarchus labrax*.
- Protocols for the detection of SJNNV and RGNNV from water have been developed.

ENVIRONMENTAL MICROBIOLOGY AND GENOMICS

- Emphasis is based mainly to Greek ecosystems such as salt marshes, anoxic lagoons, olive-mills waste, wastewater treatment from industries etc. in order to: (a) understand and characterize the microbial communities that grow in extreme environments, (b) study the interactions between different microbial communities, (c) understand the effect of abiotic factors on the development and establishment of microbial communities, (d) identify pathogenic microorganisms from environmental samples, and (e) isolate and characterize new bacterial and archaeal species.
- In the frame of this research line we aim to *discover novel microbial lineages* using advanced molecular tools like high-density DNA microarrays (PhyloChip), genomics, metagenomics, and Single Cell Genomics. An example is the the study of the Etoliko lagoon using Single Cell Genomics (**Nature 2013**), and the characterization of the phylgeny and physiology of *Atribacteria* (**ISME Journal**).
- The MGeM Lab has the capacity to develop novel tools for the study of the functional diversity. In this line of research we have been able to develop, in collaboration with University of Thessaly and ENOVEO S.A. a high-density functional microarray capable of characterizing metabolic pathways and genes involved in the degradation of pesticides (PestiChip).

Lab Members



Dr Panayota Stathopoulou



Dr Antonis Augustinos



Dr Vangelis Doudoumis



Elias Asimakis



Maria Lanara

Funding



Lab Members



Dr Panayota Stathopoulou



Sonia Nikolaki

Funding

