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## **Effects of rearing conditions on fish growth and sex ratios: Epigenetic and transcriptomic studies in zebrafish and European sea bass**

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The environment experienced during early development interacts with the genome and results in modifications in gene expression that have life-long phenotypic consequences. Epigenetic mechanisms refer to modifications of chromatin such as DNA methylation and histone modifications that do not imply changes in DNA nucleotide sequence that can be inherited. In 2011, we discovered an epigenetic mechanism linking temperature with sex ratios. Committed to explore the epigenetic regulation of gene expression in farmed fish, we recently have found differences in DNA methylation between fish exposed to different early environments. However, how different environments or farming situations elicit different epigenetic modifications and, more importantly, what genes are affected, is mostly unknown. Confinement stress or high water temperature result in male-biased sex ratios in most fish species examined so far. Furthermore, currently there is the perception among many fish farmers that too often, even after proper adjustment of the rearing conditions at the hatchery-nursery stages, the quality of the produced fish is still suboptimal. Here, utilizing the zebrafish model and the European sea bass, an important species for aquaculture in Europe, the author will present data on changes in gene expression related to epigenetic modifications during sex differentiation, how stress associated with rearing density may mediate the effects on sex ratios as well as the effects of temperature in shaping persistent differences in gene expression. The goal is to better understand how the early farming can influence gene expression in fish with possible consequences in their performance and the ultimate product quality.

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## **Zooplankton and zoobenthos communities in the Nile river, upper Egypt**

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Zooplankton and zoobenthos are highly important components in the aquatic ecosystem. They represent a key stone in the aquatic food chain and maintain a good health for the water body. These groups of animals give a complete picture about the status of the water ecosystem because they are bioindicators for pollution and eutrophication. They supply food for both aquatic and terrestrial vertebrate consumers (e.g., fishes and birds). Qualitative and quantitative survey about these invertebrates helps the scientists and decision makers to know what is happening now and what will happen in the future to give the best and more accurate decision for avoiding more troubles in the future. The present talk introduces the changes of freshwater zooplankton and zoobenthos communities according to climatic factors and anthropogenic impacts in the Nile River at Assiut city, upper Egypt.

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