

Project description for PhD in Ecotoxicology

Effect of variation in life history traits on pollution food web bioaccumulation

The main objective of this PhD project is to investigate *how differences in life history strategies affect the food web bioaccumulation of environmental contaminants*.

This objective is a part of a larger goal; to predict responses in the food web flow of bioaccumulating contaminants following expected climate change driven alterations in Arctic marine ecosystems.

Understanding how variations in animals' *life-history strategies* influence contaminant accumulation is key to address our larger goal. Life history strategies of animals inhabiting Arctic waters will change with climate change due to alterations in species composition, particularly due to *more southern species*, with their different life histories, establishing at high latitudes, and due to *flexible* behavioural and life-history *responses* to climate in the true Arctic species, particularly in their energy storage and reproductive strategies. As organic contaminants are closely tied to the energy storage capacity, in particular in the form of lipids, difference in processes of energy storage and use among species will affect the accumulation and distribution of contaminants.

The project combines knowledge from ecotoxicology, marine biology, and evolutionary ecology to test how variations in life history strategies influence the amount and nature of contaminant accumulation.

In particular, the project will address research questions such as: How does reproductive strategy affect contaminant accumulation? Is bioaccumulation of lipid soluble and protein associated contaminants similarly affected by reproductive strategy? Is bioaccumulation in mammals and birds similarly affected by reproductive strategy?

The successful candidate will compile and work with large data sets, using both statistical and mechanistic modeling to address the research questions. In particular, the candidate will address how reproductive strategy influence contaminant accumulation by analysing a continuum of life history strategies, from capital breeders (using only stored energy for reproduction) to income breeders (using only newly acquired dietary energy for reproduction). Field studies or experiments may be conducted to complement the existing data. The project will be conducted in close collaboration with the Department of Biosciences' prioritized research group "Life-history variation under multiple stressors: separating the effects on development, growth, maturation and survival - LUMS".

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