

DRAGONnest: Exploring Mud DRAGON biodiversity patterns in the Arctic

Kinorhynchs, with the common name ‘**mud dragons**’, are microscopic invertebrates (from 150 μm to 1 mm in size) and one of the least understood group of animals. Since the discovery of this phylum in 1851, only a handful of researchers have turned their scientific attention to these organisms. The scarcity of experts in Kinorhynch taxonomy is reflected in a very fragmentary knowledge about this intriguing organisms.

Due to logistic and taxonomic constrains our **knowledge about kinorhynch species** distribution and life history in Polar Regions **is extremely poor**. Kinorhynchs have very restricted dispersal ability. They have no locomotory organs, neither planktonic larvae for dispersion through the water mass. This might suggest that mud dragon species are very restricted in their distribution. Even though, recent findings suggest that at least some of kinorhynch species might have wide geographical distribution and circumpolar pattern in their occurrence. The question remains, how these organisms can be distributed across thousands of kilometers, inhabit different environments and if they indeed represent the same, widely distributed species, or maybe morphologically identical but genetically different species, called cryptic species.

The center of this project will be taxonomic and molecular identification of selected Kinorhynch species, belonging to genus *Echinoderes*, collected in different Arctic areas (Spitsbergen, East and West Greenland, Alaska). Until now, the **genetic structure of mud dragon species inhabiting Arctic regions has never been studied**. The use of molecular techniques, which become widespread as a tool to species discovery and to flag cryptic species, will likely shed light on the existence of a single species or of a potential cryptic speciation.

Thus, the outlined project would significantly expand our understanding of Arctic kinorhynch distribution patterns, but also represent the **first population genetic study on Arctic kinorhynchs**, exploring the feasibility of **new potential genes** for population genetics and barcoding, and most likely, uncovering the **first examples of cryptic speciation among kinorhynchs**, ultimately revealing their biodiversity patterns.

Arctic marine ecosystems are currently subject to accelerated climate warming and fast progressing sea-ice retreat. Predicted ice melt and changing hydrodynamics may alter the connectivity between distant populations, in turn affecting community compositions. In face of the recent climatic changes, **quantifying and understanding distributional patterns of marine biodiversity** and the environmental conditions that foster them is necessary.

Research objectives are original and focused on the highly undersampled and poorly understood organisms, but ecologically important element of the marine assemblages. Material will be collected in the Arctic- area that remain at the forefront of scientific interest. Moreover, probability that material contains numbers of unknown and undescribed species is very high. Description of new species will contribute significantly to the knowledge of Kinorhyncha, which are poorly known from the Arctic. The expected results will not only apply to people with an interest in kinorhynch diversity, but will be relevant for general understanding of Arctic connectivity, estimations of diversity and consequently the costs of biodiversity loss.