DNA Barcoding of fishes collected off the South Orkney Islands

Christiansen Henrik[1], Franz M. Heindler[1], Huw J. Griffiths[2], Anton P. Van de Putte[1,3] and Filip A.M. Volckaert[1]

[1] KU Leuven, Laboratory of Biodiversity and Evolutionary Genomics, Ch. Deberiotstraat 32, B-3000 Leuven, Belgium
E-mail: henrik.christiansen@kuleuven.be
[2] British Antarctic Survey, Natural Environment Research Council, High Cross, Madingley Road, Cambridge CB3 OET, UK
[3] Royal Belgian Institute of Natural Sciences, OD Nature, Vautiersstraat 29, B-1000 Brussels, Belgium

A comprehensive description of benthic fauna is key for sound conservation and management plans. Biodiversity descriptions rely on species identification, which can be challenging when taxonomically relevant morphological characters are fragile, obscure or largely absent. Molecular methods such as DNA barcoding can complement specimen identification and furthermore hint at cryptic speciation, synonymies, or intraspecific phylogeographic patterns. The South Orkney Islands (SO) archipelago is located in the Scotia Sea, some 600km north-east of the tip of the Antarctic Peninsula. The waters around the SO feature exceptionally high marine Antarctic biodiversity and the first High Seas marine protected area worldwide.

Recently, a research expedition to the South Orkneys has been conducted in the framework of the SCAR program "State of the Antarctic Ecosystem" (AntEco). We here present the fish fauna collected during the SO-AntEco expedition. Morphological identifications of preserved specimens are compared to molecular identification obtained via DNA barcoding. Additionally, we examine distribution patterns of the fish fauna to compare different seafloor habitats across the SO archipelago and identify potential, important drivers of community composition. The fish fauna in turn may influence benthic invertebrate communities via top-down control as opposed to structuring processes directly driven by environmental conditions.

Our results advance the Antarctic DNA barcoding database and our understanding of benthic communities and its drivers in a biodiverse, marine Antarctic region. Thereby we contribute to the South Orkney Islands marine fauna management and preservation in the future.