Project acronym: ColdStress

Project title: Genomic bases of cold stress

Project leader: Maaria Kankare, University of Jyväskylä, Finland

Discipline: Life Sciences & Biotech: Molecular and cellular biology

Station(s): NIBIO Svanhovd Research Station (Norway)

Environmental stress tolerance is one of the key traits affecting species survival and distribution. In this project, we will study the role of chromosomal inversions and transposable elements (TEs) in cold tolerance using a northerly distributed Drosophila fly species as model organism. Current call for the INTERACT TA fits perfectly to our aims by providing possibilities to make sample collection trips to research stations located in the Arctic areas. With the newly collected material as well as using our existing fly samples around the world, we aim to achieve several specific goals using long-read PacBio genome sequencing data. We intend to quantify fixed and polymorphic inversions in northern fly populations, and to validate if their inversion type and frequency or stress-related genes correlate with specific environmental conditions. Finally, we aim to create a comprehensive TE library for D. montana using different populations from various locations. The proposed research visits would be conducted to NIBIO, Svanhovd research station in Norway, and Abisko research station in Sweden in June 2022.

Ability to tolerate cold is important in many biological phenomena including host-pathogen interactions, adaptation to new climatic conditions, and spread of GMOs or pest species into northern ecosystems, which enlarges the utilization of the gained knowledge in other research disciplines including environmental and agricultural sciences. Samples proposed to be collected in this application will provide information from the very vulnerable northern locations, located above the Arctic Circle, which will also bring additional merit for the results internationally.