

Host-associated microbiota can affect the health of their animal hosts by influencing their development, physiology, and behaviour. Ecological factors such as environmental conditions or parasite infections can affect host-associated microbiota. Interactions between parasites, hosts and host-associated microbiota are still not fully known and require extensive work to be understood.

The scientific goal of this project is to analyse the composition of gut microbiota of bank voles (*Myodes glareolus*) and to search for intrinsic and extrinsic factors that might influence the microbiome composition and possible interactions between gut microbiota and endoparasites.

Bank voles are one of the most common and widespread rodent species in European forests and constitute a perfect model for ecological, parasitological and environmental studies. The project will analyse data from 270 bank voles collected in 2018 from north-eastern Poland and individuals collected in 2021 and 2023 from the same geographical location and during the same time. Bank voles will be sampled from three ecologically similar but separate study sites in the Mazury Lake District. Parasitofauna of bank voles will be determined using parasitological methods, such as sections, microscopic and molecular diagnostics. Parasite abundance and prevalence, parasite species richness and diversity will be analysed. Gut microbiota will be screened and analysed using Next Generation Sequencing and a bioinformatics approach. Toxicological studies i.e. the analysis of the presence of heavy metals will be conducted using spectroscopy methods. Statistical methods will be applied to search for the effect of intrinsic and extrinsic factors that may shape relations of bank vole microbiota and endoparasites.

As progress is made towards understanding the contribution of the microbiome to health, biodiversity and wildlife ecology, there is a growing expectation that this knowledge will eventually be translated into the protection of biodiversity and the environment. However, there are still large gaps in the knowledge describing microbiomes.

The proposed project will significantly contribute to the development of scientific disciplines such as ecology, microbiology and parasitology. It will bring novelty to the understanding of environmental factors that might shape the composition of the gut microbiome in the bank vole. Possible host-microbiome-parasite interactions will be analysed. Moreover, obtained data will be useful to compare them with other rodent species from other locations.