The laboratory of Genetics in Ecology of Microorganisms (GEM Lab), headed by Dr. Jiri Barta, is looking for a highly motivated, creative and enthusiastic Ph.D. student to join a team of international researchers.

The focus of the lab is to characterize the role of soil microorganisms in the changing climate of the Arctic region. The Arctic is changing rapidly (e.g. temperature, moisture, vegetation cover) and we want to know how soil microorganisms will respond to these changing conditions, and how they will influence the emissions of CO2, CH4, and N2O as the main potent greenhouse gasses (GHG) to the atmosphere. Depending on ice richness and soil drainage, permafrost degradation can result in wetter or drier conditions. Contrasting environmental conditions evolving under these scenarios will critically influence biotic-chemical processes shifting the microbial community composition, leading to different organic matter (OM) decomposition and potential OM stabilization processes. Based on a conceptual framework on permafrost thaw under dry and wet scenarios, the main objective of CRYOVULCAN is to comparatively investigate OM decomposition and stabilization under these two scenarios. Our main hypothesis is that chemical and biological attenuation processes will partly compensate for the organic carbon (OC) losses caused by permafrost thaw. Under (1) a dry, oxic "rusty" scenario we hypothesize chemical and biological stabilization processes to be more pronounced, leading to aggregation and mineral-organic associations and partly compensate for the OC losses. Under (2) a wet, anoxic "pale" scenario low oxygen likely leads to a reduction of the microbial ability to decompose particularly lignin due to less efficient laccases and peroxidases of anaerobes. We have assembled a Czech-German interdisciplinary consortium with complementary expertise in soil science, soil microbiology and metagenomics, which will face the challenge by a unique combination of field and laboratory experiments. In the field, our studies are based on a comparison of intact permafrost soils with soils undergoing degradation under the two contrasting scenarios. Employing state-of-the-art molecular, biomarker and spectroscopic techniques, the response of the microbial community composition, extracellular enzymes, metatranscriptotomes on the different soil environmental conditions and the respective stabilization of OM species in the soils will be investigated. CRYOVULCAN will thus contribute to the urgently needed knowledge on the effect of the soil hydrological regime on OM stabilization in degraded permafrost soils, which will control the magnitude of greenhouse gases released to the atmosphere in a warmer world.

Successful candidates will be involved in a new research project called CRYOVULCAN (Vulnerability of Carbon and Nitrogen in Cryosols), under the direct supervision of Dr. Jiri Barta. Working in the team of Dr. Barta will offer the candidate the opportunity to acquire and/or deepen his/hers experience in molecular biology and genetics of microorganisms, microbial isolation and identification, analyses of microbial communities
and their interactions and state-of-the-art tools including quantitative PCR, metagenomics, metatranscriptomics, soil enzyme activities, fluorescent labeling, and bioinformatics. Four years is the typical length of Ph.D. studies although this may vary.

We offer a dynamic working environment, stimulating scientific surroundings in a young, enthusiastic, motivated team and the opportunity to work on a high-impact project. If you are interested in more information about arctic cryoturbations, please visit the webpages of our previous projects, please visit \text{http://www.univie.ac.at/cryocarb/}.

Profile

- Applicants should hold a Master’s degree in microbiology, soil microbiology, molecular biology or related discipline.
- Motivated students of all nationalities with a strong commitment to soil microbiology are invited to apply.
- Any experience in bioinformatics (basic Linux knowledge) and microbial genetics etc. is an advantage
- The candidate should have well-developed social skills and be able to work in a team.
- Applicants should have good communication skills in spoken and written English

How to apply?

Applications for this Ph.D. position should be submitted to jiri.barta@prf.jcu.cz

Your application file should contain a motivation letter, CV and publication list (if applicable), a summary of your previous research experience, your marks and degrees during your Master studies and a reference letter from the promoter of your master thesis.

University of South Bohemia, Ceske Budejovice
Faculty of Science
Department of Ecosystem Biology
Laboratory of Genetics in Ecology of Microorganisms (GEM Lab)
Branisovska 1760
37005 Ceske Budejovice
Czech Republic
http://www.jcu.cz/?set_language=en