

SESSION: Ecosystems, Biodiversity and Biodiscovery

MARS Themes:

Understanding natural and anthropogenic drivers of change

Title:

Genomic analysis of Acidobacteria from polar region soils: Delineating the mechanisms leading to diversity and successful adaptation to the polar regions

Author(s)

Phillip Mawire^[1]

Thulani P Makhalanyane^[1,2]

Affiliation:

1. University of Pretoria
2. University of Stellenbosch

Abstract:

Polar regions, are harshest habitats on Earth, with temperature, salinity, elevated UV radiation, low nutrient and water content. These regions, dominate Earth's biosphere, supporting sophisticated microbial communities that can persist at low temperatures and are involved in biogeochemical cycles that contribute significantly to nutrient sequestration, including the global C and N cycles, and are also known to be perfect climate change responders. However, the basic mechanisms underlying bacterial cold-adaptation strategies, as well as their ecological significance in polar environments, are unknown. Ubiquity and abundance of acidobacteria in polar soils, as well as their ability to withstand extreme environments, suggest that they serve important functions in polar environment. However, we know less about their ecological functions in these environments. To bridge this gap and gain a comprehensive understanding of global microbial ecological systems in the polar regions, this research will investigate the ecology of acidobacteria in the polar regions. Here we aim to understand the ecophysiology of soil Acidobacteria in polar regions by investigating whether the Acidobacteria pangenome from geographically separated but physically similar environments will have shared genes that reflect general adaptations to the environment, forming globally dispersed functional guilds. And to determine whether adaptation to local conditions, resources, and pressures will result in endemic sets of gene products for adaptation in the polar regions. We will employ both cultivation and non-cultivation methods to determine the ecophysiology of Acidobacteria in cold environments. Low nutrient media and longer cultivation periods will be used in the cultivation methods. We will conduct genome analysis of acidobacteria from polar regions for non-cultivation methods.

Format:

5-min oral

Keywords:

Polar; Acidobacteria, Cold-adaptation; Pangenome