

Prominence of Candidate Phyla Radiation (CPR) in Alberta Groundwater

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Abstract

Groundwater is an essential part of everyday life, serving as agricultural irrigation, supporting numerous industrial processes, and providing drinking water for many. It is also home to a diverse range of unexplored microbial communities. This is especially true in Alberta, Canada, due to the rich geological history of the region and the close proximity of aquifer locations to areas ranging from oil sand-rich to agricultural to populous cities. Through collaborations with the Environment and Protected Areas division of the Alberta government we have access to more than 250 wells throughout the province, 25 of which were selected for metagenomics analysis. More than 750 metagenome-assembled genomes were recovered and coupled with historic geochemical, isotopic, and dissolved gas data, allowing us to interpret the lifestyles of microbial communities inhabiting Alberta groundwater. Results show a strong presence of organisms involved in C1-cycling, indicative of a productive subsurface environment, as well as members belonging to the Candidate Phyla Radiation (CPR). We explore likely roles of CPR, including their potential for ecological interactions via secondary metabolites. This research shows that Alberta groundwater is home to diverse, productive microbial communities that have the capacity to further our knowledge in microbial ecology.

Keywords

uncultivated, subsurface, metagenomics

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Conflicts of interest

The authors have declared that no competing interests exist.