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Conference Abstract

Preliminary data on the bacterial diversity of Dobšinská and Demänovská ice caves (Slovakia)

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Abstract

Our work brings preliminary data on the diversity of microorganisms in Dobšinská and Demänovská ice caves (Slovakia). The caves are located at about 80 km from each other. Demänovská Ice Cave is part of the Demänovské caves system, located in the Demänovská Valley in the Low Tatras National Park. Dobšinská Ice Cave (969m asl), is part of the Stratená Cave System, located on the south-western edge of the Slovak Paradise National Park in the Spiš-Gemer karst. Both caves have been opened for the public during the last decades of the 19th century and are presently intensively visited by tourists [in 2014 alone, Demänovská ice cave was visited by 70,769 tourists (Nudziková 2018)].

There are few reports on the biocenosis of these two caves, the available data referring mainly to the invertebrate fauna (Papáč et al. 2019). In what concerns the microorganisms, up to our investigation, in focus have been only the fungi. Thus, in Dobšinská Ice Cave was reported the presence of species such as Botrytis cinerea and Aspergillus fumigatus isolated from bat guano (Nováková 2006) and the abundance of fungi outside and inside the cave was compared while from Demänovská Ice Cave, based on ITS sequences, Ogórek et al. (2018) reports on the phenotypic and genotypic diversity of airborne fungal spores.

Our work complements these two studies adding data on the bacterial diversity from different parts of the two caves and depending on the substrate types (ice blocks and/or sediments).

Using Sanger sequencing of the 16S amplicons from DNA isolated from pure bacterial cultures obtained from ice and/or sediments of Demänovská and Dobšinská Ice Caves, we identified 7 and respectively 12 species of bacteria. Surprisingly, only two species where common to both caves. In both Demänovská Ice Cave and Dobšinská Ice Cave the bacterial communities were dominated by Acinetobacter and Bacillus. Beside the identification of the main bacterial groups present in the underground habitats, Illumina sequencing enabled us to build genus heatmaps for the caves, allowing for comparision between various segments of each cave in relation with the specific climate features. When compared, the different types of samples (water, sediment, ice) showed different abundance of bacteria, ice diversity being greater than sediment/water diversity in both Dobšinska and Demänovská ice caves. The chemical composition of the samples (ice and water) is also discussed.

This work is the first to bring insights on the bacterial diversity of Demänovská and Dobšinská Ice Caves and we appreciate what it opens new directions of research not only on the evolution of the microbial communities in relation to the climate changes occurred in past times, but also on how intense visiting affects the structures of the microorganisms communities.

Keywords

Ice caves, subterranean habitats, microbiome, bacteria

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Conflicts of interest

Hereby I declare that there are no conflicts of interests.

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