

The response of aquatic fauna to variable environmental conditions in Ghețarul de la Vârtop cave (Apuseni Natural Park, Romania)

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Abstract

Caves with permanent and temporary ice formations exist at mid-to-high northern latitudes, at elevations between 0 and >3000 meters above sea level. In such caves, rare and endemic species or glacial relicts strictly tied to cold microclimates habitat conditions have evolved and the negative temperatures have contributed significantly in shaping the structural pattern of both terrestrial and aquatic communities. Aquatic dwellers inhabiting ice caves are likely to show resistance and have special physiological adaptation to cope with constantly low air and water temperatures. Ghețarul de la Vârtop cave is a short (340 m) cave located in the Apuseni Natural Park (northwest Romania) that hosts temporary ice formations near its entrance. In 2021, we have initiated a study aiming to understand how low temperatures in the cave are shaping the structure of underground fauna, along a temperature gradient through the cave. The sampling design implies monthly monitoring of air temperature (hourly measurements using data loggers), water physical and chemical characteristics and the structure of aquatic fauna communities. In this paper we present preliminary data on the environmental conditions and aquatic invertebrate communities present in percolation water and associated gours from the cave. Aquatic fauna is represented by nematodes, oligochaetes and several crustacean species the majority stygobites, of which at least three are potentially new to science. The surprising presence of *Acanthocyclops reductus*, considered a Tertiary relict living in warm water raises discussions on its tolerance to highly variable temperatures but also on the colonisation history of the caves on a regional scale. Investigations of cave aquatic fauna in caves with permanent and temporary ice offer hints to understand the ecology of the

fauna, and also to further assess the mechanisms involved in adaptations of species to cope with constantly low-water temperatures.

Keywords

Karst, stygofauna, speleobiology, percolating water, invertebrates, ice caves, aquatic fauna

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