KARST SCIENCE DAYS
SYMPOSIUM PROCEEDINGS
1 (2023), 11–12
https://doi.org/000000000000

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

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Ice caves can be found at mid-to-high northern latitudes, with elevations ranging from 0 to over 3000 meters above sea level (Perşoiu *et al.*, 2021). These caves are home to rare and endemic species, as well as glacial relicts that require cold microclimates to survive (Iepure, 2018). The extremely low temperatures in these caves have played a significant role in shaping the structure of both terrestrial and aquatic communities (Iepure, 2018).

Aquatic organisms that live in ice caves have adapted to cope with the constantly low air and water temperatures. One such cave is Gheţarul de la Vârtop, which is located in the Apuseni Natural Park in Romania. This short cave hosts temporary ice formations near its entrance and was the subject of a study initiated in 2021. The study aims to understand how the environmental parameters in the cave affect the structure of underground fauna by monitoring the air temperature, water characteristics, and aquatic fauna communities on a monthly basis.

The measurements made on site reveal that the temperature remains at an average value of 3.93 °C for the rimstone and 3.92 °C for the percolation sites. The minimum recorded temperature value found was 1.6 °C at a percolation site at the entrance of the cave in spring (April). The highest value recorded was 5.8 °C in both percolation and rimstone sites at the beginning of summer (May for rimstone sites and June for percolation sites).

Our data reveals from the study reveals that the cave's percolation water and associated rimstones contain a variety of aquatic invertebrate communities, including nematodes, oligochaetes, and crustaceans (i.e., harpacticoids, Bathynellacea, cyclopoids, and oligochaets), mostly found from the middle sector of the cave. Most of these species are stygobites and new to science, indicating the importance of the cave and prone to special measures of protection and conservation.

Studying groundwater fauna in caves with permanent and temporary ice formations can help us better understand how these organisms are distributed in certain habitats, and later, what are their adaptions to constantly low-water temperatures. This knowledge can provide insight into the ecology of the fauna and the mechanisms involved in their adaptations.

References

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