

PRESS RELEASE

LISBON, 06/12/2024

Researchers call on the European Commission to protect groundwater and subterranean life from pollution

Plea was published in *Science* two days after the European Parliament approved revisions to water quality assessment standards.



Autora: Ana Sofia Reboleira.

The subterranean world holds a value that is often underestimated. Its significance seems to escape notice, particularly its vital role in storing drinking water — a resource long taken for granted — and its contribution to biodiversity, harbouring unique and rich species. Building on the European Parliament's green light to address legislative gaps, an international team of scientists part of Biodiversa+ project DarCo, led by Dr. Tiziana Di Lorenzo, a researcher at CE3C – Centre for Ecology, Evolution, and Environmental Changes at the Faculty of Sciences, University of Lisbon, and at and the Italian National Research Council, published an appeal in *Science* urging that subterranean ecosystems, their water, and biodiversity not be overlooked once again.

Unlike surface water bodies, which are regularly monitored for their physical, chemical, and biological properties, groundwater suffers from alarming neglect. Limiting its quality assessment to physico-chemical parameters overlooks the valuable insights ecological indicators can provide about the health of this natural resource. According to Di Lorenzo, **“the impact of contaminants [such as pesticides], which seep into the soil and accumulate in aquifers, cannot be fully understood without regular surveys of subterranean fauna. These organisms are uniquely adapted to these ecosystems yet are highly sensitive to the threats they face”**. Analysing and comparing data across surveys can reveal whether a water body and its habitat are on a trajectory of degradation, showing resilience to pressures, or maintaining a good conservation status. This is a clear example of the current legislation’s subjectivity and what could now be improved during Poland's Presidency of the Council of the European Union next year.

Subterranean biodiversity is unique, featuring morphological and physiological adaptations developed over millions of years to survive in the perpetual darkness of these ecosystems. Ana Sofia Reboleira, a CE3C researcher, world-renowned expert in subterranean fauna, and co-author of the article, emphasises Portugal's status as a hotspot of subterranean biodiversity, despite the absence of legal frameworks for monitoring and conserving these ecosystems. **“Groundwater biodiversity, which includes specialised animals, fungi, and microorganisms, plays a crucial role in maintaining water quality. Beneath the surface lies 97% of the total water reserves immediately available for human consumption. This biodiversity recycles nutrients and contaminants, ensuring the sustainability of these strategic reserves, which are vital for humanity’s future. It is imperative to implement specific protective measures”**, stresses the Professor at the Faculty of Sciences, University of Lisbon.

The lessons of the water cycle remind us of its perpetuity: rainwater infiltrates the soil, descends into aquifers, sustains rivers and lakes, and eventually reaches the sea, only to evaporate and fall as rain again. This continuity illustrates what happens when pollution disrupts the cycle: groundwater contaminants travel to surface water bodies and eventually to the sea, compounding impacts at every stage. Addressing the protection of subterranean ecosystems will ensure that surface-level conservation efforts are more effective and efficient, aligning better with the investments they attract.

In the near future, Member States will begin discussing River Basin Management Plans for the 2028–2033 cycle, making it imperative to align all available tools to promote their collective success.

More information:

Ana Sofia Reboleira (asreboleira@ciencias.ulisboa.pt; +351 963 346 301)

Paper - <https://www.science.org/doi/10.1126/science.ads8140>

About DarCo:

DarCo aims to advance knowledge about subterranean biodiversity in Europe and inform its management. The overarching goal is to develop a concrete plan to incorporate subterranean ecosystems in the European Union (EU) Biodiversity Strategy for 2030.

Website: <https://www.biodiversa.eu/2023/04/19/darco/>.

About CE3C:

CE3C - Centre for Ecology, Evolution, and Environmental Changes: An R&D center of excellence based at the Faculty of Sciences of ULisboa, University of the Azores and the National Museum of Natural History and Science. We conduct fundamental and applied research, integrating life and climate sciences, from organisms to ecosystems (natural and anthropogenic), in Portugal, Europe, Portuguese-speaking countries, and beyond.

ce3c.ciencias.ulisboa.pt | Rúben Oliveira (rfoliveira@fc.ul.pt, 935 591 484)