

Groundwater biodiversity and conservation challenges

Groundwater is the most important source of drinking water, but it is also a habitat for numerous specialised animal species. In subterranean environments there is no light, there are few nutrients that come mainly from the surface, and there are no seasonal or daily climatic variations. Many animal species cope well with these conditions and live exclusively underground - some higher taxonomic groups even have no surface representatives. Due to similar ecological pressures, morphological similarities are common, while molecular analyses reveal high molecular diversity and many cryptic species. In groundwater, crustaceans are the predominant taxonomic group. In recent decades, large datasets on the distribution and molecular diversity of groundwater crustaceans have been compiled, allowing analyses of biodiversity patterns at global, European, and regional scales. The areas of greatest diversity are in the mid-latitudes, in areas of long-term high surface productivity and habitat heterogeneity. The patterns of species richness and the key environmental factors that explain them are robust to sampling differences and remain the same even when molecularly defined operational units are used instead of morphologically defined species.

The Dinarides of the western Balkans are a globally exceptional region of subterranean biodiversity. Their groundwaters harbour the only subterranean representatives of some taxa in the world (hydrozoans, tubeworms, cave bivalves) and the largest subterranean amphibian in the world, the olm. New species are still being discovered in the region, and molecular analyses show high molecular diversity within many taxa. Data on subterranean species are collected in a common database, SubBioDB, which allows detailed analyses of across political boundaries. Most records are from karst groundwater, while the fauna of riverine interstitial habitats is much less studied. Groundwater species generally have very small ranges and are often found in only a single location, putting them at high risk of extinction. This is of particular concern in light of current development plans in the Balkans, which include the construction of numerous hydropower plants and the alteration of natural watercourses and their subterranean connections. Their negative impacts on groundwater habitats and fauna are well documented, but unfortunately rarely considered. Further research in less studied regions and groundwater habitats need to be conducted also to facilitate the protection of this globally important natural heritage.