

DNA Barcodes go Underground:

GBOL-project 'Subterranean Fauna'

High degrees of endemism, low levels of gene-flow and limited food resources are not only characteristics of oceanic islands but similarly well describe subterranean environments. Cave endemics are frequently reported even from a morphology-only point of view. Considering the likeliness of cave-dwelling taxa adapting in convergent ways to similar (e.g. aphotic) subterranean environments, a considerably high amount of cryptic biodiversity still remains in complete darkness.

Given the fact that caves are frequently misused as dumping grounds or completely destroyed in the process of building activities, a part of the subterranean biodiversity will become extinct before we have a chance to discover it.

A drastic example is the current situation at the 'Vilina spilja – izvor Omble' cave in Croatia. By its extent it is the second longest cave in Dalmatia (3,036 m long, 192

m deep) and it comprises numerous different habitats, both terrestrial and aquatic. It is home for more than 30 cave dwelling, primarily stenoendemic but so-far undescribed species.

Yet, this cave system will be completely flooded during construction activities for the hydro power plant Ombla. The dam, the power plant and the entire facility are planned to be built directly within the cave. Raising public awareness for the existence of caves and their endemic fauna is the only process potentially preventing sometimes irrational governmental decisions.

Members of the Biodiversity Institute of Ontario, the Bio-speleological Register of the Hesse Federation for Cave and Karst Research, the German Federation for Cave and Karst Research, and the Goethe University, Frankfurt am Main have joined forces to build up a DNA Barcode library for all described species that are known to occur in caves of Germany.



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This project is part of the German Barcode Initiative (GBOL). The study will first utilize material collected over the past years in German caves and eventually include more freshly collected material.

It is the hope of the participating researchers that this project will serve as a model for other countries and regions to survey the biodiversity of their caves.

Documentation of caves and their subterranean fauna is still in its infancy. The largest and deepest cave of Germany – the Riesending with 16.4 km length and 1,059m depth – was discovered only recently in 1995. Even this year, the Hessianhauhöhle in Baden-Württemberg newly entered the list of the longest caves in Germany (with 3,182 m). Currently, 96 cave systems of length more than 1 km are known, with the majority of them situated in Southern Germany, i.e. Bavaria and Baden-Württemberg.

The Bio-speleological Register of the Hesse Federation for Cave and Karst Research lists 2.116 ecologically classified cave-dwelling morphospecies collected in caves, artificial cavities and springs (April 2008). An amount of 11% of the documented fauna is completely (troglobionts) or temporally restricted (troglophiles) to a life under the earth.

In 1982, the year of the foundation of the Bio-speleological Register, 28 caves were reported for the federal state of Hesse. Thanks to voluntary work the Bio-speleological Register today lists 464 caves and some 4,000 further objects.

Since 2009 and with the aim to raise public awareness for the subterranean fauna of Germany, the German Federation for Cave and Karst Research appoints the ‘cave animal of the year’.



This year the large cave spider *Meta menardi* (Latreille, 1804) was chosen and in conjunction with the Arachnological Society (AraGes) also elected as the ‘European spider of the year 2012’.

The aim of the GBOL- project ‘Subterranean Fauna’ is to provide a first snapshot of the genetic diversity present in German cave-dwelling animals and in this course to raise public awareness for the protection and conservation of underground habitats and their enigmatic fauna.

For questions or in case you like to provide material of German cave-dwelling animals please [contact the author](#).



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