

# IUCN red-listing of subterranean invertebrates: problems, gaps and the future

Louis Deharveng<sup>‡,§</sup>, Ana Komericki<sup>§</sup>, Sonia Khela<sup>§</sup>

<sup>‡</sup> Muséum National d'Histoire Naturelle, Paris, France

<sup>§</sup> IUCN SSC Cave Invertebrate Specialist Group, Cambridge, United Kingdom

| Croatian Biospeleological Society, Zagreb, Croatia

Corresponding author: Louis Deharveng ([dehar.louis@wanadoo.fr](mailto:dehar.louis@wanadoo.fr))

## Abstract

Red-listing is a widely used approach to globally evaluate the threats that affect a species, according to a set of standardized criteria. The IUCN Red List of Threatened Species is the world's most comprehensive inventory of the global conservation status of species. It is an international reference in this field, and a powerful tool for conservation of endangered species, sites and habitats.

A number of subterranean organisms of various taxonomical groups have been assessed from a few decades, and are currently being assessed, revealing serious difficulties and uncertainties linked to the special characteristics of subterranean ecosystems and species. The most critical problems, that are linked to distribution, dispersion, life cycle and sensitivity to disturbance, and some ways to overcome them, are discussed in this paper.

Partly linked to this, redlisting of subterranean species has so far achieved moderate results with regard to the diversity and vulnerability of subterranean species - with the well-known exception of bats. Data drawn from IUCN online database of redlisted species reveals that subterranean invertebrates are hugely under-covered at geographical and taxonomic levels. Moreover, among red-listed species that are connected to subterranean habitats, most are stygophiles and troglaphiles, i.e. not obligate cave dwellers. In contrast, very few of the species strictly linked to subterranean life (stygobionts and troglobionts) have been red-listed so far, in spite of the exceptional proneness to endemism of subterranean invertebrate groups.

On the other hand, assessments are extremely uneven across countries and across taxa. Many regions with significant cave fauna do not have any assessed subterranean species. The richest countries in subterranean diversity are not those which have the highest number of assessed species. The zoological invertebrate groups that dominate cave fauna in diversity (beetles, springtails, microcrustacea...) have contrasted proportion of redlisted species: higher for snails, very low for microcrustaceans, beetles and springtails, with rare local exceptions.

Assessment difficulties underlined above, low coverage of cave fauna in available assessments, limited progress in number of red-listed species in the face of the high number of concerned species, and the limited human resources to do the job led us to favour a more pragmatic approach to subterranean invertebrates red-listing for the coming years. Really threatened subterranean species are actually not numerous, because subterranean habitats are protected from most critical disturbance that devastate so many surface habitats. The aim will be therefore to focus on the most threatened species and sites in the world, with a particular attention on mining, water pollution and large scale surface habitats destruction.

## **Keywords**

subterranean habitats, caves, invertebrates, red-list, threats, assessments

## **Presenting author**

Louis Deharveng

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No conflict of interest.