Subterranean Biology 22: 59–65 (2017)
doi: 10.3897/subtbiol.22.13297
http://subtbiol.pensoft.net

FORUM PAPER

A peer-reviewed open-access journal
Subterranean Biology
Published by The International Society for Subterranean Biology

Biospeleological activities in Central Europe – a status report

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Academic editor: *O. Moldovan* | Received 19 April 2016 | Accepted 6 June 2017 | Published 18 July 2017

http://zoobank.org/6DBDBC9D-8BC0-443E-A4BD-11BBB852E3E9

Citation: Weber D (2017) Biospeleological activities in Central Europe – a status report. Subterranean Biology 22: 59–65. https://doi.org/10.3897/subtbiol.22.13297

Abstract

Catalogues of cave fauna from Belgium, Switzerland, Austria, Germany (Swabian Alb, Franconian Alb, Westfalia, Hesse, Harz, Rhenish Palatinate and Saarland), and Luxembourg are available. Several activities deal with public relations, education, and training: the cave animal of the year, a camp for young cavers, the day nature, and the biospeleological workgroup. The German Barcoding of Life is a project which aims to obtain CO1 barcodes from every species in Germany with a sub-project on cave fauna. Special projects deal with *Bythiospeum*, niphargids, diplurans, sphaerocerids, and the biodiversity and ecology of cave invertebrates in the Central European Uplands.

Zusammenfassung

Es gibt Höhlenfaunenkataloge von Belgien, der Schweiz, Österreich, Deutschland (Schwäbische Alb, Fränkische Alb, Westfalen, Hessen, Harz und Rheinland-Pfalz/Saarland) und Luxemburg. Verschiedene Aktivitäten befassen sich mit Öffentlichkeitsarbeit und Schulungen; Das Höhlentier des Jahres, ein Trainingslager für junge Höhlenforscher, der Tag der Natur und eine biospeläologische Arbeitsgruppe. Das Projekt „German Barcoding of Life“ versucht CO1-Barcodes aller deutschen Arten zu erstellen. Es hat ein Unterprojekt zur Höhlenfauna. Tiergruppenspezifische Projekte behandeln *Bythiospeum*, Niphargen, Dipluren, Sphaeroceriden und Biodiversität und Ökologie von Höhlenevertebraten der zentraleuropäischen Mittelgebirge.

Keywords

Biodiversity assessment reports, public relations, education, *Bythiospeum*, Niphargidae, Diplura, Sphaeroceridae

Introduction

This text gives an overview of important past and recent biospeleological activities in "Central Europe". The Netherlands, Belgium, Luxembourg, Germany, Switzerland and Austria belong to "Central Europe" in this context. The area is therefore not identical to the geographic definition of Central Europe. Activities on bats are not included in this paper.

Biodiversity assessment of cave fauna

In many karstic and non karstic areas in Central Europe summarizing biodiversity assessment reports have been published: Belgium (Leruth 1939 with 600 species), Switzerland (Strinati 1965 with 513 species), Austria (Strouhal and Vornatscher 1975), Swabian Alb (Dobat 1975 with 289 species), Franconian Alb (Dobat 1978 with 491 species), Westfalia (Weber 1991 with 1084 species), Hesse (Zaenker 2001 with 3259 species, ongoing), Harz (Hartmann 2004 with 224 species), Luxembourg (Weber 2013 with 390 species online available [https://www.mnhn.lu/science/2013/03/15/ferrantia-69/], ongoing), Rhenish Palatinate and Saarland (Weber 1988, 1989, 1995, 2001, 2012 with 2600 species, ongoing).

In addition, many smaller publications on the cave fauna of other areas, dealing mostly with one specific animal group, are available and contain additional information.

The assessment of the cave fauna and its documentation in Central Europe is therefore comprehensive, although in some areas it is unfortunately not up to date.

Public relations, education, and trainings

Cave animal of the year

The idea of a cave animal of the year arose during the yearly conference of the Society of German Cave and Karst explorers in 2008. It has the following aims: inform the public that caves are sensitive and fragile biotopes, raise the importance of caves to authorities and NGOs, cave fauna and their protection, motivate cavers working on biospeleology, and protection of subterranean ecosystems.

Sinces then, one species has been selected every year as "Cave Animal of the Year," to indicate the importance of caves not only to their permanent inhabitants but also to hibernating species. Eutroglobiontic, eutroglophilie and subtroglophile species have alternated.

Every year, posters and flyers are printed. A presentation on the cave animal of the year and an internet homepage (http://www.hoehlentier.de/) are available. The homepage contains information on the species, photos and a press release.

Figure 1. Homepage of the cave animal of the year.

Table 1. Cave animals of the year from 2009 until 2017.

2009	*Niphargus* sp.
2010	*Scoliopteryx libatrix*
2011	*Myotis myotis*
2012	*Meta menardi*
2013	*Speolepta leptogaster*
2014	*Proasellus cavaticus*
2015	*Oxychilus cellarius*
2016	*Amilenus aurantiacus*
2017	*Diphyus quadripunctorius*

JuHöFoLa – Camp for young cavers

The "JuHöFoLa" (http://www.juhoefola.de/) is a training camp for young cavers with participants from all over Europe. It is held in Germany and is conducted in English. It consists of two weeks training with three days on biospeleology. The biospeleological part consists of short collecting trips to caves and springs in the morning, sorting/determination of the collected specimes and a theoretical session in the afternoon.

The next JuHöFoLa is planned for summer 2018.

Figure 2. Determination of cave animals in the "lab" during the JuHöFoLa (Photo: Otto Schwabe).

Day of nature

The day of nature (previously: day of biodiversity; http://www.geo.de/natur/tag-der-artenvielfalt/9274-rtkl-das-projekt-geo-tag-der-artenvielfalt-2016) is sponsored by the journal GEO and the KfW foundation. It aims to identify as many species as possible in one day and is held once a year in alternating regions.

For the last 5 years, biospeleologists have been offering collecting trips to caves, mines or springs and have published the results (Blick et al. 2014; Fritze et al. 2014).

Biospeleological workgroup

The biospeleological workgroup, created in 2016 at Eurospeleo in the Yorkshire Dales, is an e-mail information exchange system for all biospeleologists. As of the end of 2016, it had 36 participants. E-mails can be sent by every participant on all biospeleological topics anytime.

All biospeleologists are invited to join (hannes@bigwalls.de)!

DNA barcoding

"The GBOL = German Barcoding of Life" (https://www.bolgermany.de/) is a project in cooperation with several German museums and institutes, with the target to obtain

CO1 barcodes from 10 specimens of every species that has been found in Germany (the barcodes need not be from specimens collected in Germany).

A special sub-project under the head of Alexander Weigand, University of Duisburg-Essen (WeigandA@gmx.net) deals with cave fauna. As of December 2016, 381 cavernicolous species and several thousand specimens have been barcoded.

Topics on special animal groups

Bythiospeum

A project at the Staatliches Museum für Naturkunde Stuttgart deals with the cavernicolous snail genus *Bythiospeum*, with the aim to learn about the phylogentics, biogeography and diversity of this genus in Europe. First results have been published (Richling et al. 2016). Ira Richling is in charge (ira.richling@smns-bw.de).

Niphargids

A project at the Université libre de Bruxelles, under the head of Jean-François Flot, to resolve various questions on the cavernicolous shrimp family Niphargidae started in 2016. It aims to compare the phylogeny and taxonomy of the niphargids, estimate species richness, find cryptic species, identify distributional patterns delineation and to analyze the effects of the last Quaternary glaciation on both species richness and distribution. Central Europe, where specimens are still needed from the constituent countries is managed by Dieter Weber (dieter.weber124@gmx.de).

Diplura

The target of the Diplura project, a cooperation of several universities and museums, is to compile a catalogue of all cave diplurans in Central Europe, including their phylogenetic description. Alberto Sendra (Alberto.Sendra@uv.es) is in charge.

Sphaeroceridae

After knowledge was gained of the cave dwelling fly family Sphaeroceridae in certain regions (Rhenish Palatinate and Saarland, Bährmann and Weber, 2008; Luxembourg, Bährmann and Weber 2013), the intention of this project is to improve the knowledge of sphaerocerids in caves within the missing regions. Point of contact is Dieter Weber (dieter.weber124@gmx.de).

Biodiversity and ecology of cave invertebrates in the Central European Uplands

A comprehensive project in cooperation with the University of Duisburg-Essen and the National Museum of Natural History Luxembourg deals with the biodiversity and ecology of selected species of cave invertebrates in the Central European Uplands. One target is to compare subtroglophile species (*Limonia nubeculosa, Scoliopteryx libatrix, Triphosa dubitata*) with eutroglophile species (*Meta menardi, Metellina merianae, Gammarus pulex, Discus rotundatus, Oxychilus draparnaudi, Speolepta leptogaster*), and eutroglobiontic species (*Niphargus schellenbergi, Porrhomma convexum, Trichoniscoides helveticus*). Alexander Weigand (WeigandA@gmx.net) is in charge of this project.

Acknowledgements

I thank Jean-François Flot and Lee Knight for the revision of the English.

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