German Barcode of Life Phase II

Matthias F. Geiger, Björn Rulik, J. Wolfgang Wägele – on behalf of the whole GBOL consortium

Background

Since November 2011 the German Ministry of Education and Science (BMBF) is funding a consortium of natural history museums and research institutions to set up the 8 Barcode of 0 initiative (GBOL). The main aim was to establish a network of professionals and non-professionals to start with the construction of a DNA barcode reference library for the fauna, flora and fungi of Germany. After the first phase (2011-2015), most project goals have been achieved: a national web portal for DNA barcodes and specimen data was developed and is continuously improved (www.bolgermany.de), over 250 free specialists provide their taxonomic expertise and over 50 institution-based taxonomists contribute to GBOL. Especially the engagement of external experts contributed significantly to the success of the 48.000 animal and 10.000 plants species (excluding algae and fungi) present in Germany over 23.000 different species plus a few selected dust fungi have been processed and DNA barcodes for them generated.

In total, 295.000 specimens were submitted to GBOL institutes and after choosing (usually) up to 10 individuals per species from throughout their distribution range in Germany, over 145.000 of them delivered a DNA barcode so far.

GBOL Phase II

The second phase of the initiative (2016-2018) is focusing stronger on applications of DNA barcoding, with seven dedicated PhD students working on specific aspects, from metabarcoding for water quality assessments to developing a diagnostic microarray chip for the detection of phytopathogen fungi.
As a prerequisite for the successful implementation of the new techniques, a core team and network of taxonomists is further expanding the reference library with DNA barcodes for another 13,800 species. With this target, the database will be filled with about half of the known metazoan species of German animals and plants and be operable to identify the vast majority in terrestrial and aquatic environmental samples.

List of the GBOL PhD & applied projects and contact details

Status of the barcode library for some groups (total numbers for Germany)

Topic	Name	Contact
Fungal pathogens & necrotic fungi in orchards (DNA chip development)	JANNO HARJES	Janno.Harjes@uni-bayreuth.de
DNA barcoding pollination in agriculture	ISABEL KILIAN	i.kilian@gmx.de
DNA-based pollen identification	STEPHANIE SWENSON-FRIEDRICH	Stephanie.Swenson-friedrich@bot1.bio.uni-giessen.de
Metabarcoding EU Water Framework Directive (diatoms)	JONAS ZIMMERMANN	j.zimmermann@bgbm.org
Metabarcoding EU Water Framework Directive (benthos)	VERA ZIZKA (iBOL7 presentation)	vera.zizka@uni-due.de
eDNA from soil and mass samples for monitoring of biodiversity	AMELI KIRSE (iBOL7 presentation)	kritzel@ameli-kirse.de
eDNA from terrestrial mass samples for monitoring of invasives	JÉRÔME MORINIÈRE	moriniere@zsm.mwn.de
Verification of seed and nursery products	THOMAS BORSCH	direktor@bgbm.org
Egg parasitoids Trichogramma for biological pest control	CARLOS MONJE	carlos.monje@smns-bw.de

Outlook & Invitation

GBOL is currently funded until end of 2018 and chances for a 3rd funding period are small.

While the reference library of the common and frequently encountered faunal and floral biodiversity elements of Germany will be complete enough to enable most applications, much higher efforts are needed to find the remaining missing species.

In addition, evaluating the several hundred cases of potential candidate species, cryptic diversity and species complexes will take time and require additional manpower.

We are therefore looking for motivated researchers, groups, or institutes that want to team up with us in order to seek funding for joint synergistic projects.
In case you are interested, please get in touch with Matthias Geiger @ m.geiger@leibniz-zfmk.de.

Participating GBOL institutes

Selected highlights

Two large data releases on beetles (4.000 species):
HENDRICH et al. (2015) Mol Ecol Resour 15: 795-818
RULIK et al (2017) Methods Ecol Evol 00:1-10

TaxCI New R-tool for data pre-processing before upload:
RULIK et al. (2017) Methods Ecol Evol 00:1-10

Over 50 publications including numerous data releases for specific taxa resulting from GBOL so far.