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Museum of Nature Hamburg

## **Biodiversity Genomics Europe: Europe's drive to reverse biodiversity loss through genomics research**

European experts gather to launch an unprecedented project that will tackle the biodiversity crisis using DNA data. The comprehensive application of genomic science to biodiversity research will fundamentally change conservation science and policy - with impacts predicted to be on a scale similar to those of the Human Genome Project in medicine. The new pan-European Biodiversity Genomics Europe (BGE) consortium, launched today, is leading the way. The LIB supports the BGE project in the area of sample and data flow, from sampling to metadata collection to ultra-cold sample storage in the biobank.

Time is running out. An appalling one in four species on the planet are currently threatened with extinction, putting livelihoods, food supplies, and essential water and nutrient cycles at risk. Knowledge is of the essence in the fight to reverse this unprecedented loss of species and degradation of ecosystems - yet currently our understanding of how life on Earth functions and responds to environmental pressures is far from complete. Genomics provides crucial new tools to answer these questions, and the BGE consortium will cause a quantum leap in the use of genomics across the continent.

Despite centuries of scientific research, an estimated 80% of the world's species still await scientific discovery and description. Even for described species, telling them apart is often difficult. Moreover, interactions within and among species, and between species and their environment, create a hugely complex picture from individual to planetary levels. Genomic science is our best hope for success in mapping these interdependencies and predicting how individuals and groups may respond to environmental change.

By bringing together Europe's key practitioners in two fundamental DNA-based technologies - DNA barcoding and genome sequencing - BGE will streamline the rollout of these methods across Europe. The €21 million Biodiversity Genomics Europe (BGE) Project is co-funded by the European Commission, as well as the UK and Swiss governments. This first large European project will run until 2026. It brings together organisations from the BIOSCAN Europe DNA-barcoding consortium (104 partner institutions across 29 countries) and the ERGA genome-sequencing consortium (709 members across 37 countries), as parts of the International Barcode of Life and the Earth BioGenome Project, respectively.

"We are very pleased to be able to support the pioneering BGE project with our know-how at the LIB and our infrastructure," emphasizes Dr. Astrid Böhne, Section Head Comparative Genomics (Vertebrates) and project leader of the ERGA initiative at the Museum Koenig Bonn of the Leibniz Institute for the Analysis of Biodiversity Change (LIB). "One of our central mandates at LIB is to contribute with our research to the understanding of biological systems and the interaction between species and environmental change."

In the BGE project, the LIB coordinates the entire sample data flow for the ERGA initiative. The specialists of the LIB Biobank are responsible for archiving molecular samples throughout the BGE project. Under the coordination of Dr. Jonas Astrin, they are collaborating on the development of cell cultures that serve as a resource for genome sequencing, among other things. The coordination of Citizen Science in the barcoding part of the project is done by Dr. Sarah Bourlat.

## **DNA-based biodiversity research: Europe turns on the turbo**

The EU's Biodiversity Strategy for 2030 and the European Green Deal make clear commitments to address challenges such as pollinator decline, the deterioration of key terrestrial, freshwater and marine habitats, and the impact of invasive non-native species on biodiversity. The Horizon Europe-funded BGE Consortium - a major investment in European genomic science - provides the means to achieve these aims.

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### **Editor`s note:**

**DNA barcoding** uses short sequences of DNA to discriminate between species - analogous to the way conventional barcodes distinguish products in a supermarket. With modern genetic sequencing techniques, DNA barcoding has the potential to dramatically accelerate the inventory of life on Earth, providing a basis for global conservation monitoring.

At the opposite end of the scale, **genome sequencing** determines the order of DNA nucleotides – the building blocks of the genetic code – throughout the entire genome of any given species. This enables scientists to identify and locate genes and other features of the genome, creating a comparative 'map' of the code that creates each organism. This provides a full picture of how biological systems function and, crucially, how species respond and adapt to environmental change.

**BIOSCAN Europe** brings together existing European national networks, scientists and projects that work on the monitoring of biodiversity using DNA to build an efficient European system of interconnected facilities for rapid identification and monitoring of species. The initiative is part of the International Barcode of Life Consortium (iBOL) and its global BIOSCAN initiative, which aims to transform understanding of species diversity, their interactions, and dynamics. BIOSCAN Europe's aim is to establish a European hub for the International Barcode of Life consortium.

The **European Reference Genome Atlas (ERGA)** initiative is a pan-European scientific community of experts in genome sequencing that aims to coordinate the generation of reference-quality genomes for all eukaryotic European species. ERGA follows a distributed model to create and consolidate a collaborative and interdisciplinary network of scientists across Europe and associated countries. ERGA works to develop and propagate guidelines for scaling up all the steps required for state-of-the-art reference genome generation through training and knowledge transfer.

Visit [www.bioscaneurope.org](http://www.bioscaneurope.org) and [www.erga-biodiversity.eu](http://www.erga-biodiversity.eu) for more details on the individual members of both networks.

#### **About the LIB**

The LIB is dedicated to researching biodiversity and its changes, the results of which are disseminated to the wider society in an educational manner. In order to better understand the current mass extinction of flora and fauna, researchers are looking for connections and causes of – often – man-made changes. The goal is to develop solutions for the preservation of ecosystems and species in order to maintain the basis of current life.

#### **About the Leibniz-Association**

The Leibniz Association combines 97 independent research institutes. Their focus ranges from the natural, engineering, and environmental sciences to the humanities and the business, space, and social sciences. The Leibniz institutes focus on relevant social, economic, and ecological issues. They perform knowledge-oriented and applied research (also among the cross-disciplinary Leibniz research alliances), are or support scientific infrastructures, and offer research-based services.



Caption: The team responsible for the pan-European BGE project at LIB: Dr Jonas Astrin, Section Head, Biobank Curator, Dr Astrid Böhne, Section Head Comparative Genomics (Vertebrates), Dr Sarah Bourlat, Section Head Metabarcoding.

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