



# CoCiBio

Programa de cooperación para la investigación orientada a la aplicación sobre la biodiversidad y cambio climático

## BIO-GEEC: GERMAN-ECUADORIAN BIODIVERSITY CONSORTIUM (STAGE 1)

### The challenge

Worldwide there is an ever increasing public and research demand for molecular species identification. Any kind of plant, fungal or animal tissue as well as microbes are being analysed to assess biodiversity changes due to climate change, pollution, invasion, land use and bio-monitoring. Commercial products based on organic tissues or microbes also require identification for consumer protection, sustainable agriculture and farming, and the illegal trade of plants and animals. Ecuador is a megadiverse country with astonishing levels of biodiversity but, sadly, biological resources are being depleted by ongoing habitat destruction. Rapid loss of biodiversity necessitates fast and effective pipelines of species identification for bio-monitoring, rehabilitation science or comprehensive biodiversity inventories in threatened habitats such as the cloud forests or páramos. Similarly, such pipelines can also benefit commercial enterprises, such as plant nurseries, biomedical research or agriculture. In the last decade, several German institutions have developed sophisticated pipelines for DNA barcoding and established international expertise in this field. Such resources are not yet available in Ecuador but would improve biodiversity research and practical applications involving biological materials. To address this gap, we founded BIO-GEEC as a binational network between German and Ecuadorian research institutions. This consortium will establish the physical infrastructure, workflows, databases, web apps and training schemes for rapid barcoding pipelines and bring together the expertise of its partnering institutions in a concerted effort to

barcode several organismic groups of applied and/or commercial value.

### Our approach

BIO-GEEC is a binational consortium between four German research institutes and four universities in Ecuador. Our consortium has three major objectives: I) We are developing a rapid pipeline for the genetic identification of organismic groups of public and/or economic importance. We establish the physical infrastructure, databases, IT protocols and a Web App for a comprehensive barcoding workflow, and transfer the skills and tools between the partnering institutions. II) We are testing this infrastructure in four sub-projects that address patterns of biodiversity in taxa of high economic or practical relevance: plants (tissue, seeds & pollen), pollinators (in particular insects), venomous arachnids, and soil microorganisms. III) We facilitate reciprocal training and ongoing collaborations between our institutions through summer schools, international workshops, joint field work and training of early career researchers.

### Intended Impact

The first stage of BIO-GEEC is implementing standardised DNA barcoding pipelines for species-level identification of various Ecuadorian organisms (plants, insects, and arachnids) as well as microbial soil communities. This will lead to an easier and more accurate characterisation of species groups as well as ecological interactions that are of public or commercial interest. The pipelines will also facilitate the sequence data analyses for research, governmental agencies, NGOs, the public sector, and industry; creating a nexus between institutions and accessibility of genetic data. Standardised workflows are being implemented and tested for the abovementioned groups. A database and Web App are being developed to host the sequences and share them for national biodiversity strategies, biomonitoring, forensics and consumer protection. Physical infrastructure such as a



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Information	
Name of the project	BIO-GEEC: German-Ecuadorian Biodiversity Consortium (Stage 1)
Part of	German-Ecuadorian Research Cooperation on Biodiversity and Climate Change – CoCiBio
Project financed by	Federal Ministry of Economic Cooperation and Development (BMZ)
Project Partners	Eight project partners.  Germany: Nees Institute for Biodiversity of Plants, Universität Bonn; Center of Natural History, Universität Hamburg; Institute for Evolution and Biodiversity, Universität Münster; Zoological Research Museum Alexander König.  Ecuador: Pontificia Universidad Católica del Ecuador (PUCE); Universidad de las Fuerzas Armadas (ESPE); Universidad Regional Amazónica (Ikiam) & Universidad Técnica del Norte (UTN).
Duration	1 <sup>st</sup> October 2019 to 31 <sup>st</sup> March 2021

seed bank for plants and a venom bank for animals provides the foundation for future research. Knowledge is being transferred between the eight partnering institutions through training programmes, international visits of students and senior scientists.

## German-Ecuadorian Cooperation

On behalf of the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), the German Academic Exchange Service (DAAD) is supporting the "**German-Ecuadorian Research Co-operation Programme on Biodiversity and Climate Change**". Over a term of 18 months, the German-Ecuadorian research co-operation in the fields of biodiversity and climate change will be intensified as part of the DAAD-GIZ co-operation and the conditions for the application of the results of bilateral research projects will be improved. The central implementing partner in Ecuador is the Ecuadorian Ministry of the Environment MAE with its *National Institute of Biodiversity* (INABIO).

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