



Biodiversity, Climate and Scientific Cooperation in Yangambi and beyond

EXCHANGES on research initiatives in the
Democratic Republic of the Congo

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Abstracts

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CEBioS' interventions in the DR Congo

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Abstract

The DR Congo is a priority country for the capacity development program CEBioS. CEBioS is part of the Institute of Natural Sciences (BELSPO) and is funded by the Belgian International Cooperation (DGD). For more than 10 years, CEBioS has supported the Centre de Surveillance de la Biodiversité (CSB) in Kisangani and contributes in dynamising its network of provincial antennae for a better centralization and reporting of biodiversity data. CEBioS also advises the Institut Congolais pour la Conservation de la Nature (ICCN) and its Protected Areas through scientific coaching and funding for field monitoring studies, such as e.g., Kahuzi-Biega National Park, Bombo-Lumene and Itombwe Reserves. Projects on Indicators for Policy on invasive alien species and bushmeat, as well as support to the national Clearing House Mechanism of the Rio Convention on Biological Diversity, in cooperation with GIZ, further contribute to strengthening the science-policy interface in the country. CEBioS also regularly supports scientists through its Global Taxonomy Initiative. Trainings are provided by Belgian taxonomists in Belgium or in the DRC, for instance on macrofungi in Mikembo, with the University of Lubumbashi. Moreover, many *Abc Taxa* volumes on taxonomic studies in the DRC have been published, including taxa that play economic roles in value chains. Within our MEP sub-program (Monitoring of Ecosystems and their services in protected areas), CEBioS supports projects on elephants in Kahuzi Biega and, in cooperation with ULB Coopération, management of the Parc Marin des Mangroves, being involved in its scientific committee. Our CEPA sub-program (education and awareness) supports public awareness initiatives, bringing together communities, scientists and decision-makers to protect the environment. CEBioS also is instrumental in facilitating the UNESCO project in the Yangambi Biosphere reserve. Finally, we have contributed to the next program of the DRC Joint Strategic Framework and we continue our active role in the SECORES network on socio-ecological resilience with partner NGOs, such as WWF and Join4Water.

Keywords: CEBioS, RD Congo, science-policy, protected areas, capacity building

UGent Congo Basin Centre of Expertise: overview of research infrastructure, staff and activities in Yangambi and beyond

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Abstract

The Congo Basin Center of Expertise (CBCE) is a collaborative research hub at Ghent University, dedicated to understanding the ecological, biogeochemical, and atmospheric processes that shape Central Africa's ecosystems. Our work spans rainforests, savannas, wetlands, agroforestry and agricultural landscapes, grounded in long-term field research and unique datasets, including the first flux tower in the Congo Basin, now a regional benchmark.

Through close collaboration with local partners and research institutions, we invest in meaningful capacity building and "real world" research. This goes from jointly supervised research projects to sustained support and training for local students and PhD candidates across Central Africa. Our goal is to generate critical knowledge on global change and sustainability and strengthen scientific networks where they matter most.

Keywords: CBCE, UGhent, capacity building, DRC

Wood biology infrastructure, capacity building and multidisciplinary research in Yangambi and beyond by the Africamuseum and partners

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Abstract

The Royal Museum for Central Africa (Africamuseum) coordinated research and capacity building in the Yangambi landscape and beyond for more than two decades. Past and ongoing projects were funded by DGD, BELSPO, FWO, EU and other international funders. The overarching ambition of the combined projects is to achieve scientific excellence through collaboration, co-creation and capacity building. Partnerships with Belgian (e.g. UGent), Congolese (e.g. INERA, UNIKIS, CSB) and international institutes are key to success. The projects focus on three pillars: infrastructure, staff (capacity building) and multidisciplinary research.

The Yangambi Wood Biology laboratory is at the core of the infrastructure coordinated by the Africamuseum. It is the first of its kind in the Congo basin and operates closely with the UGent-led CongoFlux tower to better understand the role of several components of the forest in ecosystem carbon uptake. The Africamuseum invests strongly in capacity building at the different levels of scientific staff. We support professors and postdocs to write own research grants and get involved in international initiatives and networks such as the Central African Forest Initiative (CAFI), the Congo Basin science Initiative (CBSI), the GEO-TREES network, and the One-Forest Vision Initiative (OFVI). We support PhD students to collect data and publish in internationally renown peer-review journals. We also support a very large basis of field and lab technicians, who continuously receive training (e.g. botany and wood anatomy) and who are indispensable to collect the huge amounts of data necessary to better understand Congo basin forest ecosystem services. The Africamuseum invests in multidisciplinary science by supporting botanists, wood anatomists and zoologists to work together on the 80 km mega-transect, which is an open-air laboratory allowing to capture the geographic and temporal variability of biological diversity in Yangambi.

The Africamuseum leverages the capacity built up in Yangambi to go beyond. We are deploying well-trained teams consisting of professors, postdocs, PhD students and technicians, to remote National Parks such as Salonga and Lomami.

Keywords: Tropical forest ecology, wood biology, co-creation, capacity building

Restoring nature's health: Investigating the effects of ecosystem degradation and restoration on zoonotic disease risk in the Congo Basin

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Abstract

Emerging infectious diseases pose a significant threat to global public health. Among the factors contributing to the increase of emerging infectious diseases today, ecosystem degradation stands out as a prominent driver, exerting both direct and indirect influences on disease dynamics. While it is commonly assumed that simply reversing ecosystem degradation will restore disease regulation mechanisms, such a presumption may oversimplify the complex responses that are involved. Within the RESTOREID and PILOTMAB project, we aim to investigate how ecosystem degradation and restoration influences zoonotic disease risk, focusing on small mammal host and microparasite diversity. Here, we report on a case study with samples collected across a gradient of restored sites in the Congo Basin, more specifically in the Yangambi Biosphere Reserve. Using integrated field approaches—including small mammal trapping, invertebrate-derived DNA (iDNA), environmental-derived DNA (eDNA), and passive acoustic monitoring—we assess how host diversity changes over time since restoration and habitat degradation. In parallel, PCR-based screening target RNA viruses commonly associated with African small mammals (*Flaviviridae*, *Paramyxoviridae*, *Filoviridae*, *Arenaviridae*) to examine links between host diversity and viral dynamics. Early analyses show that iDNA enables the detection of small mammal DNA across the restoration gradient, revealing differences in small mammal diversity among sites, with older secondary forests appearing to harbour higher diversity than other sampled locations. Additionally, viral screening indicates circulation of RNA viruses within small mammal communities, with variation among host taxa. Ongoing work will further investigate how patterns of viral diversity and prevalence relate to host biodiversity and time since ecosystem restoration. By linking changes in wildlife communities with pathogen dynamics, this research provides initial insights into how ecosystem recovery may reshape zoonotic disease risk, highlighting the importance of a One Health approach to landscape restoration.

Keywords: Ecosystem restoration, biodiversity, RNA viruses

Yangambi, DR Congo: a unique place for monitoring, conserving and valorizing biodiversity in the context of global change

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Abstract

The botanical relationship between Meise Botanic Garden and the Democratic Republic of the Congo (DRC) is rooted in historical collections dating back to the late nineteenth century. Today, this shared botanical heritage—including the extensive reference collections held at Meise and key publications like the *Flore d’Afrique centrale*—forms the foundation of a modern, equitable scientific partnership. Within the DRC, a robust network of local collections and research institutes drives this work forward, with Yangambi serving as a principal research center and collection hub. Today, the Yangambi herbarium houses approximately 147,000 specimens. This collection is an irreplaceable resource for plant identification—an essential step in biodiversity and environmental studies—and provides critical data for research in ecology, climate science, and sustainable agriculture. Thanks to its biosphere reserve, historical data, and dedicated local infrastructure, Yangambi is a unique and internationally significant site for biodiversity monitoring and conservation.

In this presentation, we provide a brief overview of the collaborative activities carried out by Meise Botanic Garden in Yangambi over the past 20 years, working in close and equal partnership with INERA, UNIKIS, CSB and international partners. We also discuss the ongoing opportunities and challenges. Our joint activities cover the following themes:

- Rehabilitation of vital infrastructure for collections and research, such as the Yangambi herbarium and the ex-situ coffee collection.
- Mutual capacity building through formal and informal training, including the co-promotion of local PhD projects.
- Scientific curation and digitization to enhance global access and usability of both the herbarium and living collections.
- Biodiversity monitoring through joint inventories of various taxonomic groups (Diatoms, Myxomycetes, Fungi, Lichens, Vascular Plants).
- Collaborative research on biodiversity, climate change, and conservation biology.
- Genetic, agronomic, and quality screening of crop wild relatives (CWR), primarily coffee, along with beans and edible fungi, to support their local valorization.

Together, these collaborative efforts demonstrate how international scientific partnerships can tackle global challenges sustainably, supporting local livelihoods while preserving and documenting vital biodiversity.

Keywords: Biodiversity, conservation, genetic resources, herbarium, sustainable development

The CSB in Yangambi: advancing biodiversity research, monitoring and partnerships

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Abstract

Yangambi is a major landscape for biodiversity research in the Congo Basin, where ecological complexity, conservation needs, and institutional collaboration intersect. This presentation examines the role of the Centre de Surveillance de la Biodiversité (CSB) as a platform for advancing biodiversity research, long-term monitoring, and strategic partnerships in Yangambi. It shows how the CSB contributes to baseline data generation, methodological standardization, capacity building, and the production of decision-relevant knowledge. The presentation argues that strengthening continuity, interoperability, and local leadership is essential for transforming biodiversity research from isolated projects into a durable institutional process that supports both science and conservation.

Keywords: Biodiversity, CSB, capacity building, biodiversity research

Current state of forest research in the DRC at Gembloux Agro-Bio Tech, University of Liège

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The Gembloux Agro-BioTech Faculty (Uliège) and the non-profit organisation Natureplus are developing a number of projects relating to tree species, timber and community forestry. The faculty is also involved in training postgraduate students at ERAIFT (Regional School of Integrated Forest Management).

Gembloux Agro Bio-Tech is also a founding partner of the CANOBS network (canoobs.net), that is dedicated to develop a network of supersites for the monitoring of forest health through regular optical and lidar drone acquisitions.

These observatories, developed in collaboration with national partners (INERA, CREF) and supported by several international and national projects (CoForFunc, AFROCARDS, CANOPi), can serve as a catalyst for ongoing and future research in the Congo Basin.

Keywords: Forest monitoring, Congo Basin, LiDAR, remote sensing, community forestry

Parasitology in the DRC: Parasite diversity and disease ecology

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Abstract

Anthropogenic disturbance and biodiversity loss can alter host-parasite dynamics, with consequences for public-, veterinary-, and ecosystem health. This research aims to investigate how varying levels of habitat disturbance and biodiversity influence helminth diversity and infection patterns in rodents in the Yangambi landscape. Helminths are parasitic worms such as roundworms (Nematoda), tapeworms (Cestoda), and flukes (Trematoda), and include zoonotic species. Rodents were sampled across a gradient of disturbance and biodiversity, spanning pristine forests, secondary forests, plantations, crop fields, and villages. The sampled sites include COBIMFO- and Mega-Transect plots. The research is therefore conducted in collaboration with researchers from the RESTOREID and PilotMAB+ projects. Gastrointestinal tracts were dissected to isolate helminths, which were subsequently identified using morphological and molecular methods. So far, 113 rodents have been examined, yielding a total of 1393 helminths. Nematodes dominated across all organs, with relatively few cestodes and no trematodes observed. Detailed helminth identification is currently ongoing, and additional rodent species and habitats will be included in future work. Subsequently, relationships between disturbance, biodiversity, and helminth diversity and infection will be analyzed. The results of this study, combined with insights from similar research on viruses from the RESTOREID project, will contribute to a better understanding of biodiversity-disease relationships in Yangambi and beyond. This research is conducted in the Zoology Research Group at UHasselt led by Prof. dr. Maarten Vanhove. Other ongoing research in this group includes the impact of mining on water quality and fish parasites in Haut-Katanga (Gyrhaiss Kasembele - UHasselt, Université de Lubumbashi), as well as ichthyo-parasitological research and the use of wetland macroinvertebrates and parasites as bioindicators in the DRC and beyond (Prof. dr. Nikol Kmentova - AfroWetMaP - UHasselt, RBINS).

Keywords: Anthropogenic disturbance, biodiversity loss, helminths, parasites

How genetic tools improve our knowledge of African flora and the evolution and ecology of plant species?

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Abstract

Genetic and genomic information is increasingly used for fundamental and applied research in all areas touching biodiversity, a trend facilitated by the remarkable development of DNA sequencing technologies in the last decade. I will illustrate how genetic data on African forest trees have provided important insights to understand their taxonomy, ecology and evolution, and are also useful for forest management. (i) Population genetics approaches have clarified species delimitation and taxonomy, while also highlighting the existence of cryptic species, suggesting that the richness in tree species in tropical Africa is probably much larger than indicated by current floristic lists. (ii) Genetic markers are powerful to study reproduction of tree species, such as the mating system or pollen and seed dispersal processes, providing useful insights for the sustainable management of timber species. (iii) DNA sequences conserve traces of historical demographic events that have shaped the current genetic diversity of the populations (phylogeography). The phylogeographic signatures of a widespread tree of Central African forests suggests that the forest cover in the Congo Basin might have been highly perturbed some 200,000 years ago, contrary to forests from western Central Africa (Lower Guinea). Unfortunately, few laboratories in tropical Africa have the capacities to conduct such genetic studies, so that most local academics and students don't have the opportunity to be trained. However, new DNA sequencing technologies increasingly justify to outsource most laboratory work, so that high quality genetic research can potentially be done with minimal laboratory equipment (e.g. for DNA extraction), provided that adequate knowledge in genetic data analysis and funding are available. I believe that developing an expertise in Central Africa in the use of genetic tools is promising.

Keywords: Genetic diversity, forest management, capacity building

The Green Heart of Africa Initiative: a primer for sustainable and transformative research for biodiversity, climate and people in the Congo Basin

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Abstract

The Green Heart of Africa (GHoA) initiative aims to advance biodiversity conservation and sustainable development in central Africa through establishing collaborative research and training partnerships, strengthening local scientific capacity, and generating solutions that balance human and environmental needs. A central component of this initiative is the establishment of an integrated GHoA Biodiversity School and a harmonized monitoring network across the Congo Basin, which will provide vital biodiversity data through traditional monitoring methodologies as well as innovative semi-automated monitoring hubs. For this, we want to capitalise on existing infrastructure and academic networks. GHoA is a genuine Afro-European initiative that operates according to the philosophy of the EU Team Europe approach and is geared toward addressing key Sustainable Development Goals (SDGs) for the Congo Basin. It aligns with the vision of Congo Basin countries in including biodiversity conservation into their national development strategies, more specifically the *couloir vert* approach of the DR Congo. The GHoA initiative specifically addresses the need to train the next generation of biodiversity professionals that will implement this policy on the field. For this, it already mapped the needs with the main governmental and academic partners. In this talk, past and present activities withing the GHoA initiative as well as its long-term vision will be presented.

Keywords: Green Heart of Africa, conservation, sustainable development, Green Corridor

DRC biodiversity credit programme: the link with Yangambi and the Green Corridor

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Abstract

A pilot biodiversity credit initiative has been developed since 2022 in Lisoko (Tshuapa Province, DRC), using the bonobo (*Pan paniscus*) as an umbrella species. The approach is based on direct payments to local communities in recognition of their role as active custodians of protected megafauna and their habitats. Framed as a Payment for Environmental Services (PES), the initiative places local communities at the center of conservation efforts. Through a voluntary process based on Free, Prior and Informed Consent (FPIC), communities define land-use plans that include the protection of high-integrity forest areas while maintaining sustainable use of non-timber forest products. In return, they commit to a zero-tolerance policy toward poaching of fully protected species. The current implementation in Lisoko highlights both strong local acceptance and growing interest from national stakeholders. At the same time, key challenges remain, including the development of robust monitoring, reporting and verification (MRV) systems, appropriate legal frameworks ensuring community custodianship, and transparent governance mechanisms. By linking conservation outcomes directly to local benefits, this model aims to provide a scalable and high-integrity pathway for biodiversity financing in the DRC, with potential contributions to global biodiversity targets such as 30x30.

Keywords: Biodiversity credits, payment for Ecosystem Services (PES), community-based conservation, Bonobo (*Pan paniscus*), biodiversity governance, DRC

From logging to living forests : the CFT - Limbali Carbon Company (LCC) transition in Tshopo, DRC

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Abstract

The Limbali Carbon Company (LCC) in Tshopo, Democratic Republic of the Congo, is pioneering a transition from certified industrial logging to conservation concessions within a “Green Corridor” linking Yangambi, the Okapi Faunal Reserve and Maiko National Park. Logging ceased in 2023; by 2025 the business model had shifted from timber extraction to climate finance, biodiversity conservation and a regenerative, community-centred economy vision. Over roughly 467,000 hectares, including about 405,000 hectares of relatively intact Limbali-dominated forest, some 72 villages and approximately 75,000 people depend on these landscapes for their livelihoods. LCC is co-developing conservation and restoration plans with riverine communities, grounded in free, prior and informed consent and equitable benefit-sharing. Regenerative livelihood options (agroforestry, beekeeping, aquaculture, permaculture) are being considered to reduce pressure on forests while diversifying incomes. Recent and legacy biodiversity surveys reveal high conservation value, including at least four *Cercopithecus* species and eastern chimpanzees within driving distance of Kisangani, highlighting exceptional potential for long-term research, monitoring and innovation partnerships. While privately managed, LCC is seeking collaborations with public and private actors to implement projects aligned with its vision for living forests.

Keywords: Limbali Carbon Company, post-logging regeneration, Green Corridor, Yangambi; Congo Basin, community-based conservation, regenerative livelihoods, climate finance, biodiversity monitoring.

Les Arbres d'Afrique Centrale, tome I : familles de A à F

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Abstract

This presentation introduces the guide "*Trees of Central Africa*", a collaborative publication by Gembloux Agro-Bio Tech (University of Liège), Nature+ ASBL, and the Meise Botanic Garden, designed to support sustainable forest management in Central Africa.

Majestic and mysterious, the forests of Central Africa are full of unsuspected riches. They harbour an extraordinary diversity of trees that are essential to the balance of our planet. These trees capture carbon, provide high-quality timber, feed populations, and help heal both bodies and minds.

Despite the existence of several reference works on the flora of this region, none offers an overview that is both accessible to practitioners in the field, comprehensive and richly illustrated of the diversity of trees in Central Africa. The creation of a new reference guide, incorporating the latest taxonomic updates, was a necessity. The guide 'Trees of Central Africa, Volume I, Families from A to F' aims to meet this need by describing and illustrating all tree species reaching at least 10 cm in diameter in the lowland and submontane forests of Central Africa.

This book is an invitation to discover this richness. More than a simple field guide, it offers an immersion into the heart of the tropical forest. It describes the trees, their habitats, ecological characteristics, symbioses, phenology, interactions with wildlife, local uses, as well as conservation status and modes of exploitation.

This first volume covers 39 botanical families (from A to F) and 863 species illustrated with carefully selected pictures.

The book is available for free download via the following link : <https://hdl.handle.net/2268/340142>

Keywords : Central Africa, lowland dense moist and submontane forests, trees identification

Enabel programmes and action-research initiatives in the DRC

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Abstract

This presentation outlines how Enabel—the Belgian development agency—advances sustainable food systems and natural resources management in the Democratic Republic of the Congo through a portfolio of programmes and embedded action-learning initiatives. These efforts span Tshopo, North and South Kivu, KorLom, Sud-Ubangi, Haut-Katanga, Lualaba, and Kinshasa, leveraging DGD funding alongside the EU, AFD, IFAD and other partners. After an overview of Enabel’s thematic areas in DRC, the presentation zooms in on the food systems and natural resources management portfolio, summarising its core themes and geographic footprint. It then showcases a selection of strategic action-learning initiatives designed with academic and local partners that is articulated in support of Enabel programmes. The presentation closes with a forward look: an update on the restructuring of the DRC portfolio and an introduction to the learning questions that will steer our action-research moving forward.

Keywords: Action-research, development cooperation, agroecological transition, natural resources management.