COBAFISH
Congo basin: from carbon to fishes

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Introduction

The Congo River is the **second largest** river basin worldwide
(drainage area >100 x Belgium; discharge = 400 x Scheldt)
It harbours the **second richest fish diversity** (> 1000 known species).

The ca. $29*10^6$ inhabitants, to a large extent, are dependent on the river for food, energy, transport, domestic water, …

Notwithstanding its local, regional and global importance, its ecology, dynamics and **ecosystem functioning is poorly understood**.

Need for multidisciplinary studies on the interaction between the biota and their environment.

Introduction

Various **conceptual models** have been developed over the past decades to describe the **overall ecological functioning of large river systems**.

The importance of **longitudinal and lateral gradients** were underlined, with **contrasting importance of autochtonous and allochtonous primary production** for fueling the food web in function of spatial and temporal scales.

These concepts were largely **validated through observations in temperate or subtropical riverine systems**, only exceptional in tropical rivers

Therefore, we aim to **link terrestrial inputs, primary producers (algae and aquatic macrophytes), invertebrate and fish biodiversity to ecosystem dynamics and functioning** in the Congo river.

Where?

Two catchments on opposite sides of the Middle Congo, downstream of Kisangani.

The **Lubilu river** which drains water from the UNESCO (MAB) Yangambi Biosphere Reserve**.**

The biodiversity and ecosystem dynamics and functioning observed in the Lubilu basin will be considered **as representative of natural forested area in the Congo basin**.

Where?

The second catchment is the **Lower Lomami** a large affluent with a high fish biodiversity and more intensive land use.

The **contrasting conditions between the Lubilu and Lomami** offer us the opportunity to generate **a unique dataset with a large range of biogeochemical and ecological conditions**

Fieldwork

Four intensive sampling periods, 2 x 2 in wet and dry seasons, for all biogeochemical parameters and for all aquatic target groups.

Monthly monitoring for a subset of parameters by Kisangani team

Objectives : four key questions

- How diverse are the fish communities in two targetted catchments (Lubilu and Lomami) in terms of species composition and functional/trophic diversity?
- Which factors can be identified in regulating this diversity (aquatic primary production, physico-chemical conditions, nutrient status, and organic matter availability and origin)?
- To what extent do these fish communities depend upon autochtonous (aquatic) primary production or on allochtonous (terrestrial) production?
- What is the importance of seasonal flooding on ecosystem functioning?

Relevance of expected results

The first comprehensive and interdisciplinary dataset on the aquatic biogeochemistry and ecology of aquatic biota for any part of the Congo River basin.

Important data to address the underlying fundamental ecological questions needed for the sustainable management of the river, its fisheries and other ecosystem services, especially in view of increasing human-induced changes.

WP 1: Carbon sources, cycling & aquatic metabolism

Task 1.1: Relative contributions of allochthonous and autochthonous production to aquatic C reservoirs (KUL, ULg)

Task 1.2: Aquatic primary production, respiration, and net community metabolism (ULg, KUL)

Task: 1.3: Identification of Si sources as nutrients and the contribution of diatoms to primary production (MRAC, NBGB)

WP 2: Aquatic floral and faunal diversity

Task 2.1: Qualitative and quantitative diversity of aquatic primary producers (ULg, NBGB)

Task 2.2: Trophic diversity of macroinvertebrate communities (RBINS)

Task 2.3: Qualitative and quantitative diversity of fish communities (morphology and molecular; RMCA, RBINS)

WP 3: Ecosystem trophic structure (foodweb)

Task 3.1: Fish stomach content analysis (RMCA, RBINS, NBGB)

Task 3.2: Isotopic foodweb analysis [source (aquatic vs terrestrial) and trophic position)] (KUL)

WP 4: Network integration and coordination

Task 4.1: Preliminary analysis of existing data – optimizing sampling strategy

Task 4.2: Fieldwork preparation and coordination in collaboration with local partners

Task 4.3: Organisation of workshops & meetings

Task 4.4: Reporting and dissemination of results.

Workpackages & Tasks	Sampling sites & frequency	Partners involved
1.1. Carbon sources 1.2. Aquatic metabolism 1.3. Si studies on diatom productivity 2.1. Primary producers	-monitoring on Lomami and Lubilu (monthly) -dry and wet season sampling in main sampling points and selected sites in catchment.	-local partner for monitoring, in collaboration with P2 and P3. -P2, P3, P4, P5
2.2. Macroinvertebrates 2.3. Fish communities	-dry and wet season sampling in main sampling points and selected sites in catchment.	P1, P2, P5 in collaboration with local partners.
3.1. Trophic structure 3.2. Allochtonous vs. Autochtonous support	-dry and wet season sampling in main sampling points and selected sites in catchment.	P1, P3, P4, P5, in collaboration with local partners
WP 4: network integration and coordination		All partners, in collaboration with local partners and follow-up committee.

Thank you for your attention