Biodiversity Research and Capacity Building in the DR Congo & the Yangambi MAB

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Universiteit Antwerpen

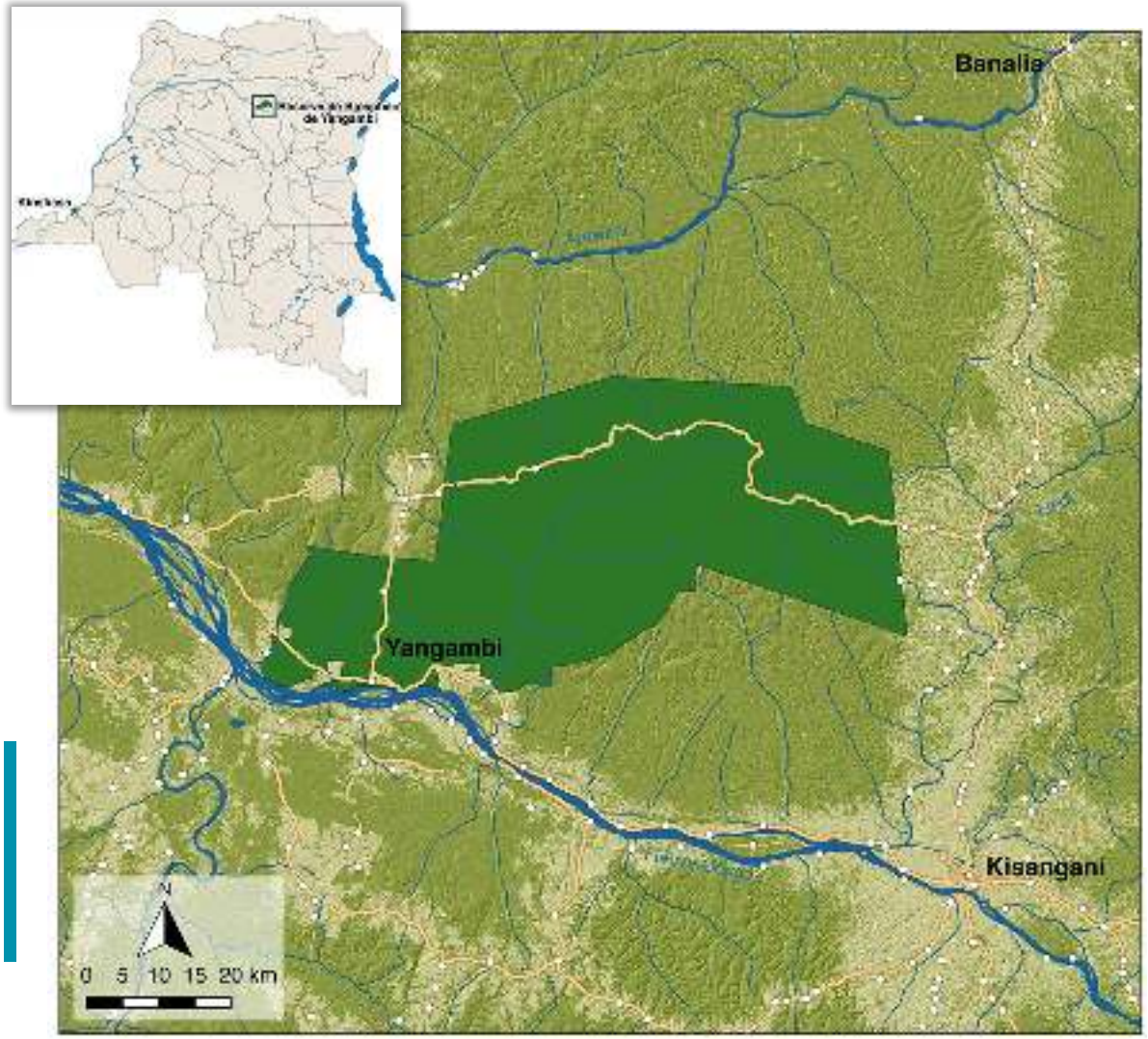
museum

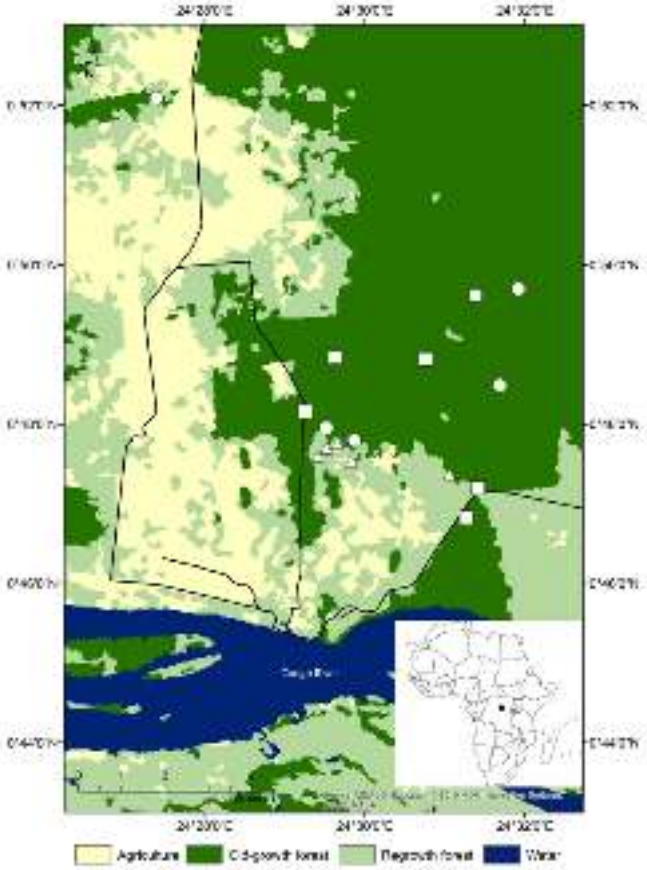
Yangambi MAB Biosphere

Situated in the north of the DRC in one of the world's largest (235,000 ha) intact tracts of tropical forest

museum


In the thick forests of northern
Democratic Republic of the Congo, sits Yangambi


Banalia
Yangambi
Kisangani
N
0 5 10 15 20 km


Agriculture
Old-growth forest
Regrowth forest
Water

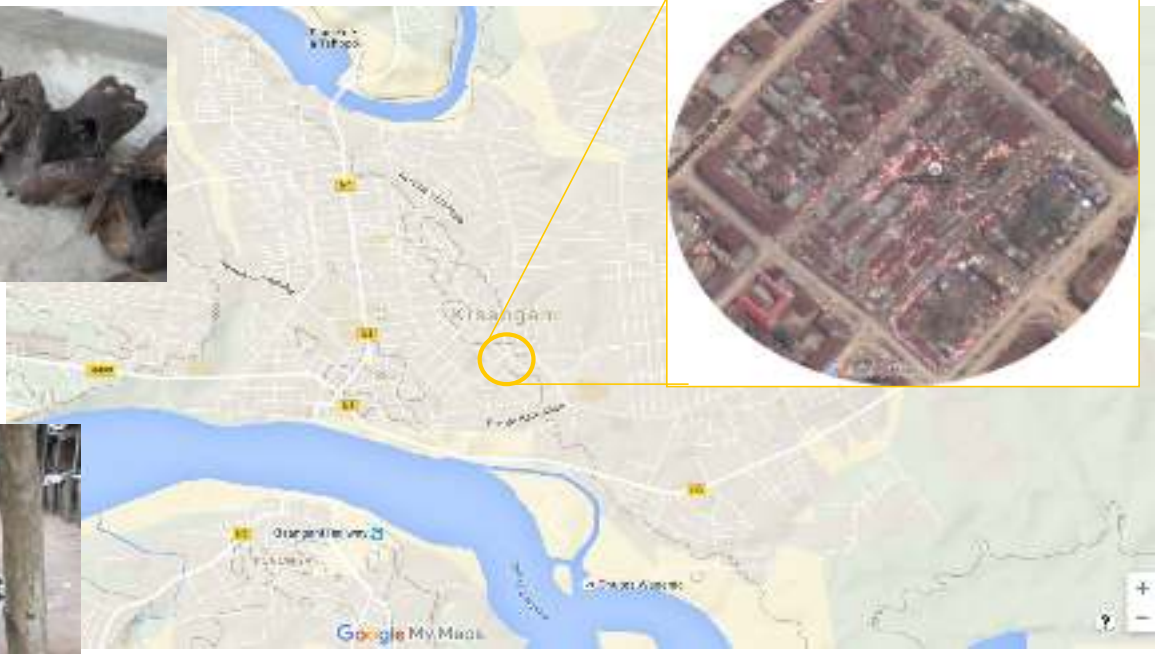
Young and growing population

Many rely on natural resources

Animal proteins : Fishing

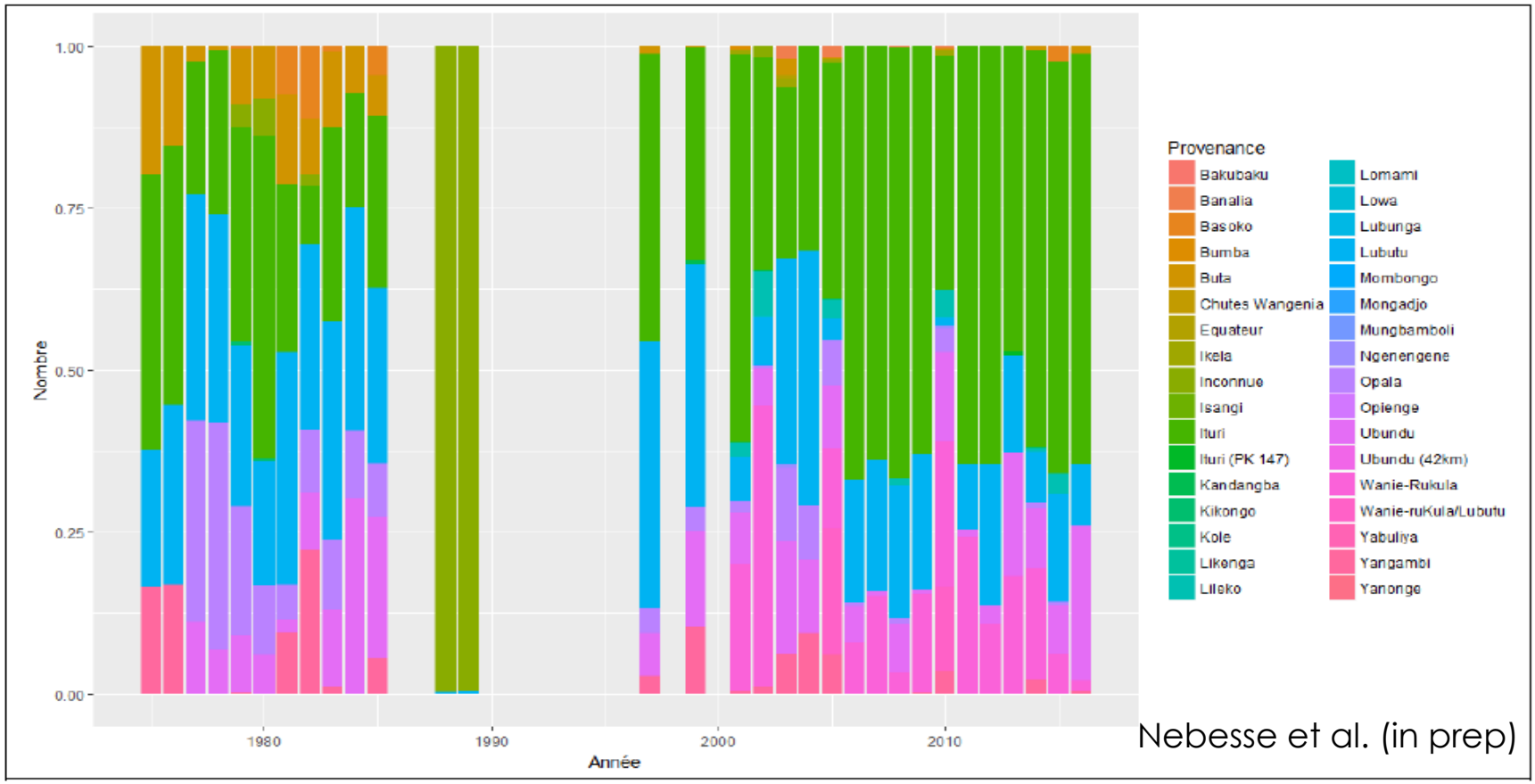
Animal proteins : Bushmeat

Central bushmeat Market in Kisangani



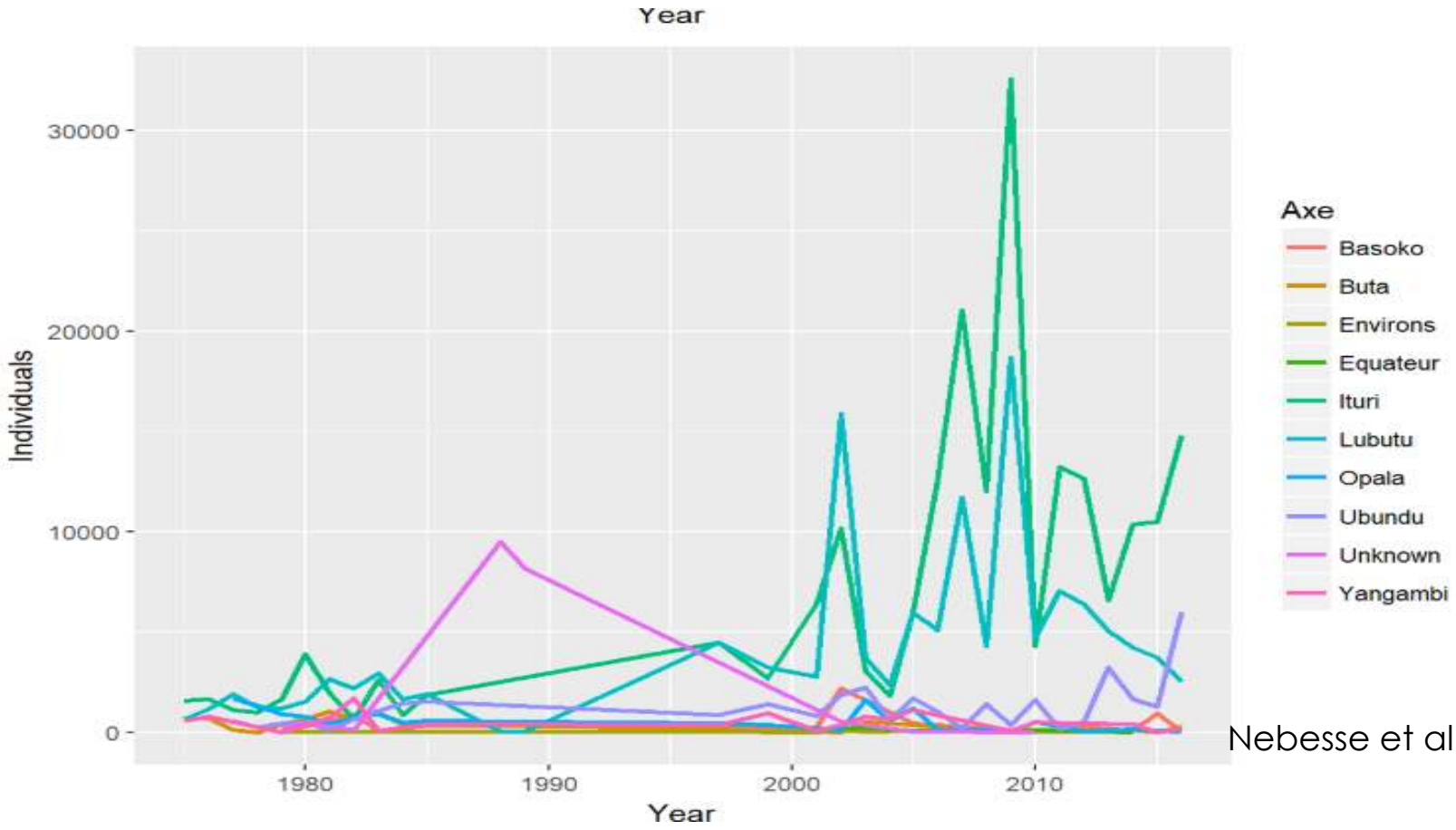
Central bushmeat Market in Kisangani

Animal proteins : Bushmeat - Origin



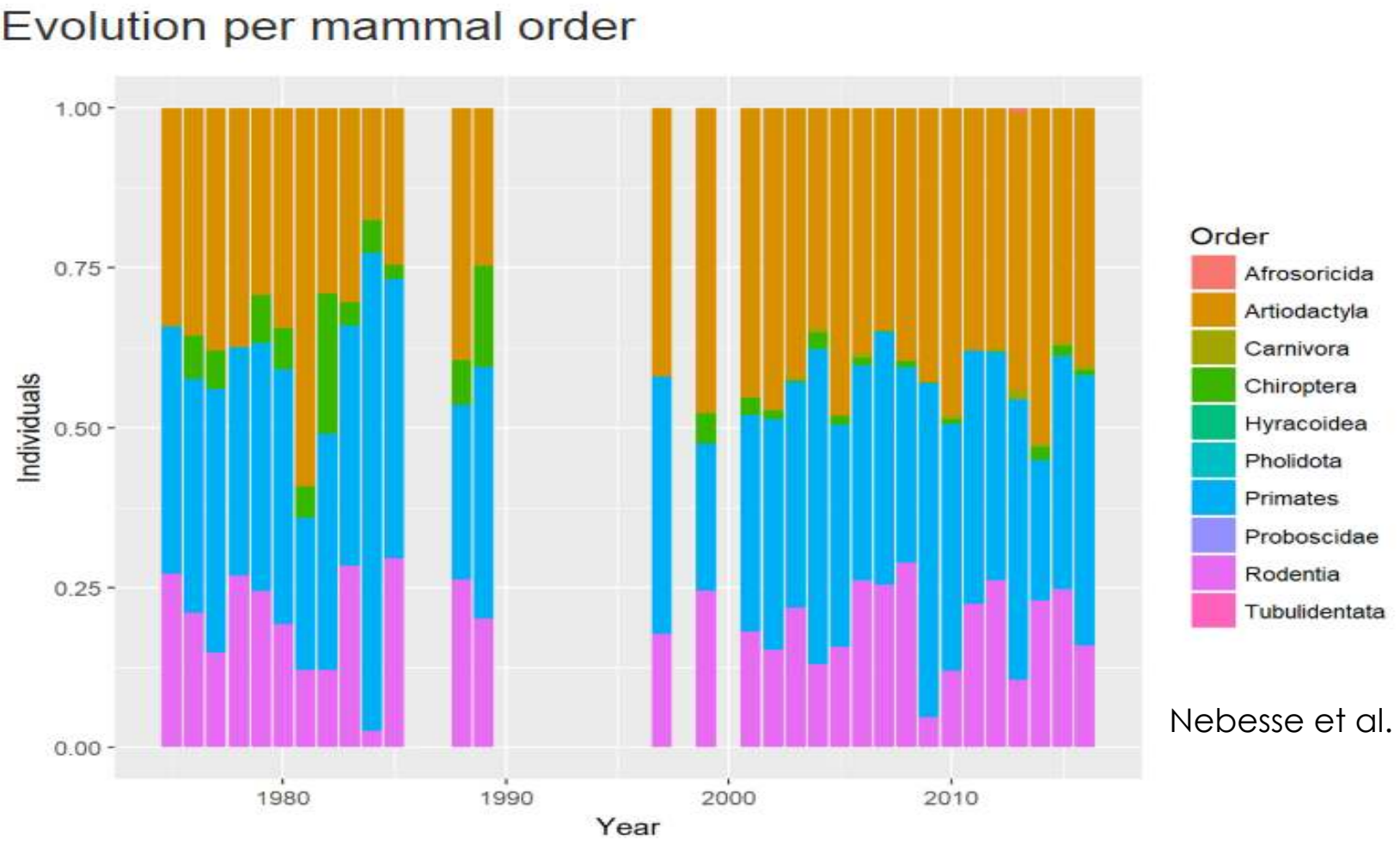
Nebesse et al. (in prep)

Animal proteins : Bushmeat Quantity on sale/origin



Nebesse et al. (in prep)

Animal proteins : Bushmeat – Mammalian ordines



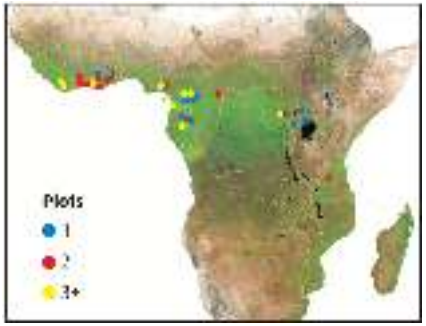
Nebesse et al. (in prep)

Biodiversity and Carbon

A Large and Persistent Carbon Sink in the World's Forests

Yude Pan,[1]* Richard A. Birdsey,[1] Jingyun Fang,[2,3] Richard Houghton,[4] Pekka E. Kauppi,[5] Werner A. Kurz,[6] Oliver L. Phillips,[7] Anatoly Shvidenko,[8] Simon L. Lewis,[7] Josep G. Canadell,[9] Philippe Ciais,[10] Robert B. Jackson,[11] Stephen W. Pacala,[12] A. David McGuire,[13] Shilong Piao,[2] Aapo Rautiainen,[5] Stephen Sitch,[7] Daniel Hayes[14]

The terrestrial carbon sink has been large in recent decades, but its size and location remain uncertain. Using forest inventory data and long-term ecosystem carbon studies, we estimate a total forest sink of 2.4 ± 0.4 petagrams of carbon per year (Pg C year^{-1}) globally for 1990 to 2007. We also estimate a source of 1.3 ± 0.7 Pg C year^{-1} from tropical land-use change, consisting of a gross tropical deforestation emission of 2.9 ± 0.5 Pg C year^{-1} partially compensated by a carbon sink in tropical forest regrowth of 1.6 ± 0.5 Pg C year^{-1}. Together, the fluxes comprise a net global forest sink of 1.1 ± 0.8 Pg C year^{-1}, with tropical estimates having the largest uncertainties. Our total forest sink estimate is equivalent in magnitude to the terrestrial sink deduced from fossil fuel emissions and land-use change sources minus ocean and atmospheric sinks.



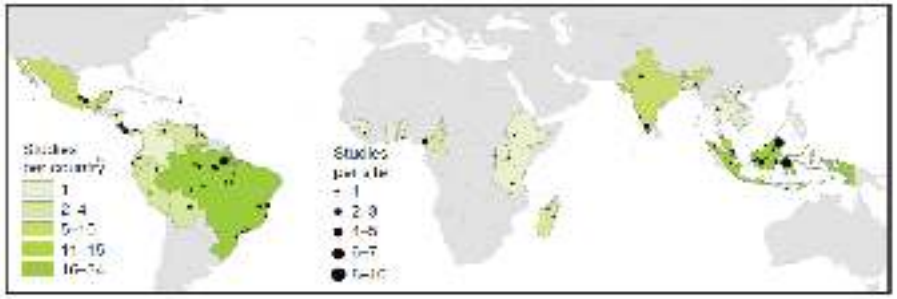
Science, 2011

LETTER

doi:10.1038/nature12425

Primary forests are irreplaceable for sustaining tropical biodiversity

Luke Gibson[1]*, Tien Ming Lee[2,3]*, Lian Pin Koh[1,4], Barry W. Brook[1], Toby A. Gardner[5], Jos Barlow[5], Carlos A. Peres[6], Corey J. A. Bradshaw[1,7], William F. Laurance[8], Thomas E. Lovejoy[9,10] & Navjot S. Sodhi[11]

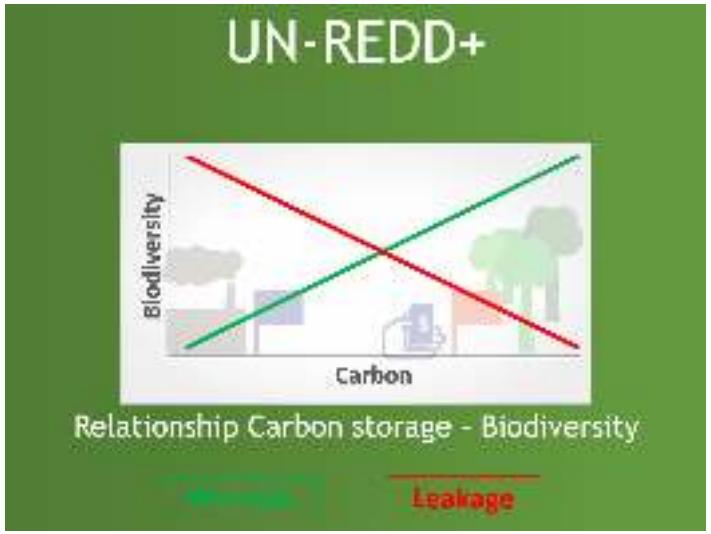


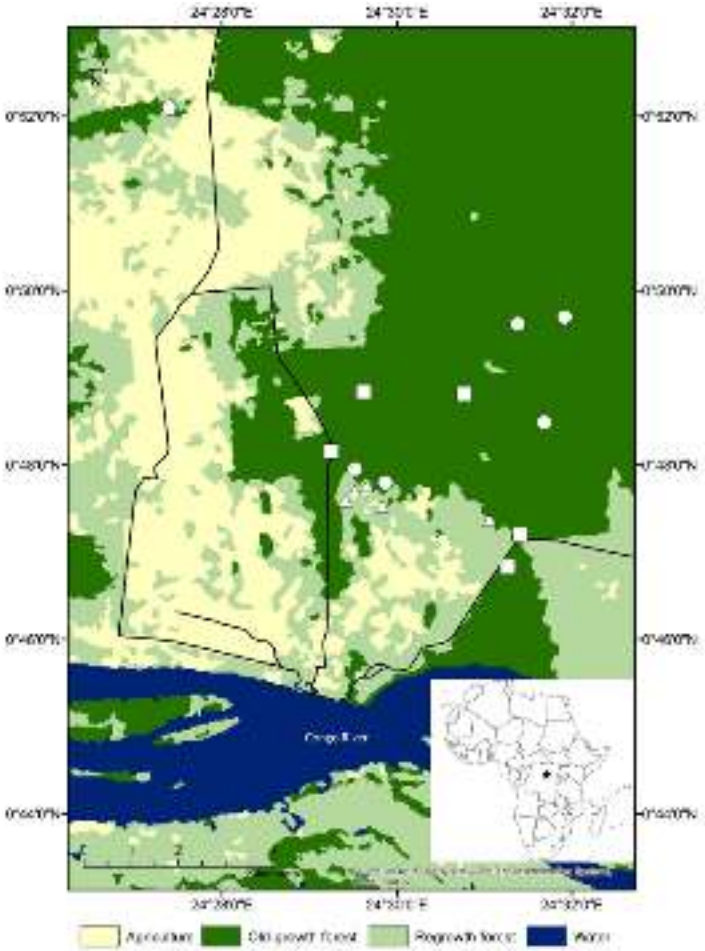
Nature, 2011

Include the Congo basin in forest studies

Nature, 2011

Relationship between above carbon stock and biodiversity

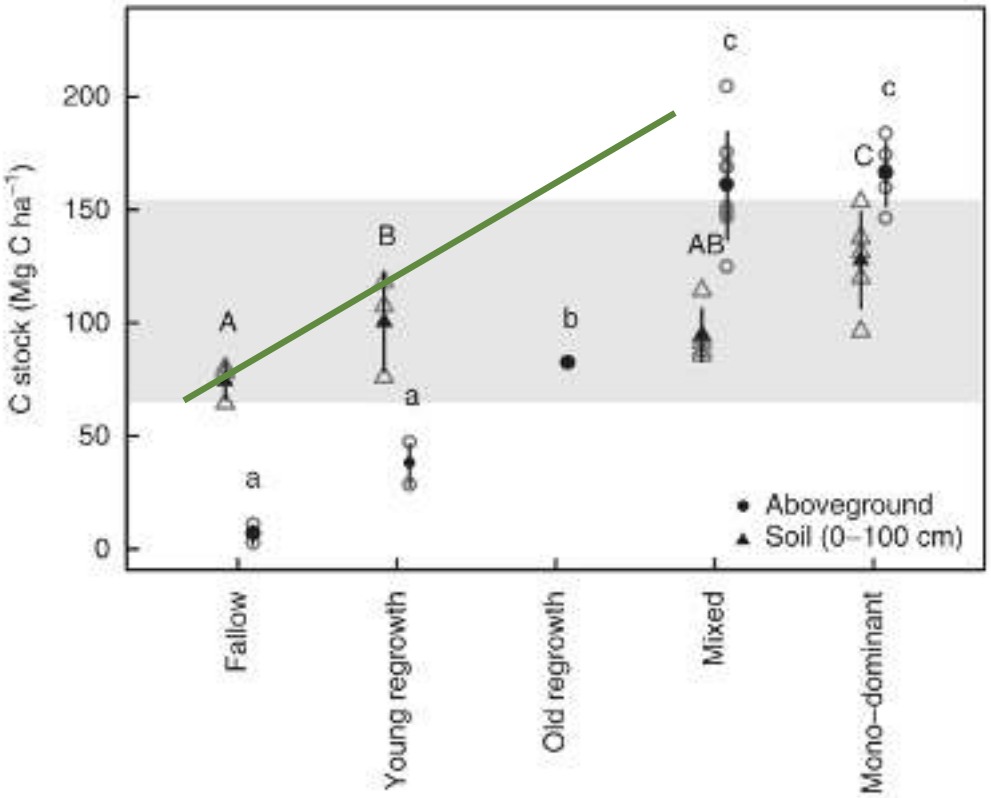




COBIMFO project SSD Belspo

Pascal Boeckx Ugent (coordinator)

Carbon measurements

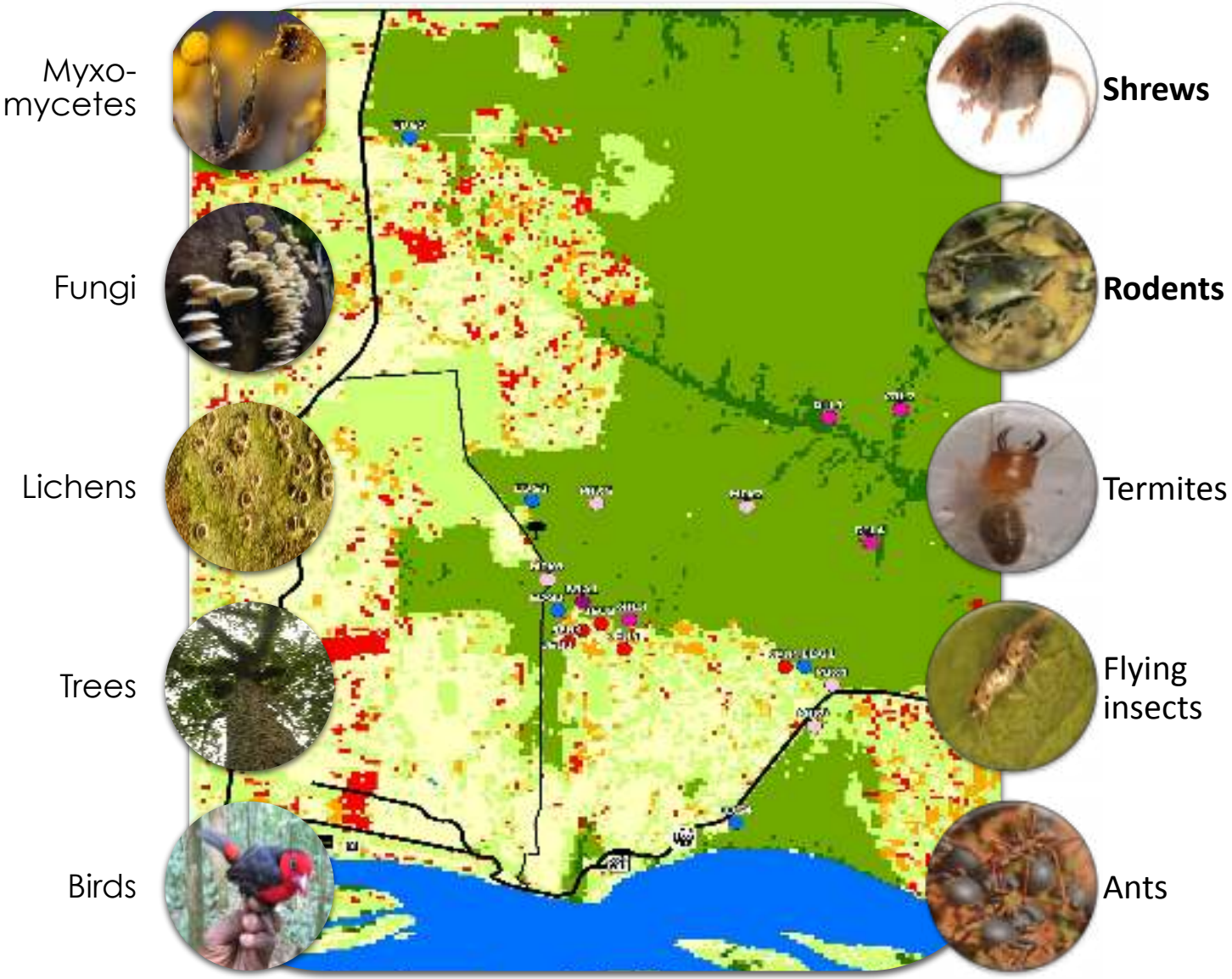


Biomass trees (50% Carbon)

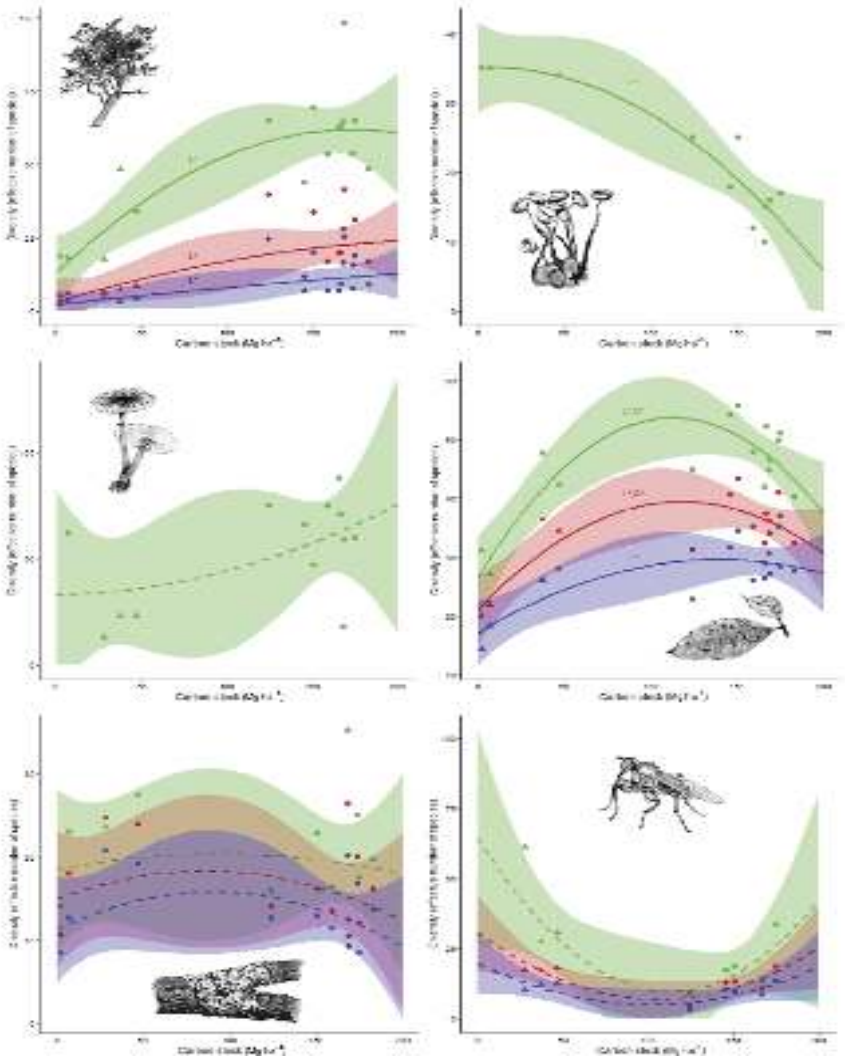
- ~ Height
- ~ Wood density
- ~ Diameter at Breast Height

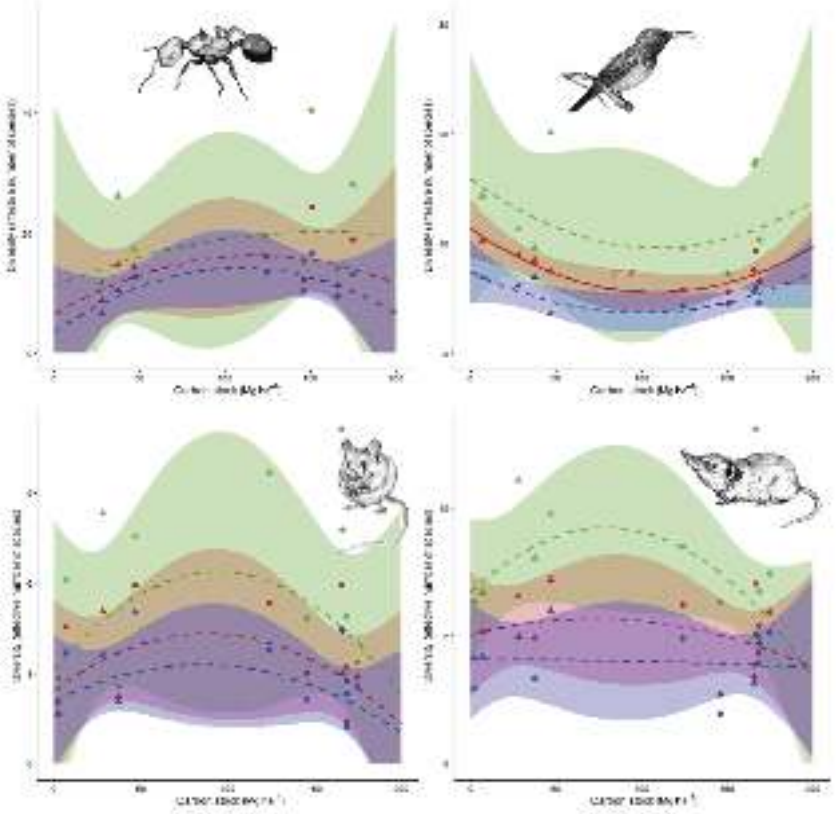
Aboveground carbon (●) increases from disturbed to old-growth forests

Soil carbon stock (▲) remains constant.


Myxo-
mycetes
Fungi
Lichens
Trees
Birds
Shrews
Rodents
Termites
Flying
insects
Ants

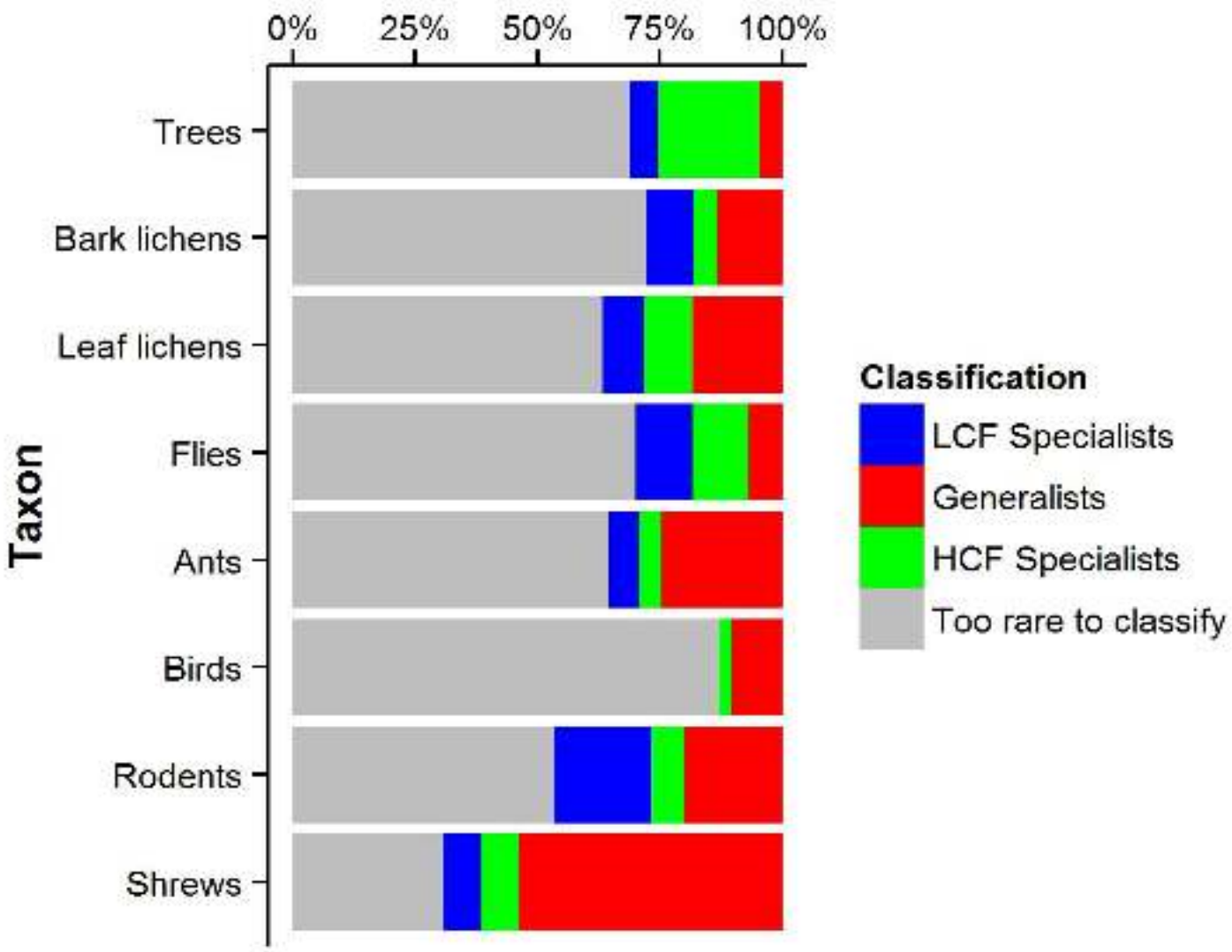
Only trees and lichens !





Specialization

- Generalists
- Specialists
  - Low Carbon Forest
  - High Carbon forest
- Too rare to classify



Conclusions

- Comparisons across regrowth and old-growth forests evinced the expected positive relationship for trees, but not for other organismal groups.
- Moreover, differences in species composition between forests increased with difference in carbon stock. These variable associations across the tree of life contradict the implicit assumption that maximum co-benefits to biodiversity are associated with conservation of forests with the highest carbon storage.
- Initiatives targeting climate change mitigation and biodiversity conservation should include both old-growth and regenerating forests to optimally benefit biodiversity and carbon storage.

SCIENCE ADVANCES | RESEARCH ARTICLE

APPLIED ECOLOGY

Reconciling biodiversity and carbon stock conservation in an Afrotropical forest landscape

Frederik Van de Perre,[1]* Michael R. Willig,[2] Steven J. Presley,[2] Frank Bapeamoni Andemwana,[3] Hans Beeckman,[4] Pascal Boeckx,[5] Stijn Cooleman,[4] Myriam de Haan,[6] André De Kesel,[6] Steven Dessein,[6] Patrick Grootaert,[7] Dries Huygens,[5] Steven B. Janssens,[6] Elizabeth Kearsley,[8] Patrick Mutombo Kabeya,[9] Maurice Leponce,[7] Dries Van den Broeck,[6] Hans Verbeeck,[8] Bart Würsten,[6] Herwig Leirs,[1] Erik Verheyen[1,7]

Relationship between nutrient origin and fish species diversity

COBAFISH project
Belspo SSD program


9
10
11
13
14
15
16

Conclusions

Carbon and nitrogen stable isotope ratios provide insights about contributions of terrestrial resources and trophic position respectively.

The used combination of C, N, and H stable isotope measurements allows to estimate the contribution of terrestrial (allochthonous) and aquatic (autochthonous) inputs to fish

It is clear that terrestrial C3 plants are an important source fuelling the Congo River food web.

Soto D X, Decru E, Snoeks J, Verheyen E, Van de Walle L, Moelants T, Mambo T, Bouillon S (). Disentangling the Congo River food web using multiple stable isotopes. Functional Ecology (submitted)

Centre de surveillance de la biodiversité

Missions

1. **facilitate and attract projects** on biodiversity in the Congo Basin;
2. **expand partnerships** (DRC / international) that will benefit CBS and DR Congo;
3. **capitalize gains resulting from these activities** : collections, joint publications

Inaugurated in June 2014

belspo

Loterie Nationale
créateur de chances

Institutional capacity building

Develop taxonomic expertise **GTI grants** ('Global Taxonomy Initiative')

Support to maintaining DRC CHM (**'Clearing House Mechanism**').

Support for projects that raise **public awareness**

2019-2023

Support to development of **indicators and reporting systems** ('MRV').

Disseminate awareness on the '**Nagoya protocol**' & benefits of sharing of genetic resources

Support **individual researchers in PhD trajectories**

VLIR CUI-UNIKIS

Apport de la biodiversité à la formation et la sécurité alimentaire dans le Bassin Nord-est Congo (Kisangani, RDC):

Project 2: biodiversity




Bushmeat replacement, fish culture, culture of fungi & dissemination


belspo


vliruos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THE BELGIAN
DEVELOPMENT COOPERATION
.be


CENTRE DE SURVEILLANCE
UNIKIS
DE LA BIODIVERSITE


UNIVERSITE
DE KISANGANI


museum


Plantentuin Meise


AFRICA
museum


UNIVERSITEIT
GENT


KATHOLIEKE UNIVERSITEIT
LEUVEN


Universiteit
Antwerpen


UCLouvain


Université
de Liège


THANK YOU
AMESEGENALO