

LAB-3

Biodiversity and Wetland Management



Biodiversity and Management of Pantanal Wetlands: an Approach for the Sustainable Use of Brazilian Wetlands

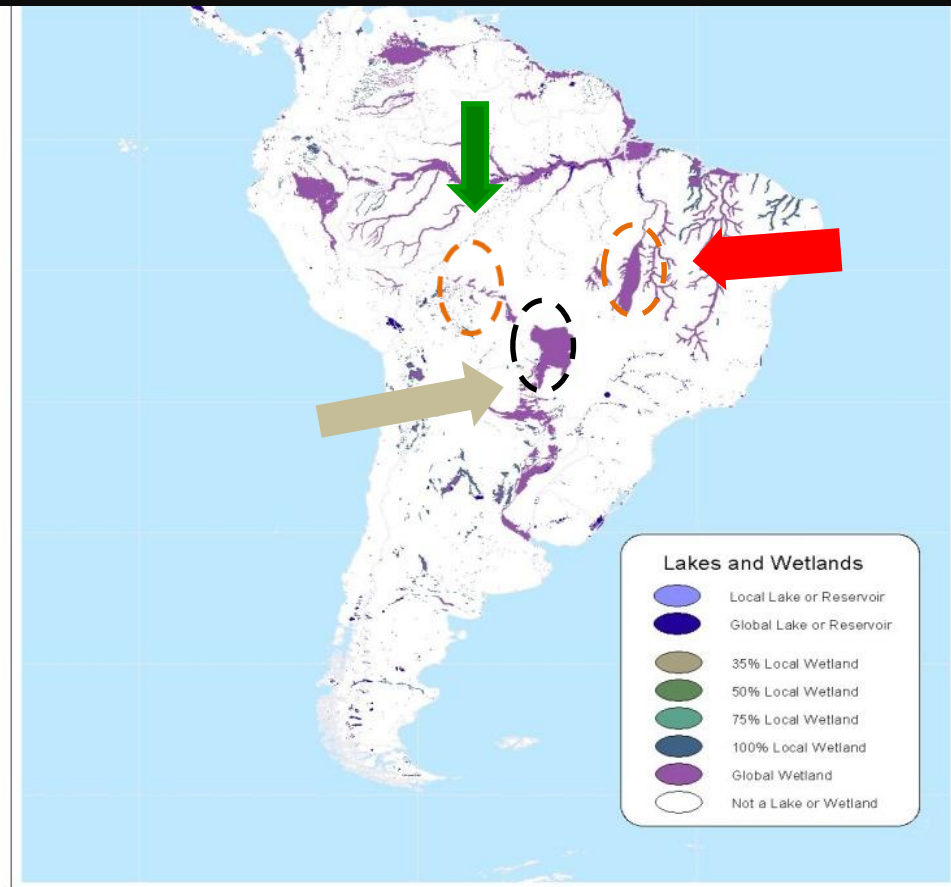
LAB # 3: C. Nunes da Cunha (Leader) , J.M. Penha, J.B. Pinho, M. Soares, V. Layme, M. Aragona, C. Strüssmann

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NEPA-IB
UFMT

Pantanal Wetland

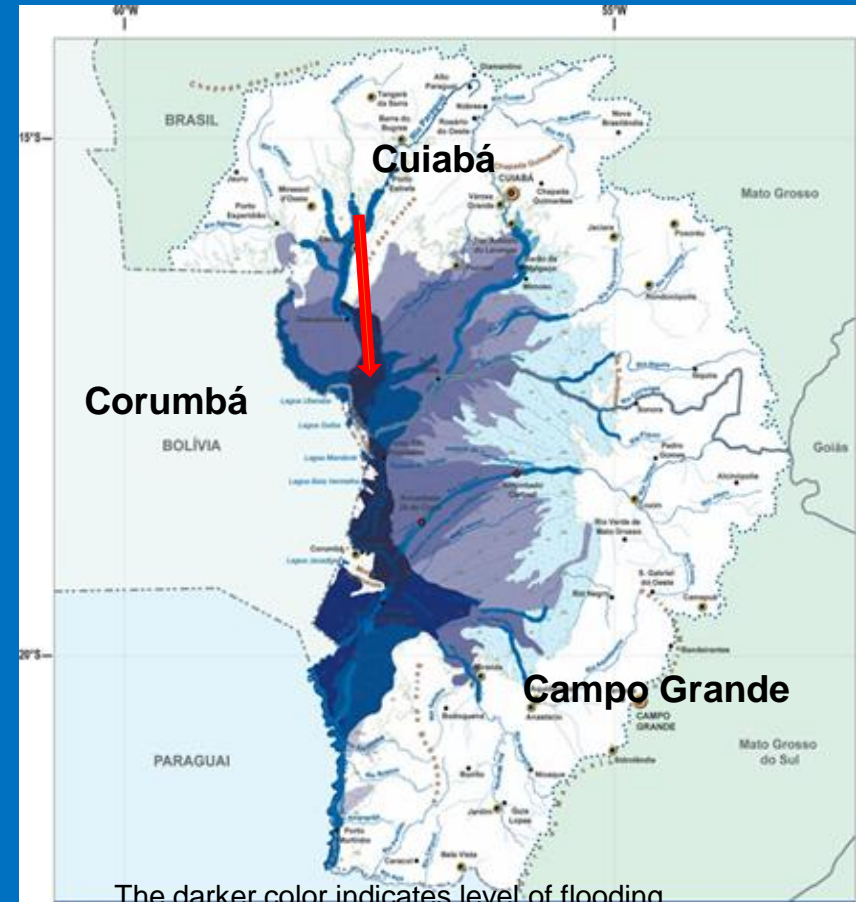
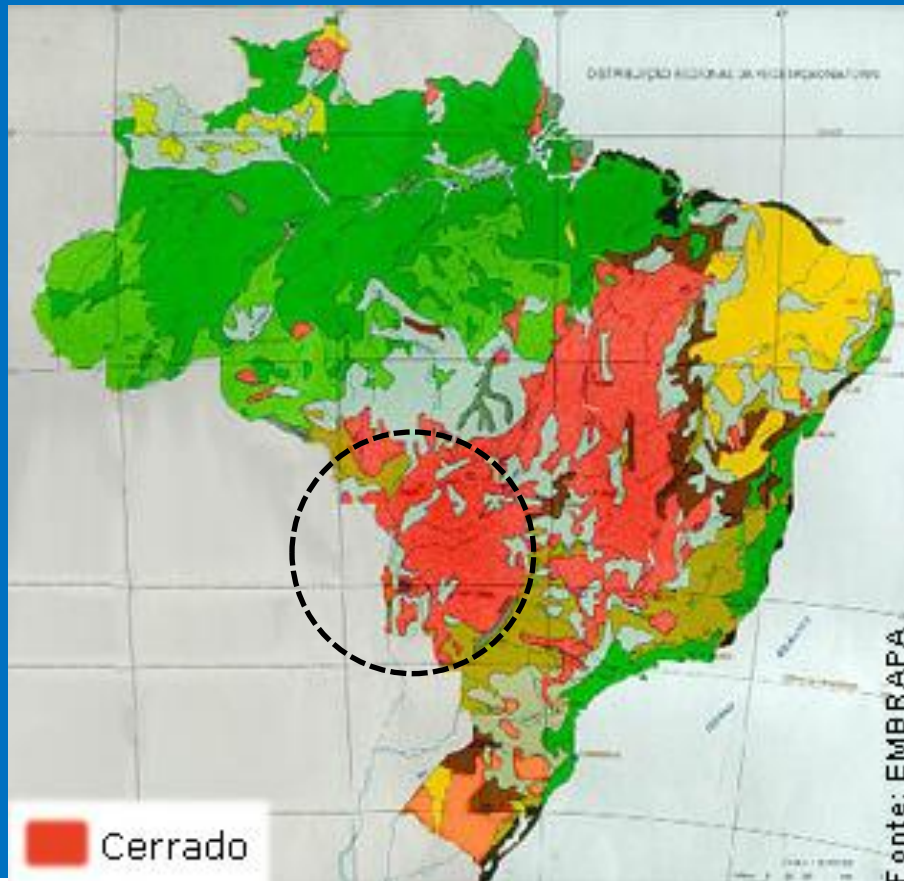
- ✓ Phytogeographical location:
 - Amazonian Tropical Rain Forest Savanna/Cerrado.
 - Gran Chaco
 - Bolivian Tropical Dry Forest
- ✓ Pantanal- Brazilian word meaning Swamp
- ✓ RadamBrasil:
 - Pantanal of Mato Grosso
 - Pantanal of Araguaia
 - Pantanal of Guaporé



Data taken from: Lehner and Doll (2001)

Atlas of the Biosphere
Center for Sustainability and the Global Environment
University of Wisconsin - Madison

Pantanal Wetland: TROPICAL SEASONALLY FLOODED (hyperseasonal) SAVANNA



The darker color indicates level of flooding.
dark blue is more flooded and for a longer time

Ecological Pantanal Wetland Research Steps

Researchers of the Institute of Biological Science of Federal University of Mato Grosso (UFMT) have been studying the Pantanal since the 1980's.

From 1990 to 2004 an international cooperation project (PEP – Ecology of Gran Pantanal) was established between UFMT and Max-Planck Institute for Limnology, Germany.



1996 - Foundation of the Pantanal Ecological Research Group (NEPA-UFMT).

7 The Pantanal Ecology Project: Challenges and Progress of a Brazilian-German Scientific Collaboration (*O Projeto Ecológico Pantanal: Desafios e Resultados em uma Colaboração Científica Brasil-Alemanha*)

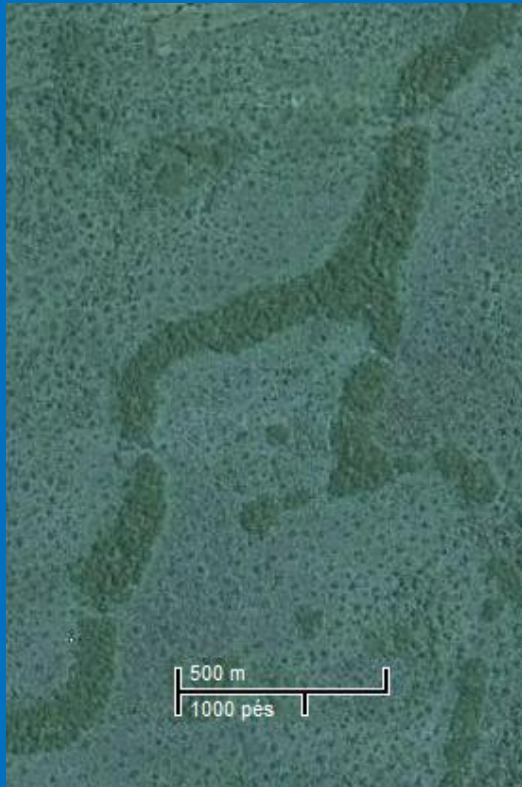
Catia Nunes da Cunha¹, Karl Matthias Wantzen¹, and Wolfgang J. Junk²
¹Federal University of Mato Grosso, Instituto de Biociências, Núcleo de estudos ecológicos do Pantanal (NEPA), Cuiabá-MT. 78060-900. Brazil. email: catiane@terra.com.br
²Max-Planck-Institut fuer Limnologie, AG Tropenökologie, 24302 Ploen, and Konstanz University, 78547 Konstanz, Germany. email: wantzen@mpil-ploen.mpg.de and wjj@mpil-ploen.mpg.de

Abstract (Resumo)

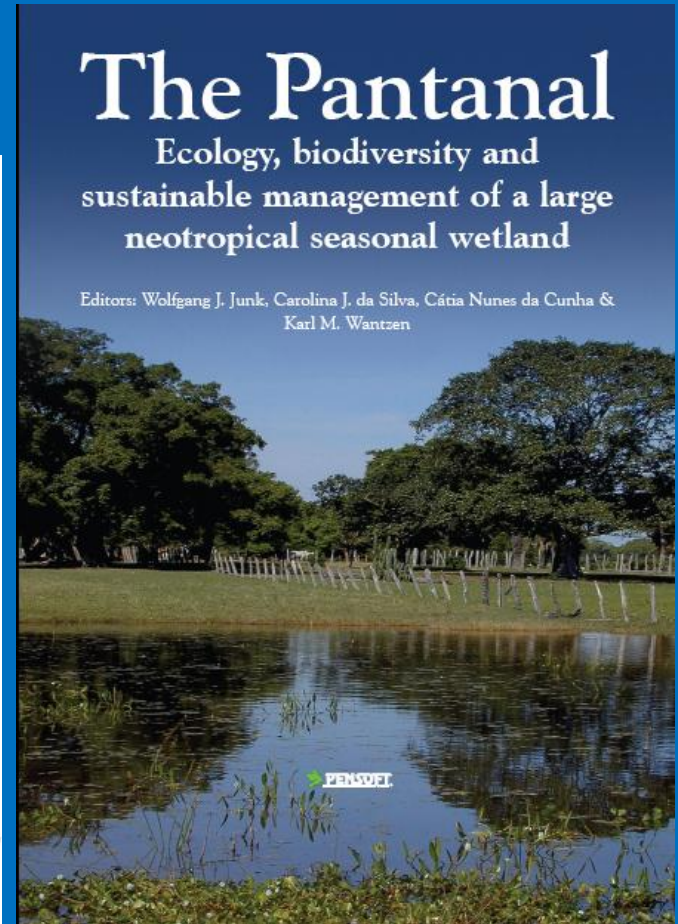
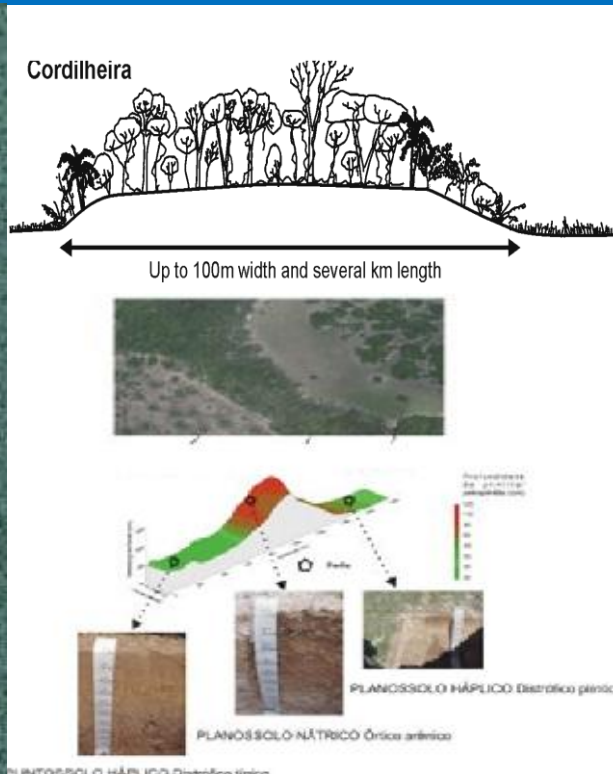
Since 1991, Brazilian and German researchers of the Pantanal Ecology Project (PEP [a cooperative effort between the Federal University of Mato Grosso, UFMT, and the Max-Planck-Institute of Limnology, MPIL]) have been studying the structures and functions of the various ecosystem types of the Pantanal. This work focused on delivering a solid scientific database for proposing management concepts and conservation plans, including analysis of environmental impacts and their socio-economic effects. The interdisciplinary approach is based on the flood pulse concept (Junk et al. 1989), which uses the annual hydrological changes as the driving force for patterns and processes in floodplain ecosystems. Limnologists, plant ecologists, zoologists, and

The Pantanal Book

1- Habitats of paleo-fluviatile origin



500 m
1000 pés



The dynamic responses of tree *Vochysia divergens* to the multiannual hydrologic regime

Applied Vegetation Science 7: 103-110, 2004
© IAVS; Opulus Press Uppsala.

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Year-to-year changes in water level drive the invasion of *Vochysia divergens* in Pantanal grasslands

Nunes da Cunha, C.¹ & Junk, W.J.^{2*}

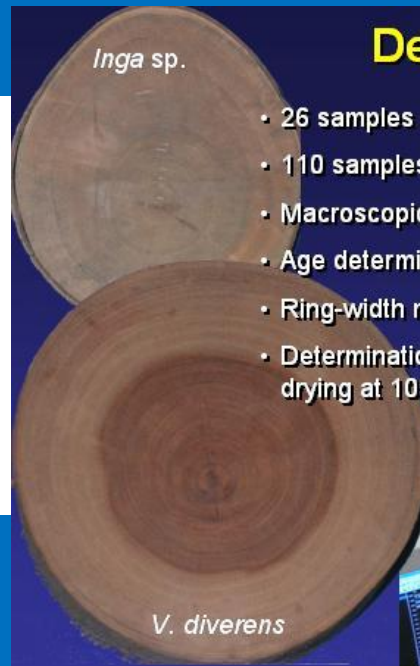
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E-mail catianc@cpd.ufmt.br; ²Max-Planck-Institut für Limnologie, AG Tropenökologie, Postfach 165, 24302 Plön, Germany; *Corresponding author; Fax +494522-763-281; E-mail wj@mpil-ploen.mpg.de

Vochysia divergens population retract and expand according the the flooded gradient

Dendrochronological analysis

- 26 samples of *Vochysia divergens*
- 110 samples of other 57 species
- Macroscopic analysis of wood anatomical features (Worbes 1989)
- Age determination (ring-counting)
- Ring-width measurement to nearest 0.01 mm (LINTAB)
- Determination of wood density (dry mass/fresh volume) after 72 h drying at 105 °C (Chave et al. 2005)

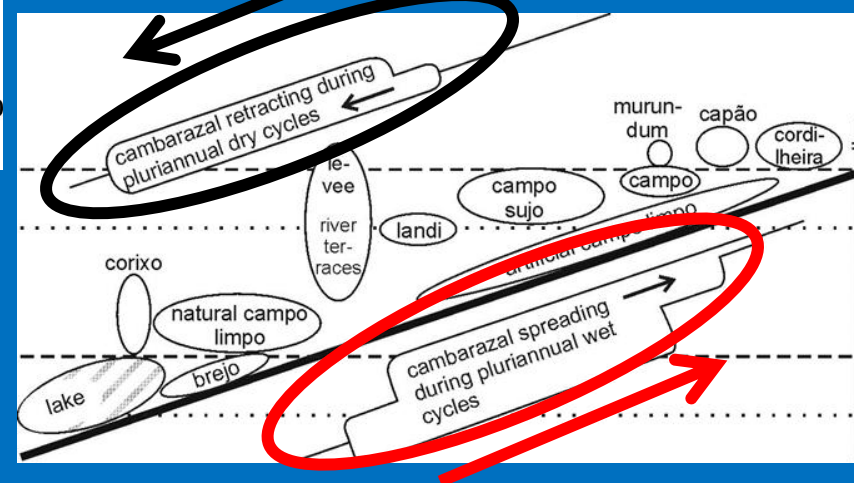
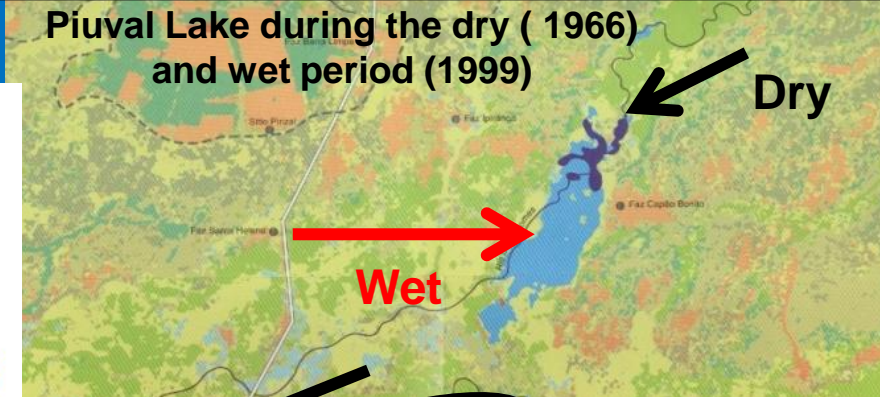
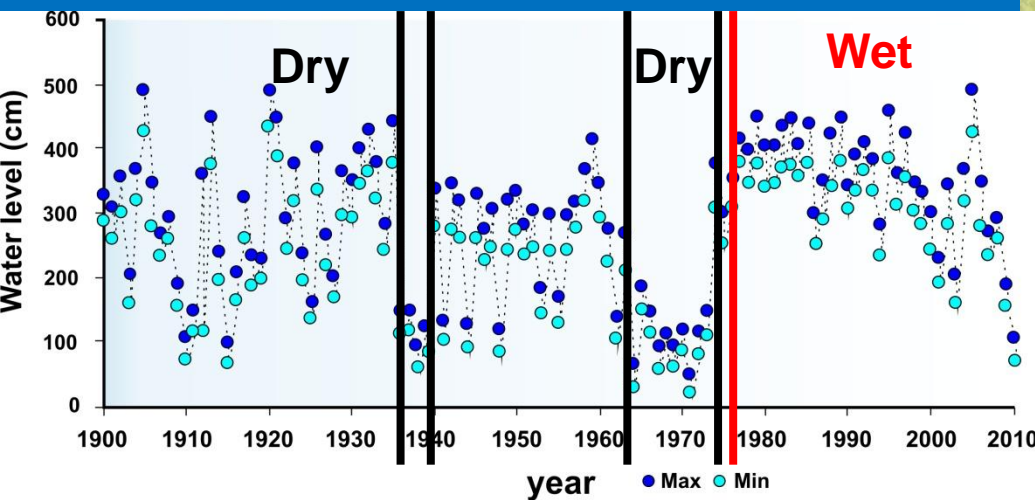


Arruda (2006)
Fortes (2006)



Multiannual Dry and Wet Periods

Of specific interest are the dynamic responses to the organisms to the multiannual hydrologic regime



Evaluation of the Biodiversity and its conservation in the Pantanal Wetland

2006 - Junk et al. verified Pantanal's species richness according to check lists

Knowledge about abundance, distribution patterns and habitat-species associations is rare, and locally restricted.

In general the seasonality was not considerate.

Lack of information hampers the discussion of management and conservation plans

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1015-1621/06/030278-32
DOI 10.1007/s00027-006-0851-4
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Aquatic Sciences

Overview Article

Biodiversity and its conservation in the Pantanal of Mato Grosso, Brazil[†]

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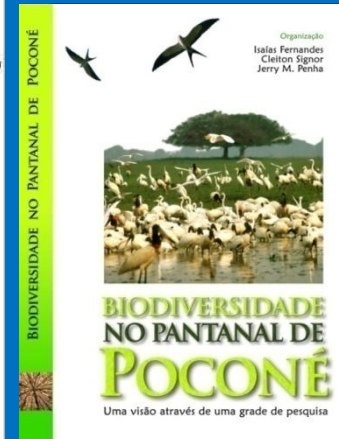
⁴ Im Eichenböhl 32, 64625 Bensheim, Germany

Meso-scale Biodiversity in the Pantanal of Mato Grosso

- To resolve this problem the NEPA/UFMT research group developed a new research program under the framework of the Pantanal Research Center (CPP), with the title: **Meso-scale Biodiversity Patterns in different grazing systems in the Pantanal of Mato Grosso.**

- The Rapeld sampling design was adopted. Grid size: 5X5 km; 30 plots

- Preliminary results were summarized in an E-book



<http://ppbio.inpa.gov.br/Port/noticias/poconeebook>

Data about: Fishes



Anurans and reptiles

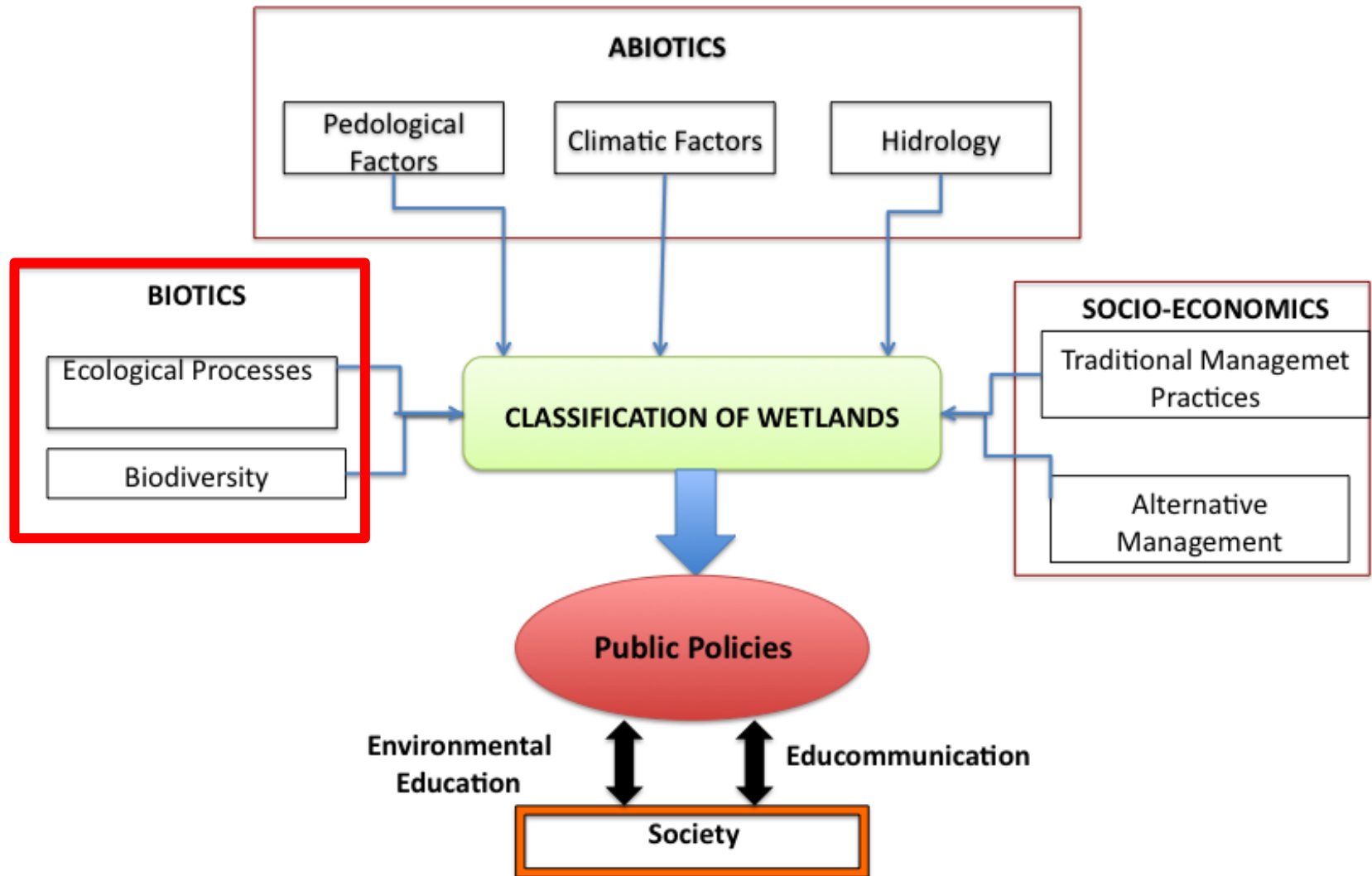


Birds



Mammals

<http://ppbio.inpa.gov.br/Port/noticias/poconeobook>



Research questions of the Lab 3

The Sub-Project of the LAB-3 deal with:

1 – How animals (birds, small mammals, reptile, amphibians, arthropods and plants) react on the flood pulse by:

- a) life story traits
- c) migration patterns

2 – How plants react to the floodpulse by

- a) Changes in photosynthetic activity
- b) Wood increment (dendrochronology)
- c) Seed germination and preference in the inundation gradient
- d) Endophytes

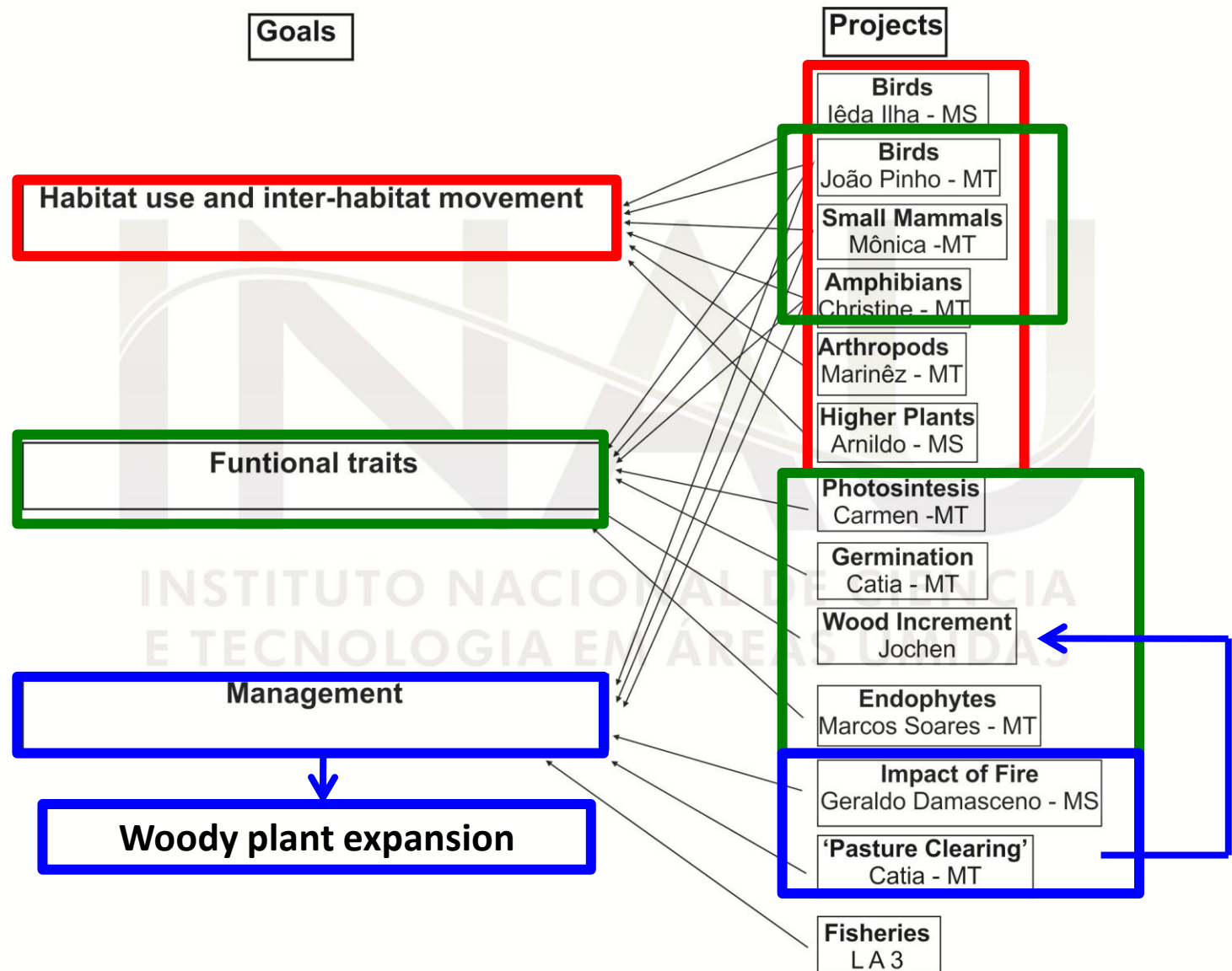
3 – How are the dynamics of the expansion of woody plant species in to pasture areas.

4 – How management strategies affect the biodiversity

5 – How we can support decision-making to a management policy aimed at conservation of biodiversity

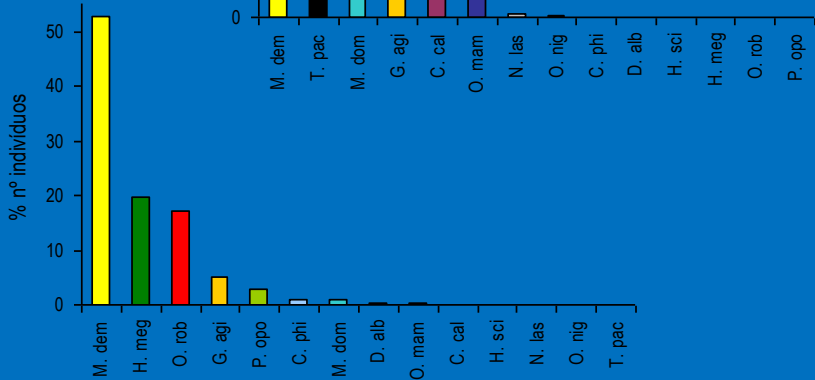
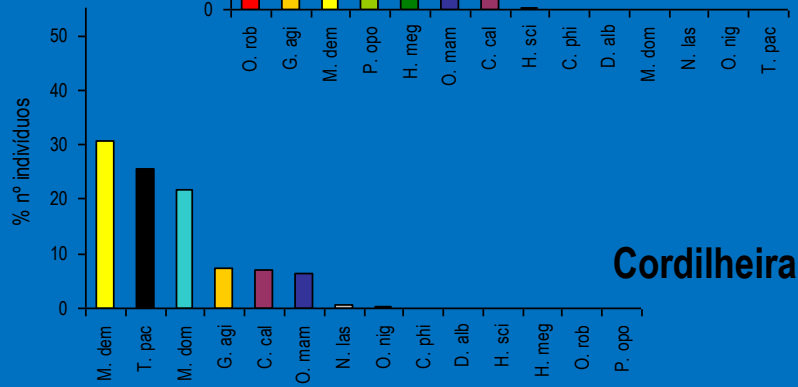
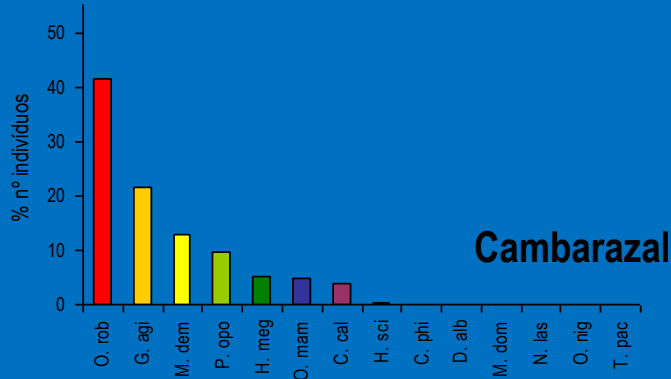
The Contribution of the Lab 3 to Science and Society

Organization of INAU Projects: Aims, localities and interactions (Part 2), L A's 3 and 4



Space and time patterns of habitat use and local migration of terrestrial small mammals among periodically flooded and non-flooded areas in the Pantanal

Dra. Mônica Aragona



wet season



dry season



Influence of pasture management on the small mammal community and its implications for the sustainable use of the Pantanal of Poconé

Viviane Layme - UFMT- vlayme@gmail.com



We registered eight species in the pasture managed, but just three species dominated the community.

Abundance is similar between areas with different frequency of disturbance by management ($F_{1,8} = 3.37, P = 0.10$). But, There are more species in more frequently disturbed areas managed ($F_{1,8} = 6.55, P = 0.03$)



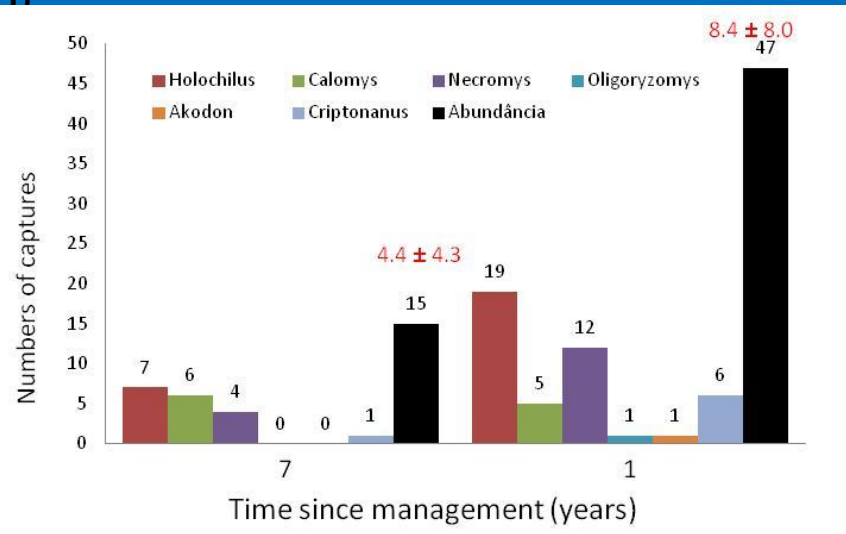
Holochilus sciureus



Calomys callosus



Necromys lasiurus

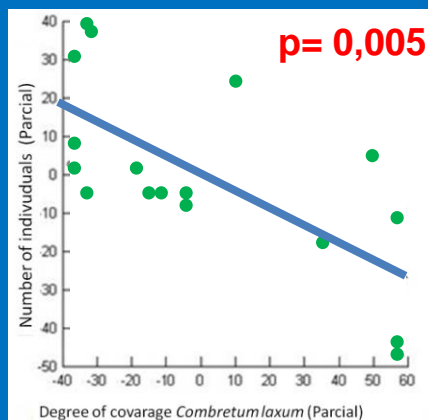
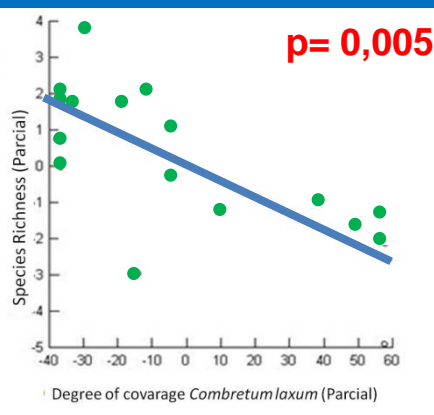


Time since last management: Similarity in richness ($F_{1,8} = 1.00, P = 0.35$) and abundance ($F_{1,8} = 0.97, P = 0.35$).

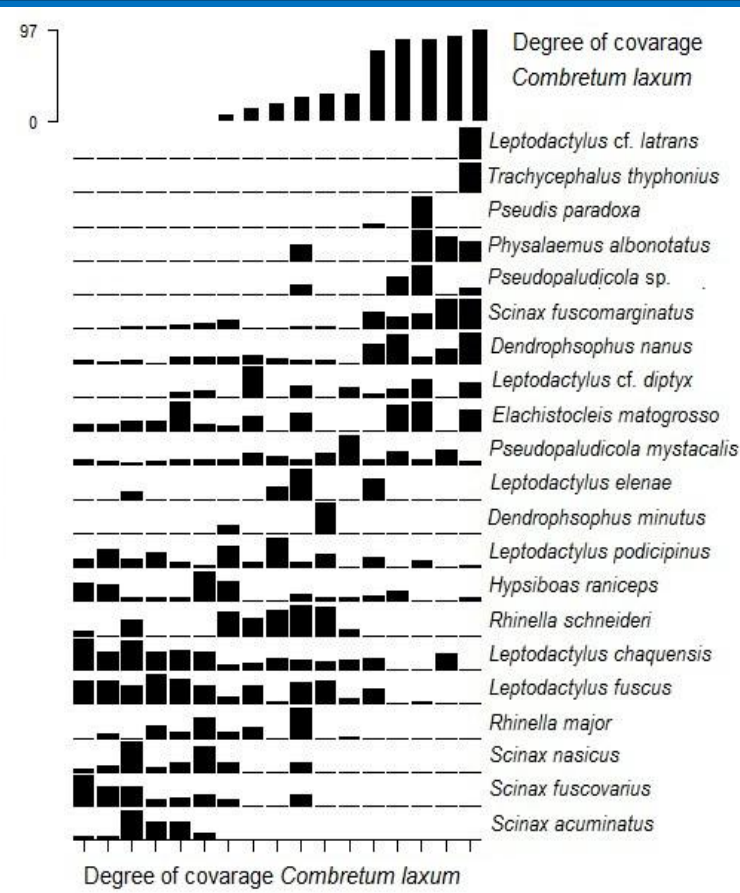
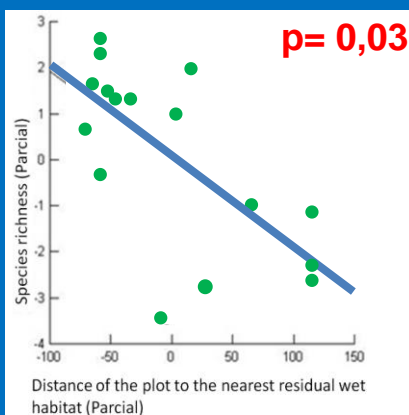
The influence of the density of “pombeiro” (*Combretum laxum*) on the composition and abundance of anuran amphibians in two localities in the Pantanal of Poconé, Mato Grosso, Brazil

Tainá Figueras Dorado Rodrigues

- O número de espécies e de indivíduos diminuiu de acordo com o aumento da cobertura por *C. laxum*, e a variação na composição da comunidade foi relacionada, ao grau de cobertura pelo arbusto.



- A riqueza também diminuiu com a distância até áreas indicativas de umidade, o que pode refletir a necessidade dos anfíbios buscarem habitats mais favoráveis durante a estiagem.



(Pillai Trace= 0,926; F= 75,016; $p = 0,0001$);





Thanks!

23 3 2006