EARTHWATCH INSTITUTE FIELD REPORT 2004

Project Title: Bat assemblage in the Rio Negro: richness, diversity, food sources and associated ectoparasites

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Research Site: Fazenda Rio Negro, Pantanal da Nhecolândia, Mato Grosso do Sul, Brasil (approx. 19° 34´ S, 56° 14´ W)

Local Management Status of the Research Site: Reserva Particular do Patrimônio Natural (RPPN) (Private Natural Reserve)

Scientific names of primary species being studied: (we are studying species communities)

Key Research Objectives:

1. To determine occurrence and abundance of bat species through different habitats and between seasons
2. To describe food items for the most common bat species
3. To record plant species whose flowers or fruits are used by the bats
4. To record seasonal variation in abundance of flowers and fruits visited by the bats
5. To determine the status of bat species as pollinator or seed disperser
6. To determine richness and diversity of ectoparasites per bat species
7. To test for differences in prevalence and intensity of parasitism among the host species, between the host sexes and age classes, and between seasons

Date this report was completed: March 30 2005

Data Collection and Results

a) Give a concise account of the data you have collected during the past field season.

- We captured 298 bat individuals in 2004, totalling 774 captures and 28 accumulated species since 2003
- Eight species of Phyllostomidae bats and *Noctilio albiventris* (Noctilionidae) defecated seeds of six plant species in the Rio Negro, Pantanal.

- *Artibeus jamaicensis* defecated seeds of all species, but the other bat species defecated only one or two species of seeds.
- *Cecropia pachystachya* seeds occurred in the fecal samples from the eight bat species. Seeds of other plant species were recorded in fecal samples from only one to three species of bats
- Seeds of *Cecropia pachystachya* (Cecropiaceae), *Ficus gardneriana*, *F. pertusa, Ficus* sp.1, *Ficus* sp.2 (Moraceae) and other three still not identified plant species were recorded
- The nutritional analysis showed that *Ficus luschnatiana* fruit pulp presented the highest total sugar concentration and *Dipteryx alata* the highest value of reducing sugars. *Piper tuberculatum* fruits were richer in protein than the other fruit species.
- Pollination studies on *Hymenaea stigonocarpa* and *Caryocar brasiliense* trees pointed out that these species flowered sequentially and were pollinated by the same bat species in the Pantanal
- Bloodsucker flies using exclusively bats as hosts were surveyed. Streblidae were the most common flies comprising nine genus and 11 species, which were parasitic on 13 bat species from 10 genus and three families. Nycteribiidae flies were represented only by *Basilia carteri*, parasitic on two species of *Myotis* bats. Streblidae and Nycteribiidae flies did not occurred on the same bat hosts

b) What progress have you made towards achieving your original objectives?

We increased sample size of bats and plants, accumulated data on plant phenology.

c) Please provide a summary of your results.

- Bats of the neotropical family Phyllostomidae were the most abundant (90%) and diverse (17 species)
- Bat community structures are similar among habitats, indicating that bats use equally all the forest mosaic through the Pantanal floodplain.
- Twenty plant species were recorded as food sources for the Pantanal bats, 13 were source of fruit pulp and eight were used as nectar and pollen sources.
- The plants *Cecropia pachystachya* and five species of *Ficus* were most common seeds dispersed through bat defecations in the Pantanal.
- The fruit bat *Artibeus jamaicensis* (Phyllostomidae) is a core species in the bat community and can be considered a keystone-species for seed dispersal and plant pollination in the Pantanal
- Ectoparasites species associated to the Pantanal bats appears to be similar to data from elsewhere, but they tend to be slightly more generalist regarding the host (bat) species

Significance/Benefits of Research

a) What is/are the significance/benefits of your research at the following levels?
   - local (in the area of the research site)

- national
- international

Results will contribute to management strategies and biodiversity conservation action plans in all the three levels.

b) How do your findings contribute to issues of sustainability?

As we are working with species at three levels in food web (**plants** that are consumed by **bats**, which are food for **parasites**), the matrix of species associations will show the resilience of the ecosystem when subjected to disturbances. Results also allow to assess part of the unknown Pantanal biodiversity and patterns of species distribution among habitats.

Dissemination of Results

a) Have you provided details of results from your research to or within:
- Scientific papers

TEIXEIRA, R. C.,C. E. CORRÊA, U. M. RESENDE & E. FISCHER. **Seed dispersal by *Artibeus jamaicensis* in the South Pantanal, Brazil**. Austral Ecology (in progress)

FERREIRA, S., C. E. CORRÊA & E. FISCHER. **Efeito do Tempo e do Método de Armazenamento Sobre a Germinação de Sementes de *Cecropia pachystachya*.** Revista Brasileira de Botânica (submitted paper)

LONGO, J. M. & E. FISCHER. **Efeito da taxa de secreção de néctar sobre a polinização e a produção de sementes em flores de *Passiflora speciosa* (Passifloraceae) no Pantanal**. Revista Brasileira de Botânica (submitted paper)

FISCHER, E. & I. R. LEAL. 2006. **Effect of nectar secretion rate on pollination success of *Passiflora coccinea* (Passifloraceae) in the Central Amazon** Brazilian Journal of Biology 67 (1): (in press)

CAMARGO, G. & E. FISCHER. 2005. **Primeiro registro do morcego *Mimon crenulatum* (Phyllostomidae) no Pantanal, sudoeste do Brasil**. Biota Neotropica 5 (1)

- Management plans and reports

Management Plan of National Park of Rio Negro, Pantanal (by Erich Fischer and Andrea Araujo for State Secretary of Environment, Mato Grosso do Sul

Management Plan of the RPPN Fazenda Rio Negro, Pantanal (By Erich Fischer and Andrea Araujo for the Conservation International)

Coordination of the Graduate Program in Ecology and Conservation of the Federal University of Mato Grosso do Sul, Campo Grande, Brazil

Field ecology course organized by UFMS (*Universidade Federal de Mato Grosso do Sul*) and CI-Brazil, in Pantanal

Committee for evaluation of the Embrapa research initiatives and projects on Pantanal use and management, Embrapa, Corumbá, Brazil

- Presentations

Participation in Forum of Brazilian Graduate Programs of Ecology, Belo Horizonte, MG, Brazil (audience: 20 coordinators of Graduate Programs in Ecology)

Disciplines of ecology (field and theoretical courses) for undergraduate and graduate students (ca. 100 students attended), Federal University of Mato Grosso do Sul, Campo Grande, Brazil

International Symposium of Long-Term Ecological Research, July 2004, Manaus, AM, Brazil (500 participants)

Field Course of Ecology and Conservation of the Amazon Forest in Central Brazil, offered by Organization for Tropical Studies (OTS-USA), Manaus AM, Brazil (22 graduate students)

Field Course of Ecology and Conservation of the Amazon Forest in South Peru, offered by Organization for Tropical Studies (OTS-USA), Puerto Maldonado, Peru (20 graduate and undergraduate students)

Conference during the Annual Meeting of the Brazilian Society of Science (SBPC), Cuiabá, MT, Brazil (audience ca. 200 persons)

- Popular articles or films

- Books, chapters, illustrations

Book chapter:
ARAUJO, A., E. FISCHER & M. SAZIMA. 2004. As bromélias no estuário do Rio Verde. In (O. Marques & V. Duleba orgs.) **Ambiente, Flora e Fauna da Estação Ecológica Juréia Itantins**. Holos Editora, Brasília.

We would appreciate copies of any relevant materials you can make available to us.