

Progress Report:

Investigation Group: ND-11

Title: Carbon and Nutrient Stocks and Regrowth in Reduced Impact and Conventionally Logged Forests and Settlements in NW Mato Grosso, Brazil

PIs:

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1. Narrative of 2003 activities:

The following activities were conducted in Juruena, Mato Grosso, Brazil:

1. Biomass inventory in 8 transects:
 - a. Vegetation = 10 cm and landscape position;
 - b. Vegetation < 10 cm from 2 x 2 and 5 x 5 plots within transects;
 - c. Soil (0-20, 20-40, 40-60 cm every 25 m);
 - d. Vines
2. Tree volume, density and nutrients of 100 individuals harvested from Block 5.
3. Impact of tree falling on surrounding vegetation (on about 25 logging sites):
 - a. Gap dimensions;
 - b. Canopy size;
 - c. Number of trees "damaged"
4. Water collection and analysis from 4 microbasins.
5. Litterfall, litter movement on soil surface; and coarse organic debris in streams.
6. CO₂ fluxes from soil piezometers using NaOH; and measurement of subsoil water.
7. Soil survey of microbasins (0-20, 40-60 cm, and piezometers to 7 m).

2003 activities that were conducted in Manaus, Amazonas, Brazil:

1. Tree growth, LAI, soil water depletion in secondary forests as affected by relaxed nutrient constraints
2. Subsoil N uptake assessed with N-15 isotope placement at 0.1, 1, and 3 m depth.
3. Movement of Ca into acid subsoils.

2. Narrative of 2004 workplan in Juruena (Manaus where indicated):

1. Continuation of biomass inventory in another 5 to 8 transects from other blocks:
 - a. Vegetation = 10 cm;
 - b. Vegetation < 10 cm (less intensively than 2003);
 - c. Soil
 - d. Vines
2. Revisit to Rohden parcels (about 10 parcels) inventoried in 1967 that includes:
 - a. Trees with = 10 cm diameter;
 - b. Trees with < 10 cm diameter

3. Revisit to cleared sites in Block 4 and 5 (about 10 sites) to look at regeneration dynamics:
 - a. Vegetation < 10 cm;
 - b. Vines;
 - c. Soils
4. Biomass in settlements for allometric equations on:
 - a. Three species that are not harvested by Rohden;
 - b. Possibly some < 30 cm size classes
5. Biomass and nutrient estimates of felled canopies in Block 5.
6. Soil characterization (nutrients, mineralogy, bulk density, and carbon) of deep cores from microbasins.
7. Dissolved Organic Carbon (DOC) in higher than first order streams to the river.
8. Litter fluxes across soil surface and in water.
9. Fluxes of DOC and nutrients.
10. Streams fluxes; piezometers; hydrologic cycle.
11. Measurement of CO₂ dissolved in and evolved from water and soil (piezometers and surface).
12. Analysis of transect soils.
13. Measurements of LAI, tree growth, soil water in secondary forests in Manaus (final measurements by March 2004).

3. Description of any difficulties encountered or any issues to resolve (if needed):

1. Transfer of funds to Juruena, Brazil for project expenses was difficult for part of 2003; however, most of these difficulties were resolved. We encouraged workers to open accounts in the local banks so that we could directly deposit their monthly wages. However, we would like UFMT to handle the UFMT expenses and salaries.
2. Communication and literature searches will be improved when the satellite internet connection is up and running (it may already be installed).
3. In general, the experiment site is far from Cuiabá, the source for most technical equipment and support. Transportation costs are high and time-intensive.
4. Equipment repair is often impossible in Juruena or the surrounding villages.
5. There was a lack of information regarding necessary extra permits or authorizations which required filling out forms from IBAMA and working with the LBA office in Manaus. All this resulted in a 2 week period during which we were not able to do field work at the end of August through beginning of September. (*)

4. Description of training activities conducted in 2003, including lectures, public outreach, and short courses:

1. In September 2003, Ted Feldpausch presented several lectures to the local primary and secondary students using a powerpoint data-show at the local community center. The topics were environmental conservation and a general summary of our research goals and activities in the Rohden managed forest and the settlement (assentamento) Vale da Amanhacer. The lecturer discussed the benefits of forest management and conservation compared to clear-cutting and pasture establishment. Following the lectures participants planted trees in the new city park

(which had recently been illegally burned). These lectures were conducted in conjunction with Pro-nature (Paulo and Linda), the Juruena Prefeitura, and the local schools.

2. Mark Johnson prepared a stand at the 2003 Juruena ExpoAmbiente (Environmental Fair) which was held for three days during June, 2003 and attended by hundreds of local residents (the Fair itself, not necessarily the LBA-ND11 stand).
3. Erick Fernandes presented the following invited talks:
 - a. November - "Advances in agroforestry approaches for rehabilitating abandoned pastureland in the central Amazon" at the LBA Workshop on "Biogeochemical changes associated with the establishment and maintenance of agroecosystems" in Brasília.
 - b. November - "Carbon, nutrient stocks, and belowground biodiversity in agroforestry on degraded pasture land in the central Amazon" at a seminar in Brasilia on ND-04 data and outcomes to the World Bank's Rainforest Unit and stakeholders from donor groups, local universities, several Government ministries, and local and international NGOs.
 - c. November - "Biogeochemistry and ecosystem services of agroforestry systems on degraded pasture lands in the Amazon" at the VI Brazilian Ecology Congress in Fortaleza, Brazil. (*)

5. ND-11 LBA DIS Contact Person: Please designate a participant in your group to be the contact person for LBA DIS questions about data, metadata, etc. If no person is identified, then it is assumed that the PI is the contact person for LBA DIS questions.

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6. The LBA-ECO Program Manager strongly supports the goal articulated in November by the LBA Science Steering Committee in Fortaleza that all LBA publications be linked to data sets registered in the LBA DIS. In January, the LBA-ECO Project Office will provide the Program Manager a comprehensive report of all of your data sets with their related publications. The current status of your investigation's data set and publication report is listed below. Please do NOT edit this information here! You should use the LBA Metadata Editor (LME) to create and edit metadata files for your data sets; the metadata file contains a section for publications related to each data set (for questions about using the LME, contact Marilyn Gentry <mgentry2@utk.edu>).

Data sets and related publications (DO NOT EDIT HERE):

Additional Posters:

Headwater stream low flow nutrient concentrations, Juruena 2003 (Poster)

7. List of publications in the primary scientific literature (in print, in press, and submitted) directly funded by NASA's LBA-ECO component. Please

submit a PDF file, if available, to pgriffit@pop900.gsfc.nasa.gov of any publications in print.

Feldpausch, T.R., E.C.M. Fernandes, M.A. Rondon, S.J. Riha, E. Wandelli, and J. Lehmann. 2003. Tropical forest recovery following human disturbance in central Amazônia: post-pasture forest structure, canopy cover, biomass and nutrient dynamics. International Young Scientists' Global Change Conference, START [www.start.org] and Third World Academy of Sciences/ICTP, Trieste, Italy. p 83. November 16-19, 2003. (*)

Feldpausch, T.R., M.A. Rondon, E.C.M. Fernandes, and S.J. Riha. 2004. Carbon and nutrient accumulation in secondary forests regenerating from degraded pastures in central Amazônia. Ecological Applications In press.

Pereira, C.N., E.C.M. Fernandes, J. Lehmann, M. Rondon, and F.J. Luizão. 2004. Inorganic and organic phosphorus pools in earthworm casts (family *Glossoscolidae*) and a Brazilian rainforest Oxisol. Soil Biol. Biochem. Submitted.

Pereira, C.N., E.C.M. Fernandes, J. Lehmann, M. Rondon, and F.J. Luizão. 2004. Agroforestry trees increase phosphorus availability in an oxisol of the Brazilian humid tropics. Acta Amazônica Submitted.

Schwendener, C.M., J. Lehmann, P. Camargo, and E.C.M. Fernandes. 2004. Nitrogen transfer determined by ¹⁵N enrichment between high- and low-quality litter on a nutrient-poor Oxisol. Soil Biol. Biochem. Submitted.

Schwendener, C.M., J. Lehmann, M. Rondon, E.V. Wandelli, and E.C.M. Fernandes. 2004. Soil mineral N dynamics beneath mixtures of leaves from legume and fruit trees in Central Amazonian multi-strata agroforests. Acta Amazônica Submitted.

8. (Optional) Any other publications that you would like to include (e.g. commentaries, letters to the editor, articles in popular magazines):

9. Participants: Please indicate in the "People to Remove from ND-11" section any people listed below who are no longer participating with your team. In the "People to Add to ND-11" section, please give the name and email address of any person currently participating with your team but who is not listed below. We will follow up with these people to create LBA-ECO website accounts with ND-11.

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(*) - Added after the submission of this report to LBA in the end of 2003.

Updated: January 7, 2004