

The role of the soil fauna in the litter decomposition process in primary forests, secondary forests and a polyculture plantation in Amazonia (SHIFT Project ENV 52)

L. Beck¹, L. Gasparotto², B. Förster³, E. Franklin⁴, M. Garcia², A. Harada⁵, H. Höfer⁷, F. Luizão⁴, R. Luizão⁴, C. Martius¹, J. W. de Moraes⁴, E. Oliveira⁴, J. Römbke³

¹ Staatliches Museum für Naturkunde Karlsruhe, Germany

² Embrapa-CPAA, Manaus/AM, Brazil

³ ECT Oekotoxikologie GmbH, Flörsheim, Germany

⁴ INPA, Manaus/AM, Brazil

⁵ Museu Paraense Emílio Goeldi, Belém/PA, Brazil

A general description of the project is given on this poster. The project is closely related to existing projects of the SHIFT programme in Manaus, which aim to develop methods for sustainable land use in Amazonian rain forests, using an experiment on recultivation of a fallow rubber plantation with mixed plantations of annual and perennial plants (polyculture systems) (projects ENV 23, 42, 45). In the present project, litter quantity and quality, decomposition rates, and the abundance, biomass, and respiration of soil-inhabiting microbes, arthropods and earthworms will be studied comparatively in one of the polyculture systems (a forestry plantation consisting of 4 tree species) and in plots of nearby secondary and primary forest. The aim of this study is to evaluate the specific contribution of the soil microflora and of the different functional soil fauna groups to the decomposition of organic matter and the resulting nutrient supply to the plants. Our basic hypothesis is that a functional soil fauna is of extreme importance for the maintenance of "healthy" nutrient cycles in the systems, and that biotic and abiotic factors of the sites can be managed in order to optimize the cycling of nutrients. In view of the high variability in the distribution of the fauna in tropical soils, only an exhaustive and very time-consuming sampling scheme will allow to address these questions and to provide a model of the underlying processes which will be applicable in similar situations. One aim, however, is to approach the establishment of short-term methods of bioindication of the "operative health" of the decay processes which allow less labour-intensive though significant sampling in future studies.