

## **SHIFT project ENV 52: Soil fauna and litter decomposition. The use of adapted soil biological methods to study macrofauna in Amazonian rain forests**

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A comparative study of litter quantity and quality, decomposition rates, and the abundance, biomass, and respiration of soil-inhabiting microbes, arthropods and oligochaetes has been started in a polyculture forestry plantation and in plots of nearby secondary and primary forest in 1997. The aim 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.

The following methods for the study of the macrofauna (all soil fauna of >2mm body diameter or >10mm body length and of either saprophagous or predatory habits) have been adapted to neotropical conditions on the base of preliminary tests.

- Extraction of the soil fauna from large soil-cores is used to determine macrofauna species composition, abundance and biomass.
- Manual sampling for macrofauna from the litter layer in areas of 4 m<sup>2</sup> yields additional information for very large fauna.
- Formol-extraction of earthworms in areas of 4 m<sup>2</sup> has been proved to be superior to hand-sorting for the assessment of large earthworms. Additionally, wet-sieving is an efficient method for the extraction of enchytraeids.
- Additional stratified and bait sampling is necessary for termites and ants because social insects are not adequately sampled with the classical soil core extraction.
- Experiment on enhancement and exclusion of predators are used to determine the impact of predators on saprophagous soil fauna (macro- and mesofauna).
- Measurements of the respiration rates of selected soil animals (using an Infrared-Gas-Absorption-Spectrometer - IRGA) together with population estimates will allow to assess turnover rates of the different soil fauna groups
- Chemical analyses (C/N-ratio, macro- and micronutrients, exchangeable cations, humic substances) of soil, plant residues and soil animal products will allow to estimate the contribution of each faunal group to the turnover of selected elements