

**Managing plant residues to improve soil fertility in central Amazonian agroecosystems. An integrated approach with agricultural trials, controlled field and laboratory experiments, ecotoxicological tests and a screening of eight different plantations with regard to soil macrofauna and decomposition**

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The functional preconditions for a plant residue management in selected land use systems in central Amazonia were studied in a German-Brazilian SHIFT (Studies on Human Impact on Forests and Floodplains in the Tropics) project from October 2000 to September 2003. Objective was the development of recommendations for an optimization of a sustainable land use. In different plantations within the sites of Embrapa-Amazônia Ocidental (Manaus, Brazil) plant residues were managed to improve soil fertility, which we define as an integrative variable resulting from several measured variables like abundance of key macrofauna groups, soil organic matter (SOM) content, decomposition rates, C/N-ratio, cation exchange capacity, soil structure.

In two field experiments we treated plots in a rather degraded fruit tree plantation with different legume mulch quantities and qualities combined with different mineral fertilizer quantities and measured the effects on macrofauna, decomposition, soil organic matter, soil nutrient content and soil micromorphology. In a further field experiment woody residues were used as mulch material and two methods of land preparation as alternatives to slash-and-burn were studied. Complementary the functional importance of single factors and their interactions were tested in laboratory experiments with microcosms.

A field trial with three legume species planted to produce mulch material and a screening of eight different land use systems for soil macrofauna and decomposition-rates were carried out to evaluate the transferability of the results of the controlled experiments.

Because pesticides are meanwhile increasingly used in Amazonia and the environmental risk is totally unknown to date, tests for their effects on soil macrofauna and decomposition processes under tropical conditions were also developed within the project.

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