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**A Microcosm Experiment to Evaluate Influence of Nutrient Release
as Mediated by Diplopods from Litter of Agroforestral Species Using
¹⁵N Marker**

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Abstract

Understanding the ecology of the soil faunal community is essential for management of nutrient cycling by litter in sustainable agriculture. In central Amazonia, diplopods are the main decomposers for many litter types in agroforest plantations. A new approach of microcosm study is introduced here to examine the effect of litter quality on interactions of macrofauna with microfauna in decomposition and nitrogen release. Litter marked with ¹⁵N was used in integrated microcosms with standardised soil and collection of percolating water. Microcosms were developed that were cheap and easy to maintain so that high replicate numbers could be employed.

Plastic tubes of 20 cm diameter were used, giving sufficient space for incubation with macrofauna. Litter moisture was controlled by water application, which proved a critical factor in animal vitality. Leafs marked with ¹⁵N were cut fresh and artificially aged to produce homogenous litter of a quality found in the field. Animals were collected and artificial populations established. Microfauna regrew in soil and litter after remoisting. By including sieved soil from field study sites, effects of interactions between litter, microfauna and diplopods could be studied. Percolating water could be collected, without extensive collection systems. Nitrogen pathways were elucidated by using the isotope labelling technique.

The method employed is considered suitable for studying soil ecosystems by controlled experiments. Interactions between compartments can be tested directly within an integrated environment, which can be extended by adding further components.

Keywords: Decomposition, diplopods, litter quality, microcosm, nitrogen tracer, nutrient cycling, soil fauna