measurements for termite species from over 20 termite genera from a central Amazonian primary forest, which will allow to specify the role of termites in the carbon cycles of these ecosystems. With these data, the extrapolation and application of data to larger scale amazon ecosystem models is possible. In this contribution, genus-, caste-, and size-specific respiration rates will be discussed, and together with data on diversity, distribution, and biomass, a model on the quantitative contribution of termites to the carbon cycle in these systems will be presented.

Phosphorus Management for Perennial Crops in the Amazon

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Continuous cultivation of the same area of low soil fertility and, without replacement of nutrients, even of high natural fertility usually leads to an exhaustion of soil nutrient stocks. Further agricultural activities will then be dependent on massive fertilizer applications. This situation is true for most of the nutrients in the Brazilian Amazon region, but mainly for phosphorus, because 90 % of the soils are poor in that element. In the Amazon there exists some information on the response of annual crops to phosphorus applications, but for perennial crops are relatively rare. In the Brazilian tropical area, information on response to phosphorus can be found for cocoa (*Theobroma cacau*), cupuaçu (*Theobroma grandiflorum*), guaraná (*Paullinia cupana*), peach palm (*Bactris gasipaes*), papaya (*Carica papaya*), banana (*Musae spp*), cítrus (*Citrus sp*), coconut (*Cocus nucífera*) and other tropical fruits. However, few works were made which define response curves to P applications for fertilizer recommendations, especially for many tree crops indigenous from Brazilian Amazon.

The dynamics of P in the soil under different perennial crops is still not very well known in the Brazilian Amazon, but there are indications that under cultivated area with annatto (Bixa orellana) the content of P in the soil is higher than under cultivated area with cupuaçu (*Theobroma grandiflorum*). This fact is probably related to the more rapid decomposition and concomitant release of P from leaves of annatto than from the leaves of cupuaçu. Furthermore, the P return with leaf litter by annatto is much larger than by cupuaçu. Studies were demonstrating that the P contents below the A horizon of a Brazilian Amazon Ferralsol are very low, but under cultivation of annatto the level of nutrients, even those values for P, are elevated at a depth between 20 and 40cm. Another factor that can influence the soil P dynamics is a cover crop which is often planted between perennial tree crops. The legume *Pueraria phaseoloides* initially competes with the perennial cultures for P. With sufficient P fertilization, however, the rapid P recycling by pueraria may keep a higher amount of P in available form than without a cover crop as shown by elevated inorganic soil P contents, in comparison to secondary forest sites.

Organic Nutrients in Soil and Soil Solution of Mixed Cropping Systems and Forests of Central Amazonia

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The dominance of variable-charge minerals in the soils of central Amazonia results in little retention of inorganic nutrient forms such as nitrate in the topsoil whereas others such as phosphate are irreversibly bound. Therefore, organic matter plays an important role in the cycling of nutrients in these soils. It represents a slowly flowing source of plant-available nutrients. On the other hand, soluble organic substances may contribute to the nutrient leaching in these soils. We assume that the distribution of organic nutrient forms in soils is strongly influenced by different tree species and that the distribution is strongly influenced by the movement of dissolved organic matter through the soil profile. We tested this hypothesis for under various species of a multi-strata agroforest (*Bactris gasipaes* Kunth., *Theobroma grandiflorum* (Willd. Ex Spreng.) K. Schum., *Pueraria phaseoloides*). In addition, woody species of secondary forest (*Vismia spp*.) and primary forest (*Eschweilera*