Abstract

During forest succession, litterfall nutrient fluxes increase significantly. The higher inputs of organic matter and nutrients through litterfall affects positively soil fertility and the species composition, which are essential components in forest restoration and management programs. In the present study, the input of nutrients to the forest soil via litterfall components was estimated for two sites of different development stages, in an early successional alluvial rain forest in Brazil. Litterfall returned to the soil, in kg/ha, ca. 93 N, 79 Ca, 24 K, 15 Mg, 1.7 Mn, 0.18 Zn, 0.09 Cu and 11.2 Al, in the site where trees were more abundant and had higher values of basal area. In the other area, where trees where less abundant and values of basal area were comparatively low, litterfall returned <50% of those amounts to the forest soil, except for Al. The amount of Al that returned to the soil was similar in both areas due to the high contribution of Tibouchina pulchra (82% of Al returned). Comparatively, high proportion of three dominant native tree species (Myrsine coriacea, T. pulchra and Cecropia pachystachya) explained better litter nutrient use efficiency (mainly N and P) in the site with the least advanced successional stage. Although litterfall of these species show lower nutrient concentrations than the other tree species, their nutrient fluxes were high in both sites, indicating a certain independence from soil essential nutrients. Such feature of the native species is very advantageous and should be considered in forest restoration programs.

Keywords

Litter production, nutrient cycling, nutrient use efficiency, secondary succession, tropical rain forest.