

Diversity and nest density of non-leafcutting, fungus growing ants (Formicidae, Myrmicinae, Attini) in an Amazonian rainforest and an agroforestry system

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As part of the research project SHIFT ENV 52-2 the influence of soil macro fauna on decomposition and nutrient cycles in agroforestry systems was studied and compared to a *terra firme* rainforest. Here we present the first data about species richness and nest density of those fungus growing ant species of the tribe Attini that do not forage on leaves of living plants, but use dead plant and other material from the litter stratum as substrate for their fungus gardens.

The field research took place at the experimental field sites of the EMBRAPA-Amazônia Ocidental near Manaus, Brazil. For monitoring diversity and nest density we investigated eight plots of 12.5 sqm each, in a primary rain forest and the same number of plots of the same size in a nearby agroforestry system of 19 ha. In all plots the lower vegetation was cut off and the soil was carefully cleaned from leaf litter. All ant nest entrances discovered were marked. Furthermore all foraging ant individuals found in the study plots were observed until they reached their nest entrance. We observed and mapped each plot for 20 hours to maximise the chance to encounter any nest entrance of Attini ants occurring.

All together we identified a total of 293 nests of 26 ant species from 7 genera of the tribe Attini. From these 26 species 22 species occurred exclusively in the rain forest and 3 species were found only in the agroforestry area. Habitat specification of the species was nearly perfect, with only a single *Cyphomyrmex* species encountered in both habitats (but with a single nest in the agroforest). Nest density in the primary forest was significantly lower (0.65 nests/sqm) than in the agroforestry system (2.28 nests/sqm) (Mann-Whitney-Test: df:1; $p < 0,001$).

With 170 nests (74,6 % of the total nest count) the species *Mycocepurus smithi* dominated in the agroforestry system, followed by *Trachymyrmex relictus* (13,6%) and *M. goeldii* (11,4 %). The nest/species ratio was 57. In the primary forest 18 species (78%) were registered only with one, two or three nests, and the most frequent (*Cyphomyrmex* sp.) with just 13 nests, resulting in a low nest/species ratio of 2,8 for this habitat.

Thus, in the agroforestry system we found a significantly reduced species richness, but high nest densities of three species (86% of them were *Mycocepurus smithi* and *M. goeldii*). Obviously these species cope very well with the changing conditions they are exposed to in an anthropogenic influenced habitat and may play an important ecological role in soil physics and chemistry of Amazonian agroforestry systems through their subterranean digging and fungus growing activity.