F-61

Soil and litter ant fauna in central Amazonian polyculture systems and forests - systematic composition, number, and biomass

Verhaagh, M.[1], Garcia, M.V.B.[2] & Martius, C.[3]

[1] Staatliches Museum für Naturkunde, Erbprinzenstr. 13, D- 76133 Karlsruhe, Germany
[2] Embrapa Amazônia Ocidental, Caixa Postal 319, 69.011-970 Manaus/AM, Brazil
[3] Zentrum für Entwicklungsforschung – ZEF, Walter-Flex-Str. 3, D-53113 Bonn, Germany

In SHIFT project ENV 52 between July 1997 and March 1999 ants of soil and litter were taken every three months with a core sampler (21 cm Ø) in a primary rain forest, a secondary forest, and two different systems of polycultures of comercially used trees in central Amazonia (Manaus, site of Embrapa) and extracted in Berlese funnels. The collected ants were classified to generic level. In total, ant species of 51 genera and 8 subfamilies were found. The primary forest (FLO), exhibited the greatest generic diversity, while it was about 20 and 30% lower in the secondary forest (SEC) and the two polycultures (POA, POC), respectively.

Due to the method used, the results are clearly biased towards small litter and soil species while arboreal and all bigger species were underrepresented as were army ants (Ecitoninae), too. Despite these limitations, ant individuals made up between 23 and 27% of the whole soil macrofauna sampled in the forests and still 15 to 18% of that in the polycultures. Ant biomass (dry-weight), however, accounted only for 6,3-6,9% of the biomass of the whole macrofauna in the forests and dropped to 3,3-3,9% in the polycultures. Biomass and median density of ants were highest in primary forest, followed by the secondary forest and one of the polycultures (POC), whereas the lowest number and biomass of ants was found in the second polyculture (POA) (Table 1). There was no statistically significant difference in density and biomass of ants between litter and soil samples for all study areas (Table 2).

Table 1. Ants in the study areas: Total number of individuals, density, biomass and number of genera

Study area	N°. of samples per collection/Total N°. of samples 1997-99	Total number of individuals Litter + Soil 0-5 cm	Average density ± Standard deviation (ind/m²) (n=8)	% of total macro-fauna	Average biomass ± Standard dev. (mg/m²) (n=8)	% of total macro-fauna	N°. of genera
FLO	20/160	7329	1322 ± 611	27,1	187,9 ± 93,3	6,9	42
SEC	20/160	4798	865 ± 378	22,9	87,8 ± 33,5	6,3	35
POA	10/80	1591	574 ± 299	15,3	45,9 ± 15,9	3,3	30
POC	10/80	2167	782 ± 284	18,3	91,3 ± 39,8	3,9	30

Table 2. Ants in the study areas: Density and biomass according to soil and litter samples

Study area	Average density ± Standard deviation (ind/m²) (n=8)		Average biomass ± Standard deviation (mg/m²) (n=8)	
	Litter	Soil	Litter	Soil
FLO	549 ± 240	774 ± 507	71,9 ± 40,0	116,0 ± 90,7
SEC	545 ± 233	321 ± 185	43,1 ± 12,7	44,8 ± 28,2
POA	245 ± 144	330 ± 195	22,8 ± 10,5	23,1 ± 7,9
POC	339 ± 159	440 ± 218	43,8 ± 21,3	47,1 ± 29,6