

Army ants – an important part of the subterranean predator guild in forests and agroforestry systems in Central Amazonia (Formicidae, Ecitoninae)

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Diversity and biology of the hypogaecic ant fauna is still poorly known in the tropics mainly due to methodological difficulties. As part of the research activities of the SHIFT Project ENV 52-2 near Manaus, Brazil, we studied the baiting effect of palm oil for neotropical ants. Here we present results on subterranean army ants (Ecitoninae).

We offered palm oil as bait in eight different habitats at the experimental study site of EMBRAPA-Amazônia Ocidental near Manaus, Amazonas. Among these habitats were two different primary forests, two secondary forests of different age and three agroforestry systems: coconut palms (*Cocos nucifera*) in a matrix of the creeping legume *Pueraria phaseloides*, monocultures of peach palm (*Bactris gasipaes*), and monocultures of rubber trees (*Hevea brasiliensis*). In total, we studied 80 plots with three sampling points, each, consisting of two palm oil baited points and one control point without bait. The first sample of each plot was collected one day after exposing the oil bait, the second one after seven days. Altogether, 240 soil discs 15 cm thick and 21 cm in diameter were taken with a cylindrical soil core sampler and exposed in Berlese funnels to extract the macrofauna.

Ecitonine army ants (2 *Labidus* and 3 *Neivamyrmex* species) occupied 64 of the sampling points baited with palm oil (40%). Only at 4 control points without palm oil army ants could be encountered (5%). The differences in individual numbers were quite impressive: 71757 (99.94%) army ant workers were counted from the 160 palm oil baited soil cores, but only 45 (0.06%) from the 80 unbaited ones. The differences between baits and controls (presence-absence data) were highly significant ($p=0.001$ for the baits after one day exposure, $p<0.001$ for baits after 7 days exposure, and $p<0.0001$ for the combined baits, Fisher's test).

Army ants were attracted in all of the investigated habitats. Significant higher frequencies could be detected only in the plots under coconut trees, under *Pueraria* cover and from the peach palm monocultures. Under coconut and peach palm trees this preference was correlated with a 10 times higher abundance of earthworms (mainly *Pontoscolex corethrurus*) in comparison to the other habitats and, under coconut trees, additionally with 3-fold higher numbers of soil macrofauna (especially ants, diplopods, isopods and termites) in the litter/humus-layer. This rich food source might influence the presence of army ants also in the *Pueraria* matrix, where such high macrofauna values were not found. The peach palm monoculture additionally may be attractive due to its long-time presence of oil-containing fruits, because many of them were not harvested in the experimental cultivation.

Our results demonstrate that the abundance of army ants in neotropical soils must be considerable although they are not obvious to the observer because of their hidden, hypogaecic lifestyle. We also conclude that the large numbers of hypogaecic army ants should be able to significantly influence the population size of many other subterranean species of the soil macrofauna.