



EFFECTS OF HABITAT COMPLEXITY ON THE ARTHROPODS LITTER FAUNA ESTIMATED DURING RAIDS ON ARMY ANTS SWARMS IN AN ATLANTIC FOREST FRAGMENT, MG, BRAZIL

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INTRODUCTION

Investigations about the influence of vegetation complexity on the community of arthropods and vertebrates have been evaluated in different habitats, but this effect was assessed mainly in the light of diversity and richness of species and did not regard the individuals abundance and biomass (see e.g. in Morato, 2004).

The army ants, or legionary ants, are generalist predators and form large swarm raids that moves forward through the leaf litter flushing practically all animal life that lies in their path (Hölldobler & Wilson, 1990). This peculiar feeding behaviour allowed to estimate the abundance and biomass of arthropods related to the litter in different habitats.

While moving at the study site, *Eciton burchelli* colonies commonly used forest edges, *capoeiras* (fallow vegetation), gardens and roads, which provided very different samples. The aim of this study was to test the prediction of the hypothesis that the vegetation complexity of an area where the army ants are moving affects the abundance and biomass of captured arthropods. Therefore it can be predicted that the greater the complexity of a habitat is, greater will be the abundance and biomass of arthropods.

MATERIAL AND METHODS

The study was accomplished at Research and Environmental Development Reserve of Peti (EPDA-Peti) which is a preservation and funded area by CEMIG (Energy Company). It comprises 606 hectares of a fragment of Atlantic rain forest and it is localized at São Gonçalo do Rio Abaixo city, state of Minas Gerais, Brazil (Nunes & Pedralli, 1995).

The data were collected from May to August 2005. The *E. burchelli* colonies, in nomadic phase, were found by observing the ants movement on the

ground. Just after the raids interception, the flushed arthropods were sampled. Sometimes, the colony raided for more than one day. In this cases, although the sampling was repeated, only one sample was considered per colony, in order to guarantee the independence of the data. By this way, a total of twelve samples were collected which provided 720 minutes of sampling. Window traps were used to collect the flushed arthropods (Milhomem et al., 2003). This method was chosen due to its passive feature. When the arthropods were trying to escape of the ant attacks, they were intercepted by a sheet of clear perspex and walked on this sheet until they fell in a plastic container with water and detergent.

After each swarm's interception, four traps were mounted in front of the largest zones of spreading, and they remained operating during sixty minute intervals. At the same time, other four traps were mounted near to the explored area (aproximately 20 meters far from the swarm), during the same sample interval, in order to obtain the control of arthropods sample without the presence of the ants. After 60 minutes, the solution of containers were filtered and the captured arthropods were kept in plastic boxes containing 70% alcohol. Then all samples were taken to the laboratory, where arthropods were separated by order, identified and counted. In order to obtain the dry weight, the samples remained in a heater of 45°C for 3 days and they were weighed with precision of 0,0001g

The variables computed per raid were abundance (total quantity of all captured arthropods in the four boxes) and biomass (total dry weight of the all captured arthropods in the four boxes).

The sampled areas were separated in different categories of habitat complexity in order to correlate that with the flushed arthropods variables. For this purpose it was considered the successional stage of each landscape, the dominance of some plants species, the proximity of a large open area and/or water streams. Field observations were used to estimate the presence

and quantity of litter fall (visual analysis) and the pioneer species, as bamboos, grass and pteridophytas. Furthermore the lianas and bamboos densities were evaluated as well the light incidence, which was related to the height of the trees and the canopy covering. Five arbitrary categories were considered. The greater the category is, higher is the successional stage and the complexity of the habitat. By this way, the category assigned "1" represents open areas on initial stage of succession; "2" gardens; "3" forest areas in intermediate stage of succession; "4" forest habitats in middle/advanced stage of succession and near to water streams and "5" forest habitats in more advanced stage of succession. Simple regressions were used to analyze the data.

RESULTS

The sampled areas were statistically different in relation to the number of flushed arthropods. Both the tested variables (abundance of arthropods and the landscape categories, and biomass of arthropods and the same categories) were positively and significantly correlated ($R = 0,74$ e $p < 0,006$; $R = 0,67$ e $p < 0,015$ respectively).

DISCUSSION

The hypothesis that the vegetation complexity can predict the abundance and biomass of arthropods was supported. Generally, a major abundance and biomass of arthropods were captured in more complex sites. This result is in accordance with the statement that the composition of species in the litter fall is dependent on several factors as the type of vegetational formation, the soil, the local climate and the diversity of microhabitats (Schowalter & Sabin. 1991). Thus, more complex habitat have a greater niches availability and they are capable to support a greater number of individuals.

Morato (2004) also evaluated the influence of vegetation complexity on the abundance and richness of wasps and solitary bees in a reserve at north of Brazil, in the state of Acre. His results also showed that this variable was significantly correlated with the abundance of wasps of two specific trophic guilds.

Although the method used by Morato (2004) to estimate and test the relationship between these

variables was different, the similar result (increase of abundance of some wasps with the increase of vegetation complexity) suggests that investigations in this field should be extended to other animal groups in order to obtain major confirmations to this hypothesis.

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