Arthropods communities composition variation in the forest formations on the extreme south of Bahia: Food resources disponibility for leaflitter frogs ans lizards

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Abstract

Suitable estimates of the composition of communities are important elements for the solution of ecological problems. Distinct empirical methodologies for its evaluation, however, may estimate differently the parameters of interest. Arthropods are key elements to ecosystems and represent a diverse and extremely numerous group in terrestrial environments. They represet the main source of food resources for the herpetofauna communities, thus, evaluating its composition and distribution in a complex landscape, as it is the case studied, is key to understand the ecological processes in the area. This work intended to evaluate three main aspects out of the proposed model: (1) to measure the abundance estimates of the leaflitter arthropods communities in a forested landscape based on pitfall trapping and on analysis of arthropods found in stomach contents of the herpetological fauna. (2) To detect the main variation in the composition of the forest leaflitter arthropod community in a fragmented landscape in the extreme south of the state of Bahia and to associate it with variations in environmental factors. (3) And to study the use and eletivity of food resource by the leaflitter herpetofauna in an Atlantic forest remnant (6,069 ha). The study was conducted at the RPPN Estação Veracruz, a private reserve in the extreme south of Bahia, Brazil. We compared the diets of frogs and lizards captured in 432 drift fence pitfall traps, distributed in four areas between January 2003 and February 2004. We analyzed three landcape components: reference forest (M); forest remnant (R); and eucalypt monoculture (E). Captures based on an effort of 17,280 pitfall traps in 40 days sampling expedition and on the stomach contents present in 523 frogs and 206 leaflitter lizards captured in the same way. There has been collected animals from 12 families, in a total of 21 frogs and lizard species from the following families: Teiidae (4), Polychrotidae (3), Gekkonidae (1), Tropiduridae (1); Scincidae (1); Gymnophthalmidae (1), Anguidae (1) of Squamate lizards, and Hylidae (2); Bufonidae (1); Leptodactylidae (3); Microhilidae (2); Dendrobatidae (1) of Anura. The estimates of arthropods based on both methodologies resulted in a total of 6,479 arthropods caught through pitfall trapping and 6,477 arthropods through stomach contents analysis, distributed among 27 categories of the Phylum Arthropoda. The pitfall traps were less efficient than the analysis of stomach contents to estimate low motility and aggregated arthropods, and the second technique was less efficient than the first to estimate abundances of animals bearing chemical defenses and flying or jumping arthropods. These results proposes a less biased estimate taking into account the best estimates of each technique. We compared both the composition of the community and the environmental variables among landscape components based on a permutation procedure. Then we generated one axis of direct ordination for the communities from the 12 sampling unities using the NMDS technique and tested the hypothesis that it depends on the main reduced axes (through a PCA) of environmental variables using a multiple regression test. We found a significant difference in the composition of the community and in the environmental variables of M and R compared to E, but no difference among the first two. There was a significant regression between one of the reduced axis of the environmental variables (PCA1) and the ordination axis of community composition (NMDS). An autocorrelation test found no significant association between distance among sampling unities and their differences in composition. Orders like Coleoptera, Isoptera, Acari and Hymenoptera seemed to be associated mainly to the reference forest, whereas Isopoda, Opiliones, Araneae, Lepidoptera and Chilopoda were mostly related to the eucalypt monoculture. Out of the 27 arthropods categories found, 19 were used by the local herpetofauna. The diet composed mainly of itens from the Phylum Arthropoda, was classified in Hexapoda, Aracnida, Miriapoda and Crustacea. Ants, termites, crikets, spiders and acari were the itens that most contributed to the whole of the diets. It was possible to identify a guild of frogs and lizards concentrating on the consuption of ants. Especialy in the case of frogs where all species, but one, showed positive eletivity for this item. It was not possible to detect the same patern in lizards, except for two species (*Ameiva ameiva* and *Polychrus marmoratus*) that showed positive electivity for ants, thus, it was not possible to determine a clear preference for any specific category in the group. This study shows clearly that there isn't a clear difference in the food resources and food eletivity by the herpetofauna between reference forest (M) and forest remnant (R), but an evident difference among those and eucalypt monoculture (E). These indicates a need of a strong management plan directed to the forest remnants in

the area, aiming to maintain their ecological process diversity.

Key-words*:* frogs, lizards, arthropods, leaflitter, atlantic forest, eucalypt, animal communities

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