THE ROLES OF DISPERSAL LIMITATION AND ENVIRONMENTAL CONDITIONS IN CONTROLLING TROPHIC GUILDS OF THE AMAZONIAN DUNG BEETLES

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INTRODUÇÃO

Metacommunity dynamics have been considered as a function of ecological processes, such as environmental in?uence, dispersal among patches, and species interactions (Leibold *et al*., 2004) Variation partitioning can then be used to infer the relative importance of environmental factors and spatial variables in explaining patterns in community structure, determining the roles of niche and neutral processes driving metacommunity patterns (Peres-Neto *et al*., 2006). Dung beetles are an important component of the rainforests detritivorous fauna and interspecific differences in habitat selection and dispersal capacity may translate into differences in spatial population dynamics, even among closely related species coexisting on the same resource. For this reason, the ecological variation among community members has been a crucial factor in the analysis of community composition (Roslin, 2008). A hierarchical response of functional groups in dung beetles species to the environment and the changes to which it is subject relies heavily on adaptive and ecological characteristics of species such as dispersal ability, reproduction, and morphological correlated traits as size and functional structures (Chao *et al*., 2012). Based upon nesting and feeding strategies, dung beetle species can be classified in telecoprids, paracoprids or endocoprids (Cambefort, 1991). The understanding of how different trophic guilds or species groups are spatially arranged, according to the biological and ecological traits, allows a more accurate comparison and determination of factors that contribute to the change in composition between tropical communities.

OBJETIVOS

The main objective of this study was to test the relative importance of local and regional processes that explain the change in the composition and species richness of dung beetles metacommunities, as well as investigate this relationship in each dung beetle trophic guild.

MATERIAL E MÉTODOS

Study site and dung beetle sampling: This study was conducted in four areas within a landscape of Amazon forest on banks of the Madeira River, municipality of Porto Velho, state of Rondônia, Brazil. Six areas were sampled and the samplings were taken during 15 days in the months of January, March and June of 2012. In each area six plots were sampled, located at different distances (0,0.5,1,2,3 and 4 km) from the riverbank. Each plot consisted of a transect of 250 meters in which five pitfall traps baited with beef liver were installed, totaling 30 traps per area sampled (5 traps x 6 plots) and 180 traps per sampling period, with traps remaining 48 h in the field. To ensure the independence of the samples a distance of 50 m was established between the traps in each plot (Larsen and Forsyth, 2005). The expedition was coordinated by PROBIOTA Consultoria Ambiental during Wildlife Conservation

Program/Entomological Monitoring Subprogram of Santo Antônio Energia. Data analysis: We analyzed the data using partial redundancy analysis with two predictor data sets, one environmental and one spatial, to evaluate the variation in assemblage composition. We also separated dung beetles into trophic guilds to evaluate possible differences in the responses of these groups.

RESULTADOS

We collected 3011 individuals belonging to 67 species of dung beetles. The species abundance per site ranged from 1 to 921 individuals. In order of increasing abundance, three species, *Deltochilum laetiusculum* (312), *Deltochilum granulosum* (518) and *Coprophanaeus telamon* (921), concentred 58% of all individuals sampled and were present at all sites. All three trophic groups were recorded, with six species classified as endocoprids, 36 as paracoprids and 25 as telecoprids. On partition of variance using all taxa models showed significant predictors, the explanation of the model was 10% but the explanation using the trophic guild separated by the deconstruction of the community was better 15% in mean. The local and regional factors (environmental variables and geographic distance) contributed differently to the variation in taxonomic composition of trophic guild of dung beetles: for endocoprids the environmental factor had greater influence, with 20% of the total variation. The environmental factor was the most important also for the telecoprids (8%) and paracoprids (9%) but for last guild the spacial factor showed similar importance 8%.

DISCUSSÃO

Overall, the results indicate greater importance of local processes (compared to regional) as predictors of change in the composition of dung beetle assemblages. This effect was especially evident for the endocoprids, which should be especially selective about the type of resource and microhabitat use. Since endocoprid dung beetles feed and reproduce directly on the resource, microhabitat-dependent properties such as dung temperature and water content are crucial to these species, and this is probably one of the reasons for the microhabitat is a very important parameter for determining the composition of this guild. Species composition is known to affect decomposition rates in dung communities (Rosenlew & Roslin, 2008). For this reason, understanding how the different guilds of the decomposing fauna respond to environmental factors, such as disturbance related microhabitat changes, is a key step in predicting the consequences of habitat modification for the stability and functioning of ecosystems.

CONCLUSÃO

The community structure of dung beetles was determined by local processes, especially for trophic guilds that disperse less.

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Agradecimento

ACKNOWLEDGMENTS: We thank the Probiota Consultoria Ambiental and SAE-Sto Antônio Energia for logistical support for this work.