



SPECIES TURNOVER THROUGH TIME: COLONIZATION AND EXTINCTION DYNAMICS ACROSS METACOMMUNITIES OF MITES
SUBSTITUIÇÃO DE ESPÉCIES NO TEMPO: DINÂMICA DE COLONIZAÇÃO E EXTINÇÃO EM METACOMUNIDADES DE ÁCAROS

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Studies of species-time relationships often assume that species accumulation in space and time are analogous, yet fail to justify this assumption. Many temporal dynamics, including successional change and several metacommunity processes, are inconsistent with this assumption because sampling through time cannot be considered random. We developed a new approach for species-time relationships that decomposes species turnover into colonization and extinction components, which may change predictably but unequally as a result of successional dynamics and environmental changes. We applied this approach to metacommunities of mites associated with rubber trees distributed over large spatial (>1000 km) and temporal (> 150 – 350 generations) scales in Brazil. Temporal turnover was synchronous among communities and driven by high colonization during some months and high extinction in others. These dynamics tracked climatic conditions that shifted seasonally – turnover was highest at low temperatures and high humidity, whereas colonization peaked at moderate temperatures and when temperature showed large increases between subsequent sample periods. These correlations with environmental conditions provide signatures of underlying processes, such as temporal species sorting, that produce patterns inconsistent with regular species-time models. Our approach uncovers the processes that generate temporal turnover and their mechanistic underpinnings, providing new insights into the temporal structure of diversity.

Keywords: Acari, species time relationship, partitioning, *Hevea brasiliensis*, succession

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