



PHYTOPLANKTON BIOGEOGRAPHY IN TROPICAL FISHCULTURE SYSTEMS IS MAINLY DRIVEN BY LOCAL AND REGIONAL FILTERS

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Variation in species occurrence and biomass across space and time (β -diversity) lies at the intersection of community ecology and biogeography, reflecting the combined effects of local and regional filters and dispersal limitation. Disentangling them remains a central challenge in ecology, particularly in systems where communities are embedded in heterogeneous landscapes and respond to drivers at multiple scales. For microorganisms, β -diversity is driven more by local filters than by geographical distances. Yet, the influence of regional context (land cover, climate) on phytoplankton remains poorly understood. Fishponds are highly managed and can disrupt the natural spatial structure of phytoplankton, making them ideal models for probing the relative roles of local, regional, and spatial filters across scales. For example, ponds within a farm may share management practices and be geographically close. So, composition should be more similar within farms than across farms exposed to contrasting environmental conditions, leading us to expect greater dissimilarity with increasing distance (H1). This pattern, however, should emerge not from dispersal limitation but from the regional context that varies across farms (climate and land use), meaning that environmental filters should collectively explain more compositional variation than geographical distances alone (H2). To test these hypotheses, we analysed 75 fishponds in southeastern Brazil (ANOSIM, PERMANOVA, Mantel correlation, and pRDA). Dissimilarity within farms was lower than between farms (H1). Environmental filters explained more variation than space alone, with local (4.5%) and regional (8.8%) filters accounting for biomass variation, compared to 7.4% for space. A similar pattern held for occurrence: local (5.8%) and regional (11.7%) filters exceeded spatial distance (10%) (H2). These effects were driven by variability in land use, climate, water conditions, and pond management. Our findings show that even in heavily managed systems, the regional context shapes phytoplankton diversity in ways that transcend local management, with implications for biodiversity conservation in agricultural landscapes.

Palavras-chave: *fishponds; β -diversity; variance partitioning; land use.*