



THE HYDROLOGICAL REGIME AND DISPERSAL ABILITY DETERMINE THE STRUCTURING MECHANISMS OF ZOOPLANKTON METACOMMUNITIES IN A NEOTROPICAL FLOODPLAIN.

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Hydrological connectivity in river–floodplain systems reorganizes environmental heterogeneity and dispersal pathways. Using data from a 15-year monitoring program in the Upper Paraná River floodplain, we quantified the relative contributions of environmental filtering (species sorting) and spatial processes (mass effects and dispersal limitation) to the assembly of zooplanktonic groups with different body sizes during contrasting hydrological periods. Assembly mechanisms varied consistently among groups along the connectivity gradient. As river level increased, mass effects became more pronounced, indicating intensified faunal exchange during high-water periods. In contrast, during low-water conditions, species sorting generally played a greater role, as habitats become more isolated and environmentally distinct, with smaller-bodied taxa being particularly affected. However, cladocerans exhibited a non-linear response, with higher contributions of species sorting at intermediate water levels. Dispersal limitation was pronounced for copepods during low-water periods, revealing stronger spatial constraints for taxa with larger body sizes and longer life cycles. Our results demonstrate that flood pulse dynamics do not impose a single structuring regime on zooplankton metacommunities. Instead, metacommunity mechanisms vary according to functional traits among biological groups. Moreover, our findings reinforce that flood pulse dynamics not only reorganize environmental conditions, but also regulate dispersal intensity, thereby driving metacommunities through time.

Keywords: *Environmental heterogeneity; species-sorting; dispersal limitation; mass-effects; flooding; body size.*

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