



Species sorting, apparent neutrality and lasting priority effects: palaeoecological lessons from an inherently dynamic natural ecosystem

J. Mergeay (1), L. De Meester (1), and D. Verschuren (2)

(1) Laboratory of Aquatic Ecology and Evolutionary Biology, Katholieke Universiteit Leuven, 3000 Leuven, Belgium
(joachim.mergeay@bio.kuleuven.be), (2) Limnology Unit, Department of Biology, Ghent University, 9000 Gent, Belgium
(dirk.verschuren@UGent.be)

To assess the influence of long-term temporal processes in community assembly, we reconstructed the community changes of two dominant components of freshwater food webs, planktonic Daphnia water fleas and benthic chironomid midge larvae, in a fluctuating tropical lake through eight cycles of major lake-level fluctuation spanning 1800 years. Our results show a highly unpredictable pattern of community assembly in Daphnia, akin to neutrality, but largely dictated by long-lasting priority effects. These priority effects were likely caused by rapid population growth of resident species during lake refilling from a standing stock in a deep crater refuge, thereby pre-empting niche space for new immigrants. Contrastingly, chironomid larvae showed a more classical species sorting response to long-term environmental change, with more limited contribution of stochastic temporal processes. Overall our study emphasizes the importance of temporal processes and niche pre-emption in metacommunity ecology, and suggests an important role for mass effects in time. It also emphasizes the value of paleoecological research to improve understanding of ecological processes in natural ecosystems.