Effect of Saharan dust inputs on bacterial activity and community composition in Mediterranean lakes and reservoirs

Reche, Isabel, Eva Ortega-Retuerta, Otilia Romera, Elvira Pulido-Villena, Rafael Morales-Baquero, Emilio O. Casamayor

Limnol. Oceanogr., 54(3), 2009, 869-879 | DOI: 10.4319/lo.2009.54.3.0869

ABSTRACT: We assessed the effects of Saharan dust inputs of particulate matter (PM), total phosphorus (TP), total nitrogen, and water soluble organic carbon (WSOC) on bacterial abundance (BA) in two alpine lakes and two reservoirs in the Mediterranean region. We also experimentally assessed the effects of dust inputs on bacterial activity and community composition and explored the presence of airborne bacteria. We found synchronous BA dynamics at least in one of the study years for each corresponding pair of ecosystems, suggesting an external control. The link between BA dynamics and inputs of PM, WSOC, or TP occurred only in those ecosystems with severe P-limitation and low dissolved organic carbon. The response was most intense in the most P-limited ecosystem. Dust addition had a significant positive effect on bacterial growth and abundance, but not on richness, diversity, or composition of the indigenous bacterial assemblages. We also obtained experimental evidence that some airborne bacteria could develop in oligotrophic waters by observing the growth of gamma-proteobacteria, a group poorly represented in natural aquatic environments.