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Large differences in bacterial community composition of nearby shallow lakes surrounded by *Nothofagus pumilio* forest in Patagonia (Argentina)

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Abstract:

Freshwater ecosystems are integrated in a terrestrial landscape, receiving continuously soil and plant-derived material. In Patagonia, the deciduous beech *Nothofagus pumilio* constitutes an important source of organic matter for aquatic environments. Here, I attempted to analyze bacterial communities, including genetic diversity and metabolic functioning, in four nearby lakes located under a *N. pumilio* forest (Chall-Huaco Mountain, Argentina). I combined fieldwork and experiments to assess physiochemical characteristics, bacterial community composition (BCC) and Carbon (C)-consumption. Physiochemical variables analyzed with NMDS showed a clear segregation of all the studied lakes. Similarly, BCC differed among lakes, maintaining its differences regardless of the seasons. Variables that significantly affected bacterial community structuring were dissolved P concentration and protein-like DOM components. The number of specialist operational taxonomic units was higher than that of generalists, but the latter doubled specialists in number of sequences. The last suggests that generalists may be responsible for the differences in BCC among lakes, and species sorting appears to be the main mechanism structuring the metacommunity. These results showed that even at a small geographic scale distinctive bacterial communities can be developed in lakes under the influence of *N. pumilio* forest.

Keywords: *Nothofagus pumilio* forest, Patagonian shallow lakes, dissolved organic matter, bacterial community composition, niche breadth