Research Article

Seasonality in molecular and cytometric diversity of marine bacterioplankton: the re-shuffling of bacterial taxa by vertical mixing

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Article first published online: 17 AUG 2015

DOI: 10.1111/1462-2920.12984

Issue

Environmental Microbiology

Early View (Online Version of Record published before inclusion in an issue) (/journal/10.1111/(ISSN)1462-2920/earlyview)

Additional Information

How to Cite

García, F. C., Alonso-Sáez, L., Morán, X. A. G. and López-Urrutia, Á. (2015), Seasonality in

molecular and cytometric diversity of marine bacterioplankton: the re-shuffling of bacterial taxa by vertical mixing. Environmental Microbiology. doi: 10.1111/1462-2920.12984

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Publication History

1. Article first published online: 17 AUG 2015
2. Accepted manuscript online: 17 JUL 2015 01:06AM EST
3. Manuscript Revised: 10 JUL 2015
4. Manuscript Accepted: 10 JUL 2015
5. Manuscript Received: 21 OCT 2014

Funded by

- Spanish National Investigation + Development + Innovation (I + D + I) Plan. Grant Number: CTM2009-13882-MAR
- Spanish Institute of Oceanography
- Marie Curie European Reintegration Grant. Grant Number: 268331
- Coastal Ocean Microbial communities and Temperature. Grant Number: CTM2010-15840
- Modelado de las reglas de ensamblado y estabilidad de los ecosistemas de comunidades planctónicas en el oceáno global. Grant Number: CGL2013-41256-P
- Principado de Asturias FEDER. Grant Number: GRUPIN14-144
- Formación de Personal Investigador
- Spanish Ministry of Economy and Competitiveness

- Abstract
- Article (/doi/10.1111/1462-2920.12984/full)
- References (/doi/10.1111/1462-2920.12984/references)
- Supporting Information (/doi/10.1111/1462-2920.12984/suppinfo)
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Summary

The 'cytometric diversity' of phytoplankton communities has been studied based on single-cell properties, but the applicability of this method to characterize bacterioplankton has been unexplored. Here, we analysed seasonal changes in cytometric diversity of marine bacterioplankton along a decadal time-series at three coastal stations in the Southern Bay of Biscay. Shannon–Weaver diversity estimates and Bray–Curtis similarities obtained by cytometric and molecular (16S rRNA tag sequencing) methods were significantly correlated in samples from a 3.5 year monthly time-series. Both methods showed a consistent cyclical pattern in the diversity of surface bacterial communities with maximal values in winter. The analysis of the highly resolved flow cytometry time-series across the vertical profile showed that water column mixing was a key factor explaining the seasonal changes in bacterial composition and the winter increase in bacterial diversity in coastal surface waters. Due to its low cost and short processing time as compared with genetic methods, the cytometric diversity approach represents a useful complementary tool in the macroecology of aquatic microbes.

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