Abundance vs biomass: effects of the traits weighting on the measure of functional diversity

Lise Bacouillard*†[1], Noémie Baux[2], Jean-Claude Dauvin[2], Nicolas Desroy[3], Katja Juliana Geiger[1], Franck Gentil[1], Céline Houbin[4], and Eric Thiébaut[1]

[1]Sorbonne Universite, CNRS, Station Biologique de Roscoff, UMR7144 - Adaptation et Diversite en Milieu Marin – Sorbonne Université, CNRS, Station Biologique de Roscoff, UMR7144 - AD2M – Place Georges Teissier, 29680 Roscoff, France

[2]Normandie université, CNRS, UMR6143 - Laboratoire Morphodynamique Continentale et Cotiere (UNICAEN) – Normandie université, CNRS, UMR6143 - Laboratoire Morphodynamique Continentale et Cotiere – 24 rue des Tilleuls 14000 Caen, France

[3]IFREMER, Station de Dinard, LER Bretagne Nord – IFREMER, Station de Dinard, LER Bretagne Nord – 38 rue du Port Blanc 35800 Dinard, France

[4]Sorbonne Universite, CNRS, Station Biologique de Roscoff, FR2424 – Sorbonne Universite, CNRS, Station Biologique de Roscoff, FR2424 – Place Georges Teissier, France

Abstract

While coastal ecosystems experience increasing pressures due to human activities and climate change, measurement of functional diversity based on the biological traits analysis (BTA) is increasingly used as a tool to assess ecosystem functioning and its responses to disturbance. A review of more than 80 papers published since 2003 highlights large differences in the methodology used to measure functional diversity, for instance in terms of the number of traits used, ranging from 3 to 25, the identity of the traits, the nature of the raw data (abundance vs. biomass). Using two different datasets on benthic macrofauna in the English Channel (i.e. a time-series of samples collected yearly from 1977 to 2016, and a spatial survey of 72 stations sampled once in 2016), we analysed how some methodological choices affect the measures of functional diversity, its spatial or temporal changes. The local diversity was calculated from different diversity indices while multivariate methods were applied to describe β-diversity. A peculiar attention is given on the effects of one methodological choice: the selection of biomass data rather than more commonly used abundance data.

*Speaker

†Corresponding author: lise.bacouillard@sb-roscoff.fr