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Macrofaunal production and biological traits: spatial relationships along the UK continental shelf

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Abstract

Biological Traits Analysis (BTA) is increasingly being employed to improve our understanding of the ecological functioning of marine benthic invertebrate communities. However, changes in trait composition are seldomly compared with concomitant changes in metrics of ecological function. Consequently, inferences regarding the functional implications of any changes are often anecdoctal; we currently have a limited understanding of the functional significance of the traits commonly used. In this study, we quantify the relationship between benthic invertebrate trait composition and secondary production estimates using data spanning almost the breadth of the UK continental shelf.

Communities described by their composition of 10 traits representing life history, morphology and behaviour showed strong relationships with variations in total secondary production. A much weaker relationship was observed for community productivity (or P:B), a measure of rate of energy turnover. Furthermore, the relationship between total production and multivariate taxonomic community composition was far weaker than that for trait composition. Indeed, the similarities between communities as defined by taxonomy were very different from those depicted by their trait composition. That is, as many studies have demonstrated, taxonomically different communities may display similar trait compositions, and *vice versa*. Finally, we found that descriptions of community trait composition vary greatly depending on whether abundance or biomass is used as the enumeration weighting method during BTA, and trait assessments based on biomass produced better relations with secondary production than those based on abundance. We discuss the significance of these findings with respect to BTA using marine benthic invertebrates.