Elemental fingerprinting may help studying connectivity in the invasive gastropod Crepidula fornicata

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Abstract

In marine ecosystems, dispersal through a pelagic free-swimming larval phase is a key process of population and community dynamics and a major component of communities' response to environmental changes. Quantifying larval dispersal and connectivity among marine populations however remains a major challenge, and typically requires integrated interdisciplinary approaches. If genetic tools and larval transport modelling are powerful approaches, they may fail to infer connectivity or lead to some discrepancies in some cases. In the last two decades, elemental fingerprinting has been proposed as an alternative method to study connectivity, through the identification of the natal origin of larvae and recruits, based on the elemental composition of their calcified structures. We investigated the relevance of this approach to assess connectivity between populations of the invasive species *C. fornicata*. We here present results on the spatial and temporal variations in the elemental composition of shells of encapsulated embryos, at two spatial scales, i.e. within and among three coastal bays of the Western English Channel. Linear discriminant analyses based on elemental ratios allowed to discriminate between the different bays with varying assignment success. In particular, the bay of Brest was well differentiated, and shells of embryos born in this bay, analyzed by femtosecond laser ablation coupled with HR-ICP-MS, were successfully assigned to this bay. Preliminary data suggested the possibility to assign embryos to particular sites, notably within the bay of Brest due to higher concentrations in Pb, which requires further investigations. Elemental fingerprinting may thus help better assessment of connectivity in this species.

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