



Dissolution mortality of juvenile bivalves in coastal marine deposits

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ABSTRACT: We evaluate experimentally the effect of carbonate saturation state at the sediment-water interface (SWI) on survivorship of various size classes of the juvenile bivalve *Mercenaria mercenaria*. Populations of 0.2-mm, 0.3-mm, 1-mm, and 2-mm *M. mercenaria* were introduced to sediments realistically undersaturated (experimental, saturation state with respect to aragonite = $\Omega_{\text{aragonite}} = \text{IAP}/K'_{\text{sp}} = \sim 0.3$) and saturated (control, $\Omega_{\text{aragonite}} = \sim 1.5$) with respect to aragonite in order to evaluate the impact of saturation state and dissolution on survivorship. Linear regression analysis was used to examine mortality within each treatment over time and show significant mortality for each size class in experimental-undersaturated treatments only ($P < 0.05$). Mortality rates in experimental undersaturated sediments were -11.8 , -4.8 , -1.9 , and -1.1% d^{-1} for the 0.2-, 0.3-, 1.0-, and 2.0-mm bivalves, respectively. Analysis of covariance (ANCOVA) was used to examine differences in mortality between treatments over time and show significantly different mortality rates for the 0.2-, 0.3-, and 1-mm individuals ($P < 0.05$). Dissolution may represent a previously unrecognized yet significant source of mortality for "just-set" juvenile bivalves, particularly the very small individuals that have been largely ignored in recruitment studies to date. Dissolution-induced mortality may help explain the exponential losses of juvenile bivalves following their transition from the pelagic larval phase to the benthic juvenile phase.

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