Using DEB models to estimate the relative contribution of endosymbiosis and filter-feeding to the nutrition of different *Bathymodiolus azoricus* size-classes

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Dynamic energy budget (DEB) models describing the flux of energy through *B. azoricus* and its endosymbionts were developed for four different size-classes, in accordance with individuals collected from the Menez Gwen vent site (Mid-Atlantic Ridge). *Bathymodiolus azoricus* is a mixotrophic mussel, which obtains energy from a dual endosymbiosis and filter-feeding. The factors that control the endosymbiosis : filter-feeding ratio in *B. azoricus* are unclear. We have used DEB models to quantify this ratio in different size classes of *B. azoricus* from the Menez Gwen vent site. The model describes the capture of H_2S, CH_4 and POC by *B. azoricus*, the microbial oxidations by thiotrophs and methanotrophs at the mussel's gills, the transfer of energy from endosymbionts to *B. azoricus* and the energetic wastes of *B. azoricus*. In accordance to experimental evidence, the mussel's clearance rate and respiration, as well as the uptake of H_2S and CH_4 by endosymbionts were described by size-dependent relationships. Simulations indicate that the relative contribution of endosymbiosis to nutrition increases with body size, suggesting that small individuals have a higher dependency on filter-feeding than large individuals. The results are discussed and related to the spatial organization of *B. azoricus* populations within mussel beds at vent sites.

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