

The estimation of DEB parameters for various Northeast Atlantic bivalve species

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Abstract

Dynamic energy budgets are used for the description of the energy flow through individual organisms from the assimilation of food to the utilization for maintenance, growth, development and reproduction. In this paper, parameters of Kooijman's Dynamic Energy Budget (DEB) model are estimated for the following Northeast Atlantic bivalve species: the Baltic clam *Macoma balthica* (L.), the soft-shell clam *Mya arenaria* L., the cockle *Cerastoderma edule* (L.), the blue mussel *Mytilus edulis* L. and the Pacific oyster *Crassostrea gigas* (Thunberg). For none of the species a complete set of parameters could be compiled. A special protocol was developed to account for missing values and to achieve consistency between parameters. Species were similar in their optimal temperature range, as reflected in an Arrhenius temperature of 5800 K, which corresponds to a Q_{10} of 2. Differences between species were observed in width of the optimal temperature range. The taxonomic relatedness between species was reflected in similar volume-specific maintenance costs, costs for growth and almost similar maximum storage density of energy. Species differed in their maximum surface area-specific assimilation rate by a factor 6 and in the fraction of energy allocated to reproduction (ranging from 0.15 to 0.50). These differences are reflected in the maximum theoretical total shell length of the species, which varied from about 3 cm in *M. balthica*, 6 cm in *C. edule*, 15 cm in *M. arenaria* and *M. edulis* and 45 cm in *C. gigas*.