Physiological performance of plaice *Pleuronectes platessa* (L.): a comparison of Static and Dynamic Energy Budgets

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Abstract
In the present study, various body size scaling relationships describing the physiological performance of plaice *Pleuronectes platessa* (L.) were derived using a dynamic energy budget (DEB) model and compared with allometric relationships derived from a static energy budget (SEB) model. Results indicated that DEB models can more correctly predict the physiological performance of plaice within variable environments. Dynamic energy budgets are preferred over static energy budgets because they are not descriptive but based on first principles, they are not species-specific, and they can be used for extrapolations beyond the range of experimental data. Nevertheless, some aspects of the DEB model can still be improved. These include: [1] processes underlying the temperature tolerance range, temperature acclimation and the relationship between optimal temperature and body size; [2] the contribution of various processes to metabolism; and [3] the incorporation and quantification of Fry's scheme of the environment, especially of masking factors (e.g., sub-optimal salinity conditions which load the minimum metabolism) and limiting factors (e.g., low oxygen conditions that constrain the maximum metabolic rate). These improvements would offer a wide range of opportunities for further application, such as the reconstruction of food and growth conditions; the validation of age determination by means of otolith readings; the analysis of intraspecific genetic variability versus non-genetic phenotypic adaptations; and the interspecific comparison of energy flows by means of variability in the various DEB model parameters.