

**Assumptions and model structure for the growth
and survival of the holopelagic brown macroalga *Sargassum* spp.
based on DEB (Dynamic Energy Budget) theory**

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Understanding and forecasting the proliferation of holopelagic *Sargassum* in the tropical Atlantic Ocean requires knowledge on the biology and transport of these macroalgae. Forecasting the biomass, proliferation and distribution of *Sargassum* rafts at time scales greater than a few weeks needs improved modeling. Recent modeling efforts focused mostly on transport and less on the biology of *Sargassum*. Three morphotypes in varying proportions compose these *Sargassum* rafts. Better understanding and modeling the specificities of each of the three morphotypes is the current challenge.

The main objectives of the BIOMAS project (BIOenergetic Modeling Approach for *Sargassum* dynamics) are to acquire the necessary knowledge to build an individual morphotype based model of *Sargassum* growth, to include this model into a drift model, and finally perform simulations of the integrated drift-growth model in order to forecast *Sargassum* morphotypes proliferation at seasonal scale. A strong synergy between laboratory experiments and modeling will allow us to build the first DEB (Dynamic Energy Budget) model applied to *Sargassum* and apply it to the three morphotypes. *In-situ* monitoring of *Sargassum* morphotypes in the Western and Eastern Atlantic will allow us to validate the integrated model.

We here focus on the description of the assumptions and structure of the DEB model for *Sargassum* growth and survival. Specific assumptions to differentiate each morphotype are discussed and model simulation will be used to contribute to the design of optimal protocols for experiments so that the parameters are accurately estimated.