

A new generic framework to apply DEB theory

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Extensions

DEB model



Package documentation

Vignettes

R



FishNess-project



Les Jeudis de l'UMR

JEUDI 18 SEPTEMBRE 2025 / 11h30 **Matthieu VERON**, Post-doctorant à l'UMR DECOD

A new-modeling framework to estimate environmental determinants and intra-specific variability in life history traits: an application to fish

Understanding and predicting rapid phenotypic changes critically rely on identifying the sources of variability among and within populations as well as their consequences on life-history traits. While the Dynamic Energy Budget (DEB) theory stands out as a powerful tool to describe life-history traits of various aquatic species in an environment where food and temperature fluctuate, it traditionally assumes homogeneous populations, where all individuals share the life history traits and DEB parameters of an "average" individual. This approach overlooks the inherent, partly genetic, variability between and within populations, often attributing it solely to environmental differences. Yet, accurately predicting dynamic environmental effects on life history traits requires accounting for inter-individual variability to better disentangle both effects. We introduce OptMyDEB, a new flexible modeling tool that addresses these shortcomings. This generic modeling platform implements an integrated DEB model that is sufficiently flexible to incorporate many types of data and to capture parameter variability across populations, sexes and individuals. OptMyDEB is an R package that has been designed to fit DEB models through maximum likelihood estimation using Template Model Builder (TMB). TMB is a statistical framework that combines automatic differentiation for efficient gradients computation and Laplace approximation for integrating random effects. This allows the optimization of high-dimensional parameter spaces, making TMB well-suited for fitting complex nonlinear dynamic systems.

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Jeudi 02 octobre 2025 : Maria José Lagunes (Doctorante MARBEC-LEMAR)
"SargaDEB – Contributions of DEB (Dynamic Energy Budget) bioenergetic modeling to the spatio-temporal dynamics of the three holopelagic morphotypes of the genus *Sargassum*"

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