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DEB theory

Dynamic energy budget (DEB) theory describe how an organism acquires and uses energy and essential elements for physiological processes, in addition to how physiological performance is influenced by environmental variables such as food density and temperature

Also DEB seek to identify simple quantitative rules for the organization of metabolism of individual organisms that can be understood from basic first principles.

According to DEB theory, Reserves are synthesized from environmental substrates (food) for use by the metabolism for the purpose of somatic maintenance, growth (increase of structural mass), maturity maintenance (installation of regulation systems, preparation for reproduction, maintenance of defense systems), maturation (increase of the state of maturity) and reproduction. This organizational position of reserve creates a rather constant internal chemical environment, with only an indirect coupling with the extra-organismal environment.

DEB theory seeks to:

- Find the simplest organisation principles for metabolism on which all life is based
- Understand observations on actual performance of life as variations on this common theme.

- Three main factors determine feeding rates: food availability, body size and temperature.
- The assimilation rate proportional to the ingestion rate.
- The composition of biomass depends on growth rate.
- Embryo development is fueled by reserves
- The specific respiration rate decreases with body size between species because large bodied species have relatively more reserve.
- All mass fluxes are linear combinations of assimilation, dissipation and growth.
- Evolution according to Darwin: variation between individuals + selection