Dynamic Energy Budget theory with applications to ecotoxicology and nanotoxicology

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Abstract

This presentation will give a brief overview of the scope of Dynamic Energy Budget (DEB) theory, emphasizing applications to ecotoxicology, including effects of engineered nanomaterials entering the environment. DEB models describe the rates at which an organism assimilates energy and elemental matter from food and uses it for maintenance, growth, development, and reproduction. These physiological rates depend on the state of the organism (e.g., age, size, maturity) and on its environment (e.g., food density, temperature, toxicants). DEB theory offers a powerful theoretical framework for relating sub-organismal (biochemical, genetic, physiological) processes to organismal performance and, thereby, to population and ecosystem dynamics. It thereby opens the way to use for ecological risk assessment where much data comes from organismal or suborganismal studies, but societal concern relate primarily to impacts on populations and ecosystems.