



Optimality theory: a general framework to study body size, metabolism and life-history evolution

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Optimality theory asserts that natural selection favours patterns of resource allocation to growth, reproduction, maintenance, repair, and storage that maximize expected lifetime reproductive success in a given ecological context. The most important factors shaping optimal allocation strategy and consequently body mass is the size-dependence of mortality, resource acquisition and metabolism. Thus, adult size is determined by joined effects of several factors that themselves depend on size (often in a form of within-species allometries). This loop causes enormous variability of body size across species and also shapes interspecific allometries. We present a mathematical framework based on optimal resource allocation and life history theory that allows integration of different ecological drivers of body size evolution.