A trait-based approach to ocean ecology

A trait-based approach to ocean ecology

Trait-based ecology merges evolutionary with classical population and community ecology and is a rapidly developing branch of ecology. It describes ecosystems as consisting of individuals rather than species, and characterizes individuals by few key traits that are interrelated through trade-offs. The fundamental rationale is that the spatio-temporal distribution of organisms and their functional role in ecosystems depend on their traits rather than on their taxonomical affiliation. The approach respects that interactions are between individuals, not between species or populations, and in trait-based models ecosystem structure emerges as a result of interactions between individuals and with the environments, rather than being prescribed. It offers an alternative to classical species-centric approaches and has the potential to describe complex ecosystems in simple ways and to assess the effects of environmental change on ecosystem structure and function. Here, we describe the components of the trait-based approach and apply it to describe and model marine ecosystems. Our description is illustrated with multiple examples of life in the ocean from unicellular plankton to fish.