

# **Deconstructing latitudinal species richness patterns in the ocean: does larval development hold the clue?**

Miriam Fernández, Anna Astorga, Sergio A. Navarrete, Claudio Valdovinos,  
Pablo A. Marquet

## **Abstract**

The consistent decrease in species richness with latitude shows several exceptions among marine organisms. We hypothesize that contrasting latitudinal diversity gradients can be explained by differences in critical life-history attributes, such as mode of larval development (MLD). We deconstructed latitudinal species richness patterns of marine benthic invertebrates according to MLD to elucidate differences in patterns of species richness and to reveal underlying processes. The patterns of species richness were remarkably similar across taxa within MLD but differed between MLD. Species richness decreased polewards in planktotrophic species and increased in direct developers. Temperature explained most of the variation in species richness. Low temperature at high latitudes may generally favour direct developing species, but, together with low chlorophyll-a concentration, limit the distribution of planktotrophic species. The contrasting influence of temperature on different MLDs might be explained by its effect on the length of planktonic life and on brooding costs.