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Chapter 4

LIFE-HISTORY STRATEGIES: A FRESH APPROACH TO CAUSALLY LINK SPECIES AND THEIR HABITAT

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Abstract

Community ecology searches for general rules to explain patterns in species' distribution, but to date, progress has been slow. This lack of progress has been attributed to the fact that ecological rules - and the mechanisms that underpin them - are contingent on the organisms involved, and their environment. Coupled with the vast complexity of biological systems, the result is that there are few rules that are universally true in community ecology. However, effective restoration management requires a thorough understanding of the ecological effects of degradation. This sets a challenge for ecological research to unveil the causal mechanisms underlying patterns in species' distribution. There is broad consensus that the way forward is to link pattern and process through species traits, as these provide the causal mechanisms explaining how abiotic and biotic factors set limits to species occurrences.

In a recently developed method, species traits were used to define groups of aquatic macroinvertebrate species with similar causal mechanisms underlying the species-environment relationships. By investigating interrelations between traits and interpreting their function, it was possible to define 'sets of co-adapted species traits designed by natural selection to solve particular ecological problems', which are termed life-history strategies.

In this chapter we discuss the position of life-history strategies in community ecology and its merits to conservation and nature management. By including the causal mechanisms for a species' survival under particular environmental conditions, life-history strategies can be used to explain species occurrences and generate testable predictions. As a species' identity is made subordinate to its biology, they may be used to compare water bodies found at a large geographical distance, which may comprise different regional species pools or span species distribution areas. By aggregating species in life-history strategies, biodiverse assemblages can be compressed into a few meaningful, easily interpretable relationships.

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