A synthesis of long-term ecological research on the Upper Rhône River in the context of concurrently developed ecological theory

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With 2 figures and 1 table in the text

Abstract

Using sites from the Upper Rhône River, France, as an example, we identify essential elements needed to test current ecological theories with previously collected data. The habitat templet concept was selected for analysis because this concept, which links ecological responses to a templet of spatial – temporal habitat variability, is a focus of current ecological debate and potentially may serve as a general tool for ecologically oriented river management. Ecologically sound river management may be based on two key points of this synthesis: that the habitat acts as a templet for species traits, and that composite taxonomic groups represent relatively homogeneous assemblages of species-trait characteristics. The use of statistical approaches developed in this project to analyse other long-term data-sets may clarify remaining questions about the applicability of habitat templet theory to river ecology.

Introduction

A common problem of the synthesis of long-term ecological research is that during a long-term study of an ecological system, ecological theories concurrently develop. As a result, both more and less important parts of the research considered in such a synthesis were done in periods when current theoretical constructs were either not developed or just originating. Thus, a synthesis of long-term ecological research that aims to test new theoretical concepts has to be based on approaches that differ from the common practice of designing a particular experiment to test a particular hypothesis. Here, we summarize such an innovative approach that may enable other research groups to design strategies for the synthesis of long-term studies of ecological systems.

Facing the task to synthesize almost 20 years of ecological research on the Upper Rhône and its floodplain in a special issue of Freshwater Biology (STATZNER et al. 1994), 30 researchers designed and applied a strategy to test concurrently developed theories, focusing on the habitat templet concept (SOUTHWOOD 1977, MINSHALL 1988). The habitat templet concept links trends in species traits to habitat conditions. It was in the focus of the synthesis because it is an important element in the theoretical framework of modern ecology and is of high potential to serve as a foundation of ecologically oriented river management.

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