The Intermediate Disturbance Hypothesis: application of this concept to the response of epilithon in a regulated Mediterranean river (Lower-Durance, southeastern France)

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With 5 figures and 3 tables in the text and 1 appendix

Abstract: Hydrological regime is responsible for the most significant disturbances occurring in the regulated lower part of the River Durance. The present study was an attempt at determining the response of epilithon to the hydrodynamic disturbances occurring in this river. Three patterns of hydrodynamic disturbance resulting from three different types of regime were analysed. Under low stable compensation flow regimes, disturbance frequency and intensity were considered to be low. Under constant release flow regimes, disturbance frequency and intensity were considered to be severe. High compensation flow regimes with infrequent releases were considered intermediate.

The validity of the Intermediate Disturbance Hypothesis (IDH) was confirmed for the number of algal species and the autotrophic index (an index for estimating the autotrophic versus heterotrophic balance). The results show that when the disturbance was of intermediate severity, the autotrophic and heterotrophic communities were balanced, which was not the case at either low or high hydrodynamic disturbance levels. The results allow to define the habitat of the epilithic algal species. Colonizer and competitor species were identified on the basis of the IDH. Several obviously ubiquitous and resistant species were recorded at all three disturbance levels.

Introduction

In rivers, the epilithic biomass depends on four main factors: hydrological, chemical, biological (BIGGS 1987, ROTT 1991) and geological (BIGGS & GERBEAUX 1993) factors. The main hydrological determinants described so far are

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