



Biodiversity and ecosystem functioning

Problem

Considering the current rate of extinctions, it is crucial to understand the consequences of these losses of biodiversity for the functioning of ecosystems. It is this notion that has led to the emergence of biodiversity-ecosystem functioning research in the last decade. Within this research, grasslands proved a very suitable ecosystem for experimental studies. The results obtained in these experiments, however, led to an intense debate about their interpretation.

Objectives

We aimed to clarify how loss of biodiversity will affect ecosystem processes such as production, preservation of soils, mitigation of droughts and floods. More specifically, we tested experimentally the hypothesis that productivity of grassland ecosystems declines with decreasing plant diversity, because species-rich communities exploit the available resources more completely.

Approach

We carried out a study with experimental grassland communities that differ in species richness.

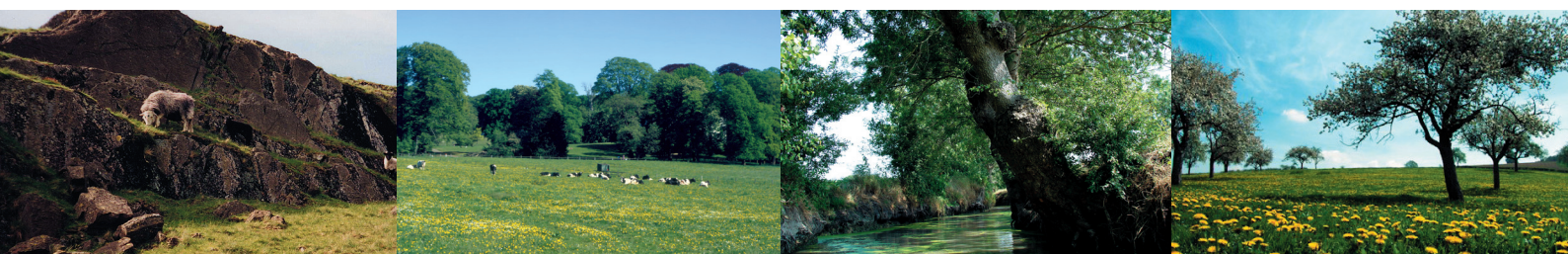
Results

The results clearly show that productivity (as a measure of ecosystem functioning) declines when plant diversity decreases. Species-rich communities are more productive than species-poor ones, because of niche complementarity: different species have different strategies to acquire and use resources, which complement each other. As a consequence, species-rich communities use almost all available resources.

When species go extinct, however, some strategies disappear and the community can no longer use all resources. These results indicate that ecosystem functions will eventually decline when the current wave of extinctions is not halted. More research is needed, however, to reach good predictions about the future of ecosystem functions.

Follow-up

Future research should focus on the importance of diversity for other ecosystem functions (e.g. carbon sequestration, prevention of soil erosion), in other ecosystem types (e.g. forests), and across large spatial and temporal scales.



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