Response diversity, ecosystem change, and resilience

Biological diversity appears to enhance the resilience of desirable ecosystem states, which is required to secure the production of essential ecosystem services. The diversity of responses to environmental change among species contributing to the same ecosystem function, which we call response diversity, is critical to resilience. Response diversity is particularly important for ecosystem renewal and reorganization following change. Here we present examples of response diversity from both terrestrial and aquatic ecosystems and across temporal and spatial scales. Response diversity provides adaptive capacity in a world of complex systems, uncertainty, and human-dominated environments. We should pay special attention to response diversity when planning ecosystem management and restoration, since it may contribute considerably to the resilience of desired ecosystem states against disturbance, mismanagement, and degradation.

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