Ecological communities in a changing world: How do extreme events modify community structure?

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Résumé

Climate change is expected to increase the frequency and intensity of extreme weather events such as heat waves, fires or droughts. Extreme events punctually increase the mortality of species populations and can trigger permanent transitions to novel ecological communities. Yet we still lack theoretical baselines to predict the ecological consequences of such extreme events. This is because past research in theoretical ecology has mostly quantified community stability in the absence of concrete perturbations, while more realistic perturbations, that vary both in intensity and frequency, have received comparatively less attention. In this talk, I will first present a theoretical approach designed to predict which combinations of frequency and intensity of extreme events a species can recover from, which is based on demographic rates. By combining this approach with the metabolic theory of ecology, I will show that quantitative predictions can be made about the average abundances and biomass of species able to persist in an environment exposed to extreme events. I will then present an experimental test of the theoretical predictions by using microbial communities that cover a wide range of body sizes and densities.

Mots-Clés: stability, extreme events, climate change, body mass, theory

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