

Climate-dependent trophic interactions restructure plant chemistry and ecosystem functioning

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Trophic interactions are fundamental to understand the functioning and persistence of ecosystems. One of the greatest current challenges in ecology is to predict how ecosystems will face the changes induced by climate change. Here we investigate this question with multi-trophic communities in common garden experiments along an elevation gradient as a proxy for different climatic conditions. We monitored the combined influence of trophic levels and climatic conditions on plant growth, herbivory, phytochemistry and organic matter degradation rate. We found that the outcome of trophic interaction is strongly elevation-dependant with plants being unaffected to herbivory/predation pressure at optimal temperature while losing their ability to defend themselves efficiently under cooler or warmer temperatures, which in turn influences organic matter decomposition. This study is thus the first to reveal current outcomes of trophic interactions and ecosystem functioning along elevation, as well as how they may change under future climate scenarios.