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Protist Predation Influences the Temperature Response of Bacterial Communities

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Abstract:

Temperature strongly influences microbial community structure and function, in turn contributing to global carbon cycling that can fuel further warming. Recent studies suggest that biotic interactions among microbes may play an important role in determining the temperature responses of these communities. However, how predation regulates these microbiomes under future climates is still poorly understood. Here, we assess whether predation by a key global bacterial consumer—protists—influences the temperature response of the community structure and function of a freshwater microbiome. To do so, we exposed microbial communities to two cosmopolitan protist species—*Tetrahymena thermophila* and *Colpidium* sp.—at two different temperatures, in a month-long microcosm experiment. While microbial biomass and respiration increased with temperature due to community shifts, these responses changed over time and in the presence of protists. Protists influenced microbial biomass and respiration rate through direct and indirect effects on bacterial community structure, and predator presence actually reduced microbial respiration at elevated temperature. Indicator species analyses showed that these predator effects were mostly determined by phylum-specific bacterial responses to protist density and cell size. Our study supports previous findings that temperature is an important driver of microbial communities but also demonstrates that the presence of a large predator can mediate these responses to warming.

Keywords: predation, temperature, protistan bacterivory, bacterivores, aquatic microbiome, microbial respiration