Submitted Abstract

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Abstract

Protists are abundant and play key trophic functions in soil. Documenting how their trophic contributions vary across large environmental gradients is essential to understand and predict how biogeochemical cycles will be impacted by global changes. Here, using amplicon sequencing of environmental DNA in open habitat soil from 161 locations spanning 2600 m of elevation in the Swiss Alps (from 400 m to 3000 m), we found that, over the whole study area, soils are dominated by consumers, followed by parasites and phototrophs. In contrast, the proportion of these groups in local communities shows large variations in relation to elevation. While there is, on average, three times more consumers than parasites at low elevation (400-1000 m), this ratio increases to twelve at high elevation (2000-3000 m). This suggests that the decrease in protist host biomass and diversity towards mountains tops impact protist functional composition. Furthermore, the taxonomic composition of protists that infect animals was related to elevation while that of protists that infect plants or of protist consumers was related to soil pH. This study provides a first step to document and understand how soil protist functions varies along the elevational gradient.