

COVARIATION IN SOIL BIODIVERSITY AND BIOGEOCHEMISTRY IN NORTHERN AND SOUTHERN VICTORIA LAND, ANTARCTICA

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We report on work in Northern (72°) and Southern (77°) Victoria Land, Antarctica, investigating the structure of soil communities and the influence of soil properties on habitat suitability. The objectives of this study were to investigate relationships between the microbial and metazoan communities and describe covariation of these biota with underlying biogeochemical properties of the soils they occupy. Variation in soil microbial communities was examined using denaturing gradient gel electrophoresis (DGGE) of PCR-amplified 16S rDNA. We examined soil metazoan communities using an extraction/centrifugation technique followed by light microscopy. Genetic variation among nematode, rotifer and tardigrade populations was examined using rDNA and mtDNA sequences. We examined the composition of organic matter and identified potential source pools using stable isotope ratios of soil carbon and nitrogen pools. Our results show that microbial and metazoan biodiversity varies markedly across the sites studied and shares significant variation with underlying soil properties, especially with the concentration and composition of soil organic matter. DGGE revealed 4 major taxonomic groupings in the microbial communities; differences in these groupings coincide with sites in Northern and Southern Victoria Land. Similarly, variation in distribution of major taxonomic groups of metazoans was associated with differences in soil organic matter and other soil properties including microbial biomass, soil moisture, and inorganic nitrogen content among the sites. Molecular analyses indicated 2-3 different species of 2 nematode genera (*Eudorylaimus* and *Plectus*) and one endemic species (*Scottinema lindsayae*) are associated with distinct soil habitats across the region, though taxonomic resolution influenced inferences about habitat suitability among and within nematode genera. These results suggest that soil habitat suitability and relationships with biodiversity of microbes and metazoans are structured by similar soil biogeochemical parameters in Northern and Southern Victoria Land.