

Effects of grassland fire intensity on soil microbial ecology

Periodic or seasonal burning of vegetated habitats is a natural process, and is considered to be an important component of ecosystem management and stability. In grassland ecosystems, fire is generally considered to be critical for vegetative species composition and diversity, and is ultimately a driver of biome structure. Anthropogenic activities, which tend to increase burn frequencies, have negative impacts, including loss of the seed bank and long-term losses in key nutrients. While the effects of fire on various vegetated habitats have been extensively studied, less attention has been paid to the effects of fire on the underlying soil microbiome. However, given the widely accepted and critical roles of soil microorganisms in 'soil health', which include biomass degradation and C and N biogeochemical cycling (including diazotrophy), plant-growth promoting effects, and pathogen suppression, the impacts of fire on post-fire ecosystem productivity are of considerable ecological significance. In this study, we aim to use modern metagenomic methods, coupled with functional assays and thermal profiling, to investigate the effects of fire intensity on the structure and function of a grassland soil microbiome, and on plant-microbe interactions in the rhizosphere.