Functional Diversity of Microbial Communities in Forest Soils in Response to Airborne Lignite-Derived Depositions. (S03-klose152834-Oral)

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Abstract:

Atmospheric fly ash emissions from lignite-fired power plants strongly affected large forest areas in Germany. To estimate the impact of different fly ash loads on the functional diversity of microbial communities, a field study was conducted in old spruce stands along a historical deposition gradient. Lower microbial biomass contents in soils with high fly ash loads were mainly controlled by Ca content and soil pH, while microbial C:N was governed by magnetic susceptibility and effective cation exchange capacity. Higher respiration rates and energy requirements of soil microorganisms at sites with high depositions were mainly related to contents of organic C and total N in humic horizons. Specific beta-glycosidase activity expressed per unit organic C was significantly reduced by fly ash (P<0.05) indicating an inhibition in C mineralization in these soils. Fly ash favored a microbial population capable of utilizing a greater diversity of (BIOLOG) C substrates. However, decomposition of site-specific litter was reduced by high fly ash loads.

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