Microbial Dynamics Associated with Rhizosphere Carbon Flow. (S03-butler191508-Poster)

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Abstract:

The flow of photosynthate from plant roots into soil and the subsequent uptake of this readily available carbon by the microbial biomass have been well documented. Little is known regarding the flow of photosynthate into specific members or taxonomic groups of the soil microbial community, however. We used a 13C pulse-chase labeling procedure to examine the flow of photosynthetically fixed 13C into the microbial biomass and individual phospholipid fatty acids (PLFAs) in the bulk and rhizosphere soil of annual ryegrass plants. The delta 13C signature of the total microbial biomass varied both spatially and temporally throughout an 8-day chase period. For example, 24 hours following labeling, the delta 13C signature of the microbial biomass was +395 per mille in the rhizosphere soil and +50 per mille in the bulk soil. Eight days later the microbial biomass delta 13C signature declined to +44 per mille and -1 per mille in the rhizosphere and bulk soils, respectively. Nearly all of the microbial PLFAs were labeled, with the fungal marker appearing most highly labeled, suggesting differential usage of rhizodeposited carbon by the microbial community.

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