Microbial-derived carbon is a major contributor to rhizosphere soil organic carbon accumulation in alpine coniferous forests

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Abstract

Root activity creates a unique microbial hotspot in the rhizosphere and profoundly regulates soil carbon (C) dynamics, but empirical assessments of the soil microbial carbon pump (MCP) and associated ecological consequences on soil C storage based on insight of the rhizosphere remains lack, especially for different root functional modules. Based on the assessment of MCP efficacy in the rhizosphere of absorptive and transport roots, we found that rhizosphere MCP efficacy was ˜ 60%. The RMCP-efficacy was 26.5% higher in the rhizosphere of absorptive roots than in that of transport roots. The plant-derived C contributed only 5.71 ˜ 10.48% of the increased SOC in the rhizosphere. These observations suggest that the soil MCP is intensely stimulated in the rhizosphere, especially in the rhizosphere of absorptive roots. Our study provides novel and direct empirical evidence for the active soil MCP functions in SOC sequestration from the perspective of the rhizosphere.

Title page

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