Decomposition of rhizospheric soil organic carbon is more sensitive to climate warming than non-rhizosphere carbon

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The rhizosphere is the narrow region where plant roots and the soil interact vigorously and intensive microbial metabolism occurs. The properties of rhizosphere soil are usually different from that of non-

rhizosphere soil. This is called rhizosphere effects (REs).

The decomposition of rhizospheric soil organic carbon (SOC) plays an important role in driving carbon cycling in forest ecosystems. However, how rhizospheric SOC decomposition responds to simulated global warming, is rarely understood.

A research team led by Prof. Wang Qingkui from the Institute of Applied Ecology (IAE) of the Chinese Academy of Sciences recently conducted a laboratory incubation experiment to examine the rhizosphere effects of Cunninghamia lanceolata (i.e., China fir) and its understory ferns on the temperature sensitivity (expressed as Q10) of SOC decomposition.

The researchers found all plant species they tested had positive rhizosphere effects on Q10 of SOC decomposition. And the positive REs on Q10 could be attributed to the high rhizospheric nitrogen availability and the high microbial activity (i.e., positive REs on nitrogen components, microbial biomass and microbial residues).

This study shows that the decomposition of rhizospheric soil organic carbon is more sensitive to climate warming than the decomposition of SOC in the bulk soil, which highlights the need for discriminating between the rhizospheric and non-rhizospheric soil when predicting the feedback of SOC pool to future climate changes.

The study, titled "Cunninghamia lanceolataand understory ferns had positive rhizosphere effects on the temperature sensitivity of soil microbial respiration in a subtropical forest," has been published in *Geoderma*.

More information: Xuechao Zhao et al, Cunninghamia lanceolata and understory ferns had positive rhizosphere effects on the temperature

sensitivity of soil microbial respiration in a subtropical forest, *Geoderma* (2021). DOI: 10.1016/j.geoderma.2021.115593

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