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Short Communication

Tree diversity regulates soil respiration through accelerated tree growth in a mesocosm experiment

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Highlights

A mesocosm experiment was conducted to test tree diversity and identity effects on soil respiration.

Tree species differed strongly in traits related to growth rate and litter quality.

Tree diversity significantly increased litter mass loss, tree growth, and soil respiration.

Path analysis revealed tree growth as the main driver of elevated soil respiration.

Litter mass loss was not a significant driver of soil respiration in the short-term experiment.

Abstract

Soil respiration is an essential component of carbon (C) cycling in terrestrial ecosystems.

Despite increasing awareness of the significance of aboveground-belowground interactions,

little is known about tree diversity effects on soil respiration and the underlying mechanisms.

Here, we conducted a 105-day mesocosm experiment in a climate chamber to test the effects

of tree diversity (1, 2, and 4 species) and identity (with tree species differing strongly in litter and growth traits) on soil respiration (comprising decomposition of soil organic carbon and

root respiration). We expected tree diversity to affect soil respiration through changes in tree growth and surface litter decomposition (indicated by the litter mass loss). Our results show

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