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Carbon Addition Modified the Response of Heterotrophic Respiration to Soil Sieving in Ectomycorrhizal-Dominated Forests

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摘要	Soil heterotrophic respiration (Rh) is an important pathway of carbon (C) dioxide release from terrestrial soils to the atmosphere. It is often measured using sieved soil in a laboratory, but the uncertainty of how it is influenced by soil sieving persists, which limits the accuracy of predicting soil organic C dynamics in C models. To address how soil sieving during laboratory incubation affects Rh and its response to increased carbon availability, we investigated Rh in sieved and intact soil cores and its response to ¹³ C-glucose addition. This was conducted through a 27-day laboratory incubation in four forests, including two ectomycorrhizal-dominated (ECM) forests and two arbuscular mycorrhizal-dominated forests. The significant influence of soil sieving on Rh in all forests was not observed during incubation when glucose was not added. After adding glucose, the Rh in the sieved soils on the 5th day of incubation was averaged 27.2% lower than that in intact soils in ECM forests. On the 27th day it was 22.1% lower in the Pinus massoniana forest, but 78.0% higher in the Castanea mollissima forest. Strong relationships were detected between Rh in sieved and intact soils ($r^2 = 0.888$), and in soils both with and without the addition of glucose ($r^2 = 0.827$). The measured soil variables explained 74.7% and 49.7% of the variation in Rh on the 5th and 27th day of incubation, and the role of soil nutrients and microbial PLFA groups in regulating Rh varied temporally. Our findings suggest that plant mycorrhizal types influenced the role of increased C availability to microbes in regulating the response of Rh to sieving in forest ecosystems. View Full-Text
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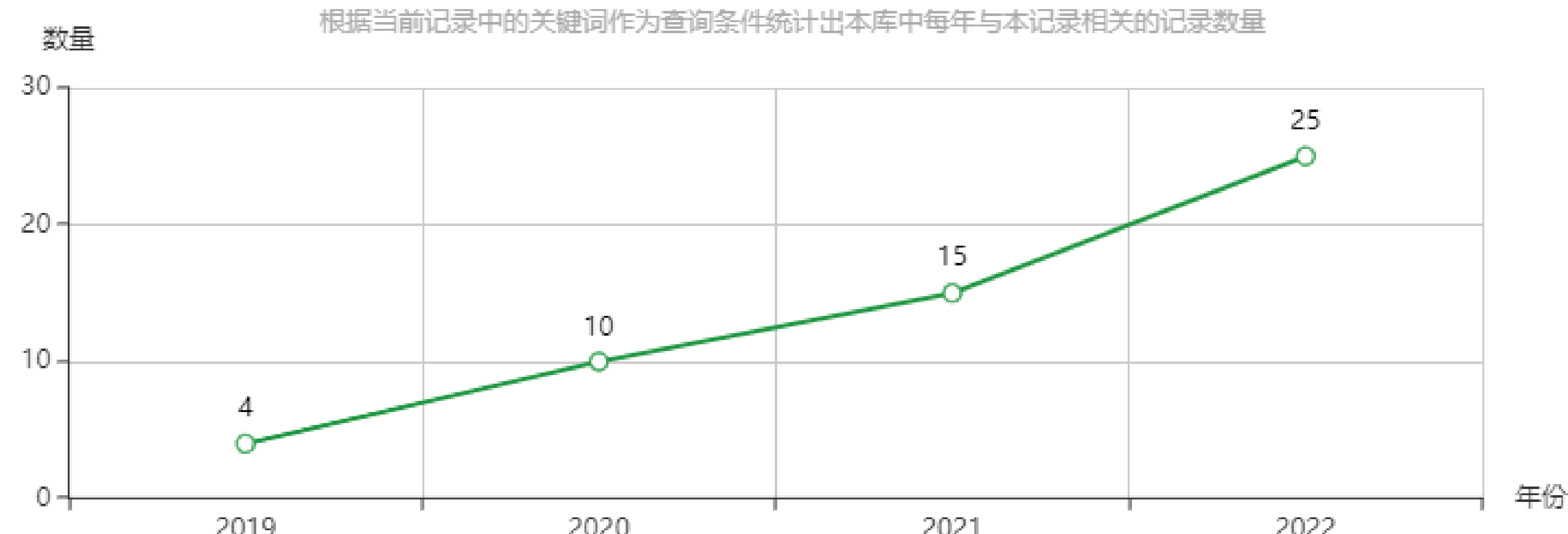
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