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Differentiated CO2 efflux in the mycorrhizosphere of rice cultivated in paddy soil

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Arbuscular mycorrhizal fungi (AMF) are the most widespread obligate biotrophic plant symbionts and their extra-radical hyphae have the potential in the regulation of carbon (C) cycling by enhancing soil aggregation or by stimulating priming effect. When exposed to the elevated CO_2, hyphae growth and colonization rate were increased, and consequently lead to more profound effects on C cycling. However, previous studies on AMF functions in the decomposition of organic C have focused on hyphosphere (i.e. at presence of hyphae), very limited information is available for myco rhizosphere (i.e. at presence of roots and hyphae). This study was set to test the differences in organic matter decomposition (indicated by CO_2 efflux) between myco rhizosphere and hyphosphere. Two microcosm experiments were carried out using rhizobox method to separate soil environment into root- and hyphae-compartment. AMF inoculation induced an increase of CO_2 efflux from the root-compartment, while there was no change in the hyphae-compartment. Stable C isotope analyses combing with the soil microbial abundance analysis is indicated that the increased production of CO_2 in root-compartment was related to the increase of the exudates (i.e. the easy decomposed organic C input) from roots which stimulated by AMF. The crucial role of AMF presence in C cycling was confirmed with differential CO_2 efflux associated with mycorhizosphere vs. hyphosphere environment.

Biography

Lili Wei is a Professor at Institute of Urban Environment, Chinese Academy of Sciences, China. Her research interests are Wetland Ecology, Plant Functional Ecology, and Stable Isotope Ecology. She has more than 20 publications in different international journals.

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