Top consumer-mediated versus passive spatial flows of resource driving functioning in an experimental meta-ecosystem

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Résumé

Species at the basis of food webs are possibly limited by different elements in ecosystems of contrasting functioning. If spatial flows from the neighboring ecosystem bring those limiting elements, we can expect them to enhance meta-ecosystem productivity through spatial complementarity. Moreover, the effect might be modulated by subsidy quality, which varies with the nature passive or active (i.e., via. animals) of the spatial flows. We studied this hypothesis in a meta-ecosystem experiment in which we manipulated the presence and the nature of the spatial flows (top consumer excretion versus detritus flow) connecting one net autotrophic ecosystem and one net heterotrophic ecosystem. We found an overall positive effect of spatial flows on ecosystem productivity emerging over time, which differently affected some parts of the system depending on the nature of the flow. We discuss the mechanisms at play through the change in stoichiometry induced by the spatial flows. Our results stress the importance of accounting for flow quality, in addition to flow quantity, when analyzing the contribution of spatial flows to ecosystem functioning.

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Mots-Clés: metaecosystem, spatial flows, productivity