

Unveiling the roles of litter quality and soil decomposer ‘ability’ in leaf litter decomposition: Masking the home-field advantage

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摘要: Microbial communities adapted to local litter may accelerate ‘home’ leaf litter decomposition rates, a phenomenon known as home-field advantage (HFA). However, we do not yet fully understand HFA, as its strength is highly variable and depends on environmental conditions. Two common models were used to check HFA: (1) Home Field Advantage Index (HFAI) is designed for litter reciprocal transplants involving two species, with one in the native site and the other in a non-native site; and (2) Decomposer Ability Regression Test (DART) necessitates at least three litter species, similarly, one in the native site and others occur in others non-native sites. Here, we synthesized 1147 observations to evaluate the contribution of HFA to litter decomposition and driving factors using both models. We found that the HFAI model, which quantified HFA simply based on differences in litter mass loss, indicated positive HFA effects, accelerating litter mass loss by 6.4% at home. The HFA became stronger when there was a greater dissimilarity in initial litter carbon (C) concentrations and soil microbial biomass nitrogen (MBN) between home and away sites. In contrast, the DART model, which disentangled litter quality and decomposer ability from HFA, did not reveal evidence of HFA. One possible reason is the small sample size in DART. Nevertheless, the DART model indicated that litter quality and decomposer ability were important factors, with HFA showing a negative correlation with both litter quality and decomposer ability. More long-term and wide-area data would be necessary to provide efficient evidences for model development and reveal the role of decomposers during litter decomposition.

关键词: Carbon cycling; Home-field advantage; Reciprocal transplantation; Decomposer ability; Litter mass loss; Litter quality