

Abstract 2026

EROSION OF BIODIVERSITY AFFECTS THE STABILITY OF SOIL MICROBIAL COMMUNITIES

Tardy Vincent*^[1] Maron PierreAlain*^[1] Ranjard Lionel*^[1] Leveque Jean*^[2] Mathieu Olivier*^[2] Lemanceau Philippe*^[1]

^[1]INRA/Université de Bourgogne ~ Microbiologie du sol et de l'environnement ~ DIJON ~ France-^[2]Université de Bourgogne ~ UMR Biogésociété ~ DIJON ~ France

Session: S11.02- SOIL BIODIVERSITY AND ECOSYSTEM SERVICES

Text: Anthropogenic activities have led to a significant modification/reduction of biodiversity. By observing this erosion, the understanding of the relationship between biodiversity and ecosystem functioning has emerged as a central issue in ecological and environmental sciences during the last decade. This relationship between diversity-stability-function has been extensively studied by plant ecologists, but remains largely unexplored for soil microorganisms.

In this context, we studied the impact of an erosion of biodiversity on the stability of soil microbial communities (i.e. resistance and resilience) in response to two perturbations: a residual metallic stress (mercury input at 20 ppm) and a transient heat stress (50 °C for 24 hours). Microbial diversity erosion was obtained by inoculating sterile soil microcosms with different dilutions of a grassland soil suspension. The response of microbial communities (bacteria and fungi) was evaluated by following the density and the diversity, but also the kinetics of soil carbon mineralization.

Our results show that the erosion of diversity affects significantly the resistance and resilience of microbial communities in terms of community dynamics (diversity and density) and functioning whatever the stress. More precisely, the kinetics of soil carbon mineralization is similar between the different levels of diversity, but the intensity of mineralization decreases with the decrease of diversity. When diversity is lower, the heat stress affects more strongly the mineralization than the metallic stress. This study highlights the ecological importance of soil microbial diversity in the ability of a soil to maintain the supply of ecosystem services in fluctuating environmental conditions.