



Microbial colonisation of sterilised soils across a pH gradient in a full factorial re-inoculation experiment

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We compared the influence of community and environmental conditions for the functioning (fungal and bacterial growth and respiration) and trait distribution (bacterial pH-tolerance) of soil microorganisms across a pH gradient. A reciprocal inoculation experiment, including pHs 4.1, 5.2, 6.7, and 8.3, was used. Sterilised soil microcosms with added plant material were inoculated with fresh soil (communities) and monitored for two months. Respiration was dominated by bacteria at high and by fungi at low pHs. The bacterial pH-tolerance of all inoculated communities (initial trait distribution) converged with the pH of the soil (environment). There were also differences between inocula, resulting in suboptimal pH-tolerance when the inoculum pH did not correspond to soil pH; low pH inocula had lower than optimal pH-tolerance in high pH soils and *vice versa*. Bacterial communities misaligned to their environment had impaired functioning (growth in all soils and respiration in high pH soils). The inoculum effect on bacterial pH tolerance and functioning could be detected within one week and remained for two months. Fungal communities emanating from low pH inocula consistently resulted in higher fungal growth and biomass (all soils) and respiration (low pH soils). This suggested that variation in fungal pH-tolerance did not influence their performance, in contrast with bacteria. It is likely that a larger fungal sample in low pH inocula explained these results. Consequently, respiration was characterised by the alignment of the bacterial trait distribution to the environment for high pH soils, while it was characterised by larger fungal inoculum for low pH soils.