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What is respiration - response to glucose addition, presence of plant roots and differences across biomes

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Respiration is likely the most often measured process in soil ecology. It is used as a general measurement of soil activity, and physiologically related to microbial maintenance requirements, growth, and soil organic matter production via biochemical efficiency and CUE.

Genomic tools are increasingly used in soil ecology for measurement of community composition, and functional analysis of communities, and when combined with stable isotopes, can be used to infer activities, either of the whole community or of individual taxa. However, relating genomic or gene-expressed functions to whole ecosystem processes, such as respiration, remains a conceptual and practical problem.

We analyzed the biochemical processes related to respiration and determine how, during a short soil incubation experiment in the presence of glucose, these processes change. Furthermore, we will show how gene and transcript abundances of respiratory processes vary across more than 4000 soil and rhizosphere samples in forests and grasslands and other biomes.

Results illustrate the treasure trove of biochemical information available to us in the form of metagenomes and metatranscriptomes.