

Carbon and nitrogen transformation and their driving microorganisms in paddy soil, as assessed by meta-transcriptomics

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Paddy soil undergoes drastic change in redox potential along water management during rice cultivation period. After water-logging, various reductive biochemical processes, including denitrification, metal and sulfate reduction, and methanogenesis can occur in the soil, leading to generation of reduced soil layer. On the other hand, thin oxidized layer is present at soil surface, where oxidative biochemical processes such as nitrification and methane oxidation can occur. These oxidative and reductive reactions play central role in material transformation in paddy soil and are closely related to soil fertility, rice growth and surrounding environment.

We carried out meta-transcriptomic analysis of oxidized and reduced soils collected from Niigata paddy field during rice cultivation period. Whole microbial communities, quantity and diversity of transcriptome involved in carbon and nitrogen transformation in the soils were investigated by rRNA and mRNA analyses. Active microbial communities, possible carbon and nitrogen transformation, microbial players involved in the transformation, and their temporal transition in the paddy soil will be reported.

Keywords: soil microbial communities, metatranscriptome, bioinformatics, paddy soil, CN cycle