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ORAL PRESENTATIONS

11. Recently identified microbial guild mediates soil N_2O sink capacity

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Nitrous oxide is the predominant ozone-depleting substance and contributes approximately 6 per cent to overall global warming. Terrestrial ecosystems account for nearly 70 per cent of total global N_2O atmospheric loading, of which at least 45 per cent can be attributed to microbial cycling of nitrogen in agriculture. The reduction of N_2O to nitrogen gas by microorganisms is critical for mitigating its emissions from terrestrial ecosystems, yet the determinants of a soil s capacity to act as a source or sink for N_2O remain uncertain. To address whether the composition and structure of the N_2O reducing communities matters for N_2O consumption in soil, we analyzed the diversity of this guild amongst the different European soils by pyrosequencing. We demonstrated using

structural equation modeling that the soil N_2O sink capacity is mostly explained by the abundance and phylogenetic diversity of a newly described N_2O reducing microbial group, which mediate the influence of edaphic factors. Analyses of interactions and niche preference similarities suggest niche differentiation or even competitive interactions between organisms with the two types of N_2O reductase. Using co-occurrence analysis, we further identified several recurring communities comprised of co occurring N_2O reducing bacterial genotypes that were significant indicators of the soil N_2O sink capacity across different European soils.