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► To cite this version:

Luiz Domeignoz Horta, Aymé Spor, David Bru, Marie-Christine Breuil, Florian Bizouard, et al.. The diversity of the N₂O reducers matters for the relative proportion of N₂O emitted across cropping systems by denitrification. 20th European Nitrogen Cycle Meeting, ENC2015 Conference, University of Aberdeen. GBR., Sep 2015, Aberdeen, United Kingdom. 65 p. hal-02743401

HAL Id: hal-02743401

<https://hal.inrae.fr/hal-02743401>

Submitted on 3 Jun 2020

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ORAL PRESENTATIONS

Diversity of N₂O reducers matters for the relative proportion of N₂O emitted across cropping systems by denitrification

Luiz Domeignoz-Horta, A. Spor, D. Bru, M.C. Breuil, F. Bizouard, J. Léonard, Laurent Philippot

INRA, UMR 1347 Agroécologie, F-21065 Dijon cedex, France

luizdomeignoz@gmail.com

Agriculture is the main source of terrestrial emissions of N₂O, a potent greenhouse gas and the main cause of ozone layer depletion. The reduction of N₂O into N₂ by microorganisms carrying the nitrous oxide reductase gene (*nosZ*) is the only biological process known to eliminate this greenhouse gas. Recent studies showed that a previously unknown clade of N₂O-reducers was related to the capacity of the soil to act as an N₂O sink, opening the way for new strategies to mitigate emissions. Here, we investigated whether the agricultural practices could differently influence the two N₂O reducer clades with consequences for denitrification end-products. The abundance of N₂O-reducers and producers was quantified by real-time PCR, and the diversity of both *nosZ* clades was determined by 454 pyrosequencing. Potential N₂O emissions and potential denitrification activity were used to calculate the N₂O emission ratio. Overall, the results showed limited differences between management practices but there were significant differences between cropping systems in both the abundance and structure of the *nosZII* community, as well as in the N₂O emission ratio. More limited differences were observed in the *nosZI* community, suggesting that the newly identified *nosZII* clade is more sensitive than *nosZI* to environmental changes. Potential denitrification activity and potential N₂O emissions were explained mainly by the soil properties while the diversity of the *nosZII* clade on its own explained 26 percent of the proportion of N₂O emitted, which highlights the importance of understanding the ecology of this newly identified clade of N₂O reducers for mitigation strategies.