



HAL
open science

N₂O production, a widespread trait in fungi

Laurent Philippot

► **To cite this version:**

Laurent Philippot. N₂O production, a widespread trait in fungi. 7. Colloque AFEM Association Francophone d'Ecologie Microbienne, "Microbiologie et environnement : fondamentaux et applications" , Université de Pau et des Pays de l'Adour (UPPA). FRA., Nov 2015, Anglet, France. hal-02738525

HAL Id: hal-02738525

<https://hal.inrae.fr/hal-02738525v1>

Submitted on 2 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Session 1 : Dynamique de la biodiversité, évolution et biogéographie

N₂O production, a widespread trait in fungi

Laurent Philippot * ¹

¹ UMR1347 Agroécologie – Institut national de la recherche agronomique (INRA) : UMR1347 – 17 rue Sully 21065 Dijon, France

N₂O is a powerful greenhouse gas contributing both to global warming and ozone depletion. While fungi have been identified as a putative source of N₂O, little is known about their production of this greenhouse gas. Here we investigated the N₂O-producing ability of a collection of 207 fungal isolates. Seventy strains producing N₂O in pure culture were identified. They were mostly species from the order Hypocreales order-particularly *Fusarium oxysporum* and *Trichoderma* spp.-and to a lesser extent species from the orders Eurotiales, Sordariales, and Chaetosphaeriales. The N₂O ¹⁵N site preference (SP) values of the fungal strains ranged from 15.8‰ to 36.7‰, and we observed a significant taxa effect, with *Penicillium* strains displaying lower SP values than the other fungal genera. Inoculation of 15 N₂O-producing strains into pre-sterilized arable, forest and grassland soils confirmed the ability of the strains to produce N₂O in soil with a significant strain-by-soil effect. The copper-containing nitrite reductase gene (*nirK*) was amplified from 45 N₂O-producing strains, and its genetic variability showed a strong congruence with the ITS phylogeny, indicating vertical inheritance of this trait. Taken together, this comprehensive set of findings should enhance our knowledge of fungi as a source of N₂O in the environment.

Mots-Clés: N₂O, greenhouse gas, fungi, soil

*Intervenant