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Session 1 : Dynamique de la biodiversité, évolution et biogéographie

N₂O production, a widespread trait in fungi

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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