

JS1-3:

Phylogenetic diversity and environmental distribution of denitrifying fungi

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Fungi are saprophytic organisms and play pivotal roles to degrade organic matter such as plant residue in soil ecosystems. Some fungi have been revealed to possess ability of nitrification and/or denitrification, and therefore the processes of fungal nitrification and denitrification are becoming integrated into figures of inorganic nitrogen cycle, which had been composed of only prokaryote. The existence of N₂O producing fungi in various environments are well recognized by increasing ecological studies of denitrifying fungi. The contribution of fungi to N₂O production process in soil is, however, still under discussion.

In order to clarify the ecology of fungal denitrification in soil, we have focused on Japanese tea field where a large amount of nitrogen fertilizer are extensively amended. We isolated and classified denitrifying fungal strains. Their growth and N₂O-producing activities have been evaluated in media supplemented with or without organic nitrogen. The environmental conditions where the strains frequently isolated were analyzed to discuss the ecology of fungal denitrification in the field.

In this symposium, I would also like to introduce the biochemical mechanisms of fungal denitrification which have been clarified by other research groups. Recent progresses according to the phylogenetic diversity, the distribution of denitrifying fungi in environments, and the contribution of fungal denitrification to the soil N₂O-producing activities will be also introduced. The physiological roles of N₂O production in fungi will be briefly discussed with consideration of the fact that the denitrifying fungi with high N₂O-producing activities are often phylogenetically close to plant and/or animal pathogens.

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