

PB-031:

N₂O reductase gene and activity in bradyrhizobia nodulating *Aeschynomene indica*

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Because nitrous oxide (N₂O) is a greenhouse gas with a global warming potential approximately 300 times that of CO₂, the anthropogenic N₂O emission should be reduced. To reduce N₂O into harmless N₂ by bacterial denitrification process, the presence of nosZ gene encoding a N₂O reductase is important. *Aeschynomene indica* is an annual aquatic legume plant, which often grows wild on footpath between paddy fields. *A. indica* generally forms nitrogen-fixing root/stem nodules by infection of photosynthetic bradyrhizobia strains, such as *Bradyrhizobium* sp. ORS278 and BTai1. *Bradyrhizobium oligotrophicum* S58, which was isolated from paddy field soil, also shows nodulation and symbiotic nitrogen fixation on *A. indica* (Okubo et al. Appl. Environ. Microbiol. 2013. 79:2542-51). However, there is no report on N₂O reductase by these *A. indica* bradyrhizobia. In this study, we investigated the distribution of N₂O reductase gene in *A. indica* bradyrhizobia, and their N₂O reductase activities under culture condition. BLAST search showed that nosZ gene was identified from the genomes of S58 and BTai1 with high homology to that of USDA110, whereas not identified in ORS278 genome. To examine whether these strains show N₂O reductase activity according to their genotype, we tested N₂O uptake under culture conditions. N₂O uptake by strain S58 was detected, whereas it was not observed in ORS278 culture. In addition, the decrease of N₂O concentration in the gas-phase of S58 culture depended on the starting bacterial density. These results indicate that *A. indica* bradyrhizobia have a potential of N₂O reduction as well as soybean bradyrhizobia, which depend on the existence of nosZ in the genome. In this presentation, we will report N₂O reduction activity of strain S58 in symbiotic state on root/stem nodules.

keywords:bradyrhizobia,Aeschynomene indica,nosZ