

No. 0631

## Studies on Isolation of Salt-Tolerant Nodulating Bacteria and Improvement of Salt-Tolerance in Host Plant

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### Summary

Bacteria which form nodules on legume plants belong to the *alphaproteobacteria*, but some species of genera *Ralstonia* and *Burkholderia* belonging to *betaproteobacteria* are also known. Historically, the rhizobia isolated from genus *Lotus* was named as *Mesorhizobium loti*. During the course of isolation of salt-resistant, nodulating bacteria from the root nodules of *Lotus japonicus* which are grown on seaside area in Chiba Prefecture, we isolated salt-resistant symbiotic rhizobium strains designated as YSUR, TKR and SRHM, and two salt-resistant, non-rhizobial symbiotic strains designated as Ka9123 and Y103A. Based on phenotypic and genotypic studies, the former three strains were found to belong to the genus *Mesorhizobium*, but the latter two strains were to belong to genus *Aminobacter*. These strains are able to nodulate both with *L. japonicus* and *Lotus corniculatus*.

Nodulation test, sequencings of 16S rRNA gene, *recA*, *nifH* and *nodA* genes were determined. After infection test, strains were re-isolated from the nodules and re-identified based on 16S rRNA gene and *nifH* gene sequences, physiological and chemotaxonomic characteristics.

According to 16S rRNA gene sequence analyses, strains YSUR, TKR and SRHM were found to fall within the genus *Mesorhizobium*, but strains Ka9123 and Y103A shows high similarity (99.9%) with the species of genus *Aminobacter*. Strains YSUR and TKR was considered to be a new species of the genus *Mesorhizobium*, and the strain SRHM was also belong to another new species of the genus *Mesorhizobium*. DNA-DNA hybridization study indicate that strains Ka9123 and Y103A showed low level of DNA-DNA relatedness to three *Aminobacter* species (*A. aganoensis*, *A. niigataensis*, and *A. ciceronei*). The isolates could be distinguished from *Aminobacter* species based on cellular fatty acid profile and phenotypic characteristics. Therefore, these two strains would be a novel species of the genus *Aminobacter*, for which *Aminobacter nodulans* sp. nov. is proposed. The positive result for nodulation test, sequencings of *nod* and *nifH* genes strongly suggest that these genes could be transferred in the rhizosphere from *Mesorhizobium* species to these salt-resistant strains.