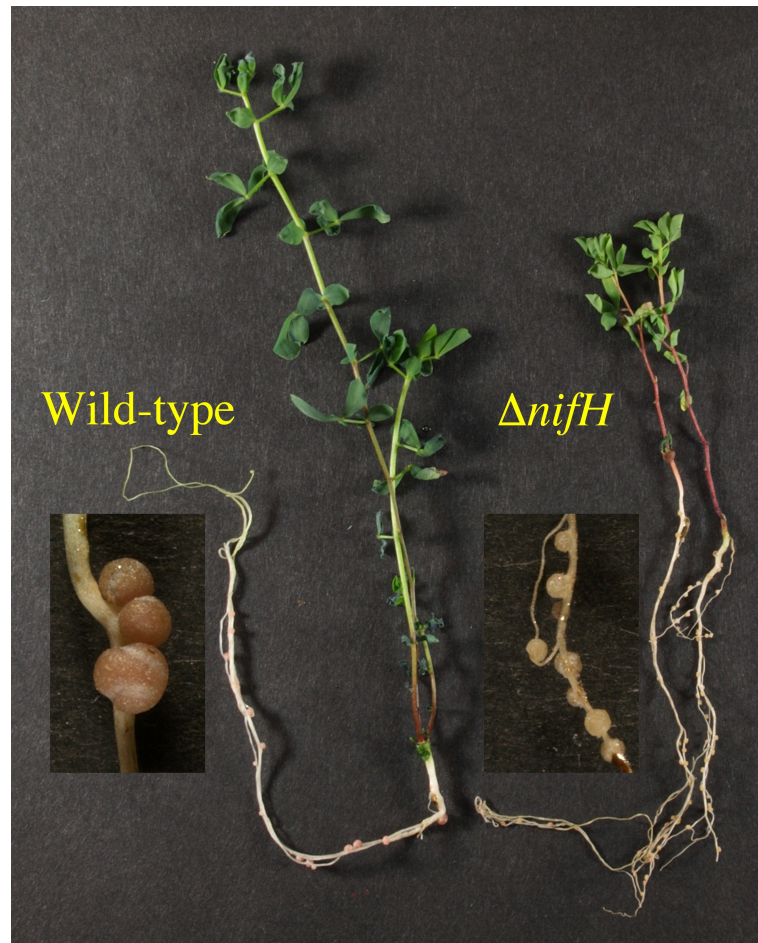


# Molecular Biology and Genomics of Nodule-Forming Symbiosis and Nitrogen Fixation

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Symbiotic phenotypes of *Mesorhizobium loti* wild-type and mutant with *Lotus japonicus* plants

I The nodule-forming symbiosis between rhizobia and legumes is a typical mutualistic symbiosis in that legume host supplies organic acids obtained through carbon fixation, in turn, rhizobia supply ammonia fixed by nitrogen fixation under nitrogen limited conditions. However, establishment and maintenance of rhizobium-legume symbiosis is not so simple and requires a sequence of highly regulated and coordinated events for mutual authentications. Probably it is because the interaction resembles a pathogenic interaction at some stages including invasion of the micro-symbiont to the cytoplasm of the macro-symbiont cells. We are investigating genes and their functions responsible for establishment and/or efficiency of nitrogen-fixing symbiosis, by means of genomics and molecular genetics. We found that it is important for rhizobia to possess protection against reactive oxygen species under nitrogen fixing conditions. We also found that rhizobia utilize type III secretion system similar to animal and plant pathogens to modulate symbiotic efficiency.

Keywords : Rhizobium, Legume