

Research Theme: Population genomics
Research Project Title: Adaptive radiation following the loss of a root symbiont
Principal Investigator/Supervisor: Jarkko Salojärvi
Co-supervisor/ Collaborator(s) (if any):
Project Description
<p>a) Background:</p> <p>One of the essential factors of plant growth is the uptake of nutrients from the soil. For this means, plants have developed several different mechanisms, such as arbuscular mycorrhizal (AM), ectomycorrhizal, and nitrogen-fixing root nodule symbioses (RNS) with diazotrophic bacteria (e.g. rhizobia or Actinomycetes of the genus Frankia).</p> <p>b) Proposed work:</p> <p>In this project, you will study the genomic patterns induced by the switch of the symbiont by carrying out a population genomics analysis of model tropical tree comparative system in <i>Trema</i> – <i>Parasponia</i> genera. The <i>Trema</i> genus represents 12 pioneer tree species that are distributed across all tropical regions, but that has recently lost RNS symbiosis and therefore relies on the more ancestral AM symbiosis. In contrast, the 5 <i>Parasponia</i> species still retained RNS, but their ecological niche is concentrated on scattered areas around active volcanoes in South East Asia region. In terms of evolutionary time scales the switch is relatively recent, since the species diverged only about 10 million years ago.</p> <p>Here you will participate in collecting and sequencing the whole genomes of hundreds of individuals from two different species of each genera, covering the whole geographic range of the species. You will then study this population to estimate the population structure and historical population sizes in order to obtain information of the possible fitness advantage of the loss of nitrogen fixation, as suggested by the difference in geographic ranges. Additionally, the global sampling will provide genomic evidence on the migration patterns of tropical forest tree species.</p>
<p>Supervisor contact:</p> <p>If you have questions regarding this project, please email the Principal Investigator: jarkko@ntu.edu.sg</p>
<p>SBS contact and how to apply:</p> <p>Associate Chair-Biological Sciences (Graduate Studies) : AC-SBS-GS@ntu.edu.sg</p> <p>Please apply at the following: http://admissions.ntu.edu.sg/graduate/R-Programs/R-WhenYouApply/Pages/R-ApplyOnline.aspx</p>