

Description for the general public

The legume family (Fabaceae) represents the third largest family of angiosperms comprising approximately 19 500 species. Within this family there are both annual and perennial flowers as well as perennial woody plants. A characteristic feature of most legume plants is their ability to fix nitrogen through close interaction with symbiotic bacteria. Due to this interaction, plants such as beans, peas and lupins can develop even on poor soils without additional fertilization.

Modern genetic science formulated a number of questions related ability of plants and microorganisms to develop symbiotic ties, their common history and mutual communication. The project entitled "Genome dynamics underlying nodulation capacity of early diverging legumes." is a part of the current research focused on higher plants.

In this project we bring up a number of important issues related to the evolutionary changes that have influenced the evolution and maintenance of the ability to actively use atmospheric nitrogen in legumes. The key question that the research team will try to answer as a result of the project is a background of legumes biodiversity, the indispensable and undesirable elements in the process of plant-microbe symbiosis. By studying distant cousins of cultivated legumes (e.g. *Chamaecrista fasciculata*, *Senna obtusifolia*, *Desmanthus virgatus* and *Mimosa pudica*) we will increase the body of information describing the characteristics of gained or lost genes, the expression of which differentiates plants capable or incapable to develop symbiotic iteration. Over the past years, a vast array of highly automated research tools expanded our capacity to generate and analyze large sets of genomic data. By combining high throughput transcriptome sequencing and large phylogenomic reconstructions we will be able to describe the "love" story of legumes and their microscopic companions in more details.

In the future, collected data and formulated explanations of ancient evolutionary changes will also facilitate better utilization of legumes in agriculture and biotechnology.