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“Cloning of Acetyl Transferase gene promoters to investigate role during root nodule symbiosis in Medicago truncatula”

Legumes are a family of plants that are used for human consumption, livestock forage and sometimes used for manure. The legume family is large with over 16,000 species. Some of the most popular species of legumes are beans, chickpeas, peanuts, and lentils. The legume this study focuses on the model legume “Medicago truncatula”. Legumes have the ability to establish root nodule symbiosis. A process where the bacteria, Rhizobia, enters the root hairs of the plant and then convert atmospheric nitrogen into ammonia in root organs called nodules, which the plant can use as a nutrient. This study will investigate the gene expression of two Acetyl Transferase genes involved in root nodule symbiosis. We will clone the 3 kb upstream region of the two promoters using the Golden Gate cloning method. Primers will be designed in order to amplify the promoters, tested for efficiency using gel electrophoresis, clones and transformed into Agrobacterium rhizogenes. The promoters will be tested in ‘hairy root’ of Medicago truncatula to determine their expression patterns within the nodule. This study contributes to the understanding of fundamental signaling pathways involved in the process of legume nitrogen fixation which is a critical cornerstone of sustainable agriculture.