DEPARTMENT OF
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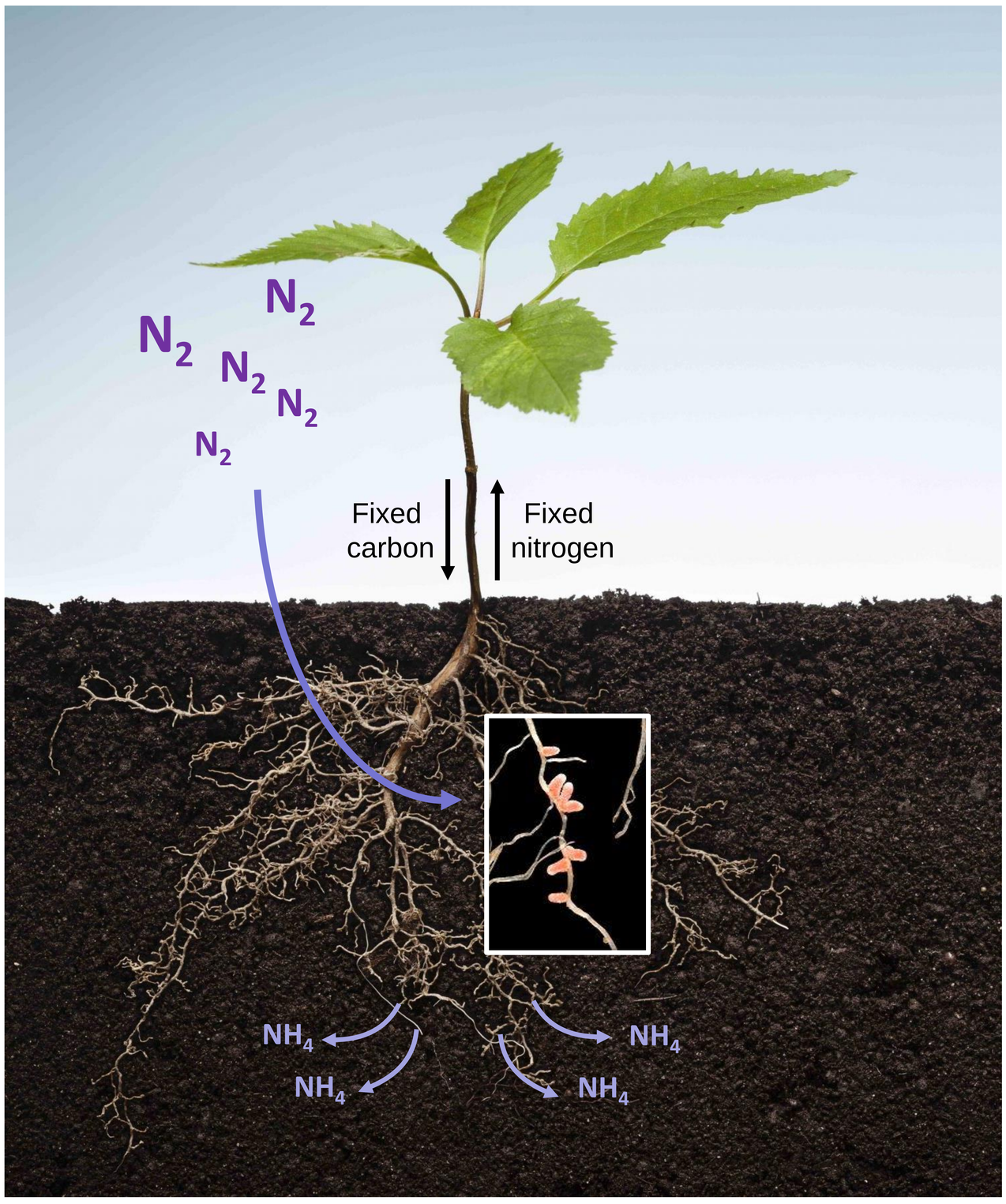
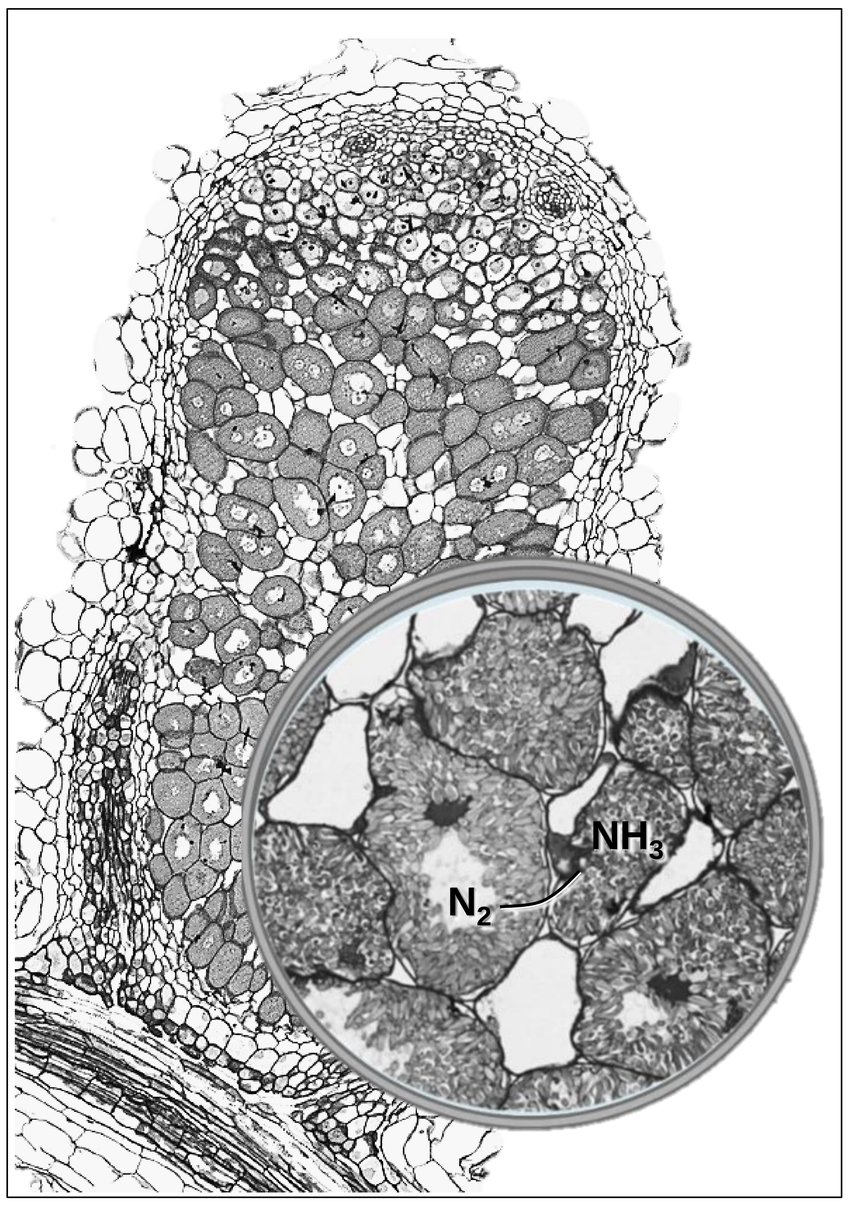
Enhancing symbiotic nitrogen fixation for sustainable agricultural production

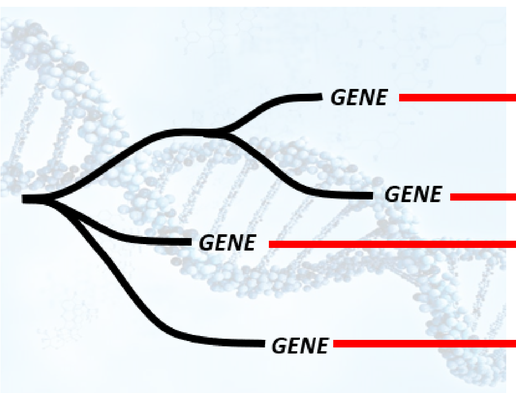


Legumes accommodate symbiotic rhizobacteria within plant cells of special organs, the root nodules, where rhizobia bind elementary nitrogen from the air. As a result of this symbiosis, cultivated legumes are able to provide themselves and subsequent rotation crops with nitrogen, reducing requirements for environmentally and economically costly mineral nitrogen fertilization



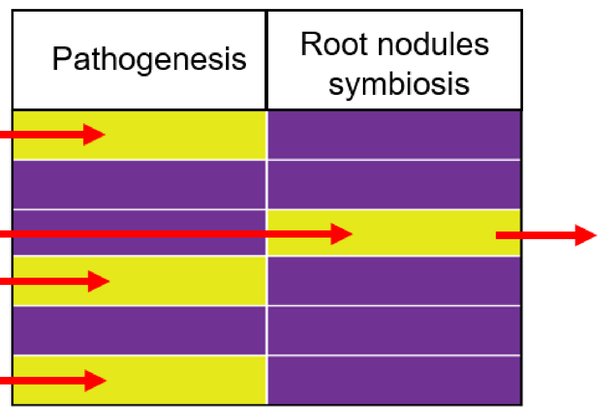
Approach: The identification of genes negatively regulating nitrogen-fixing symbiosis based on their homology to known pathogen defence-related genes and symbiotic expression pattern

1. Genome mining of defence-associated gene families in model legumes



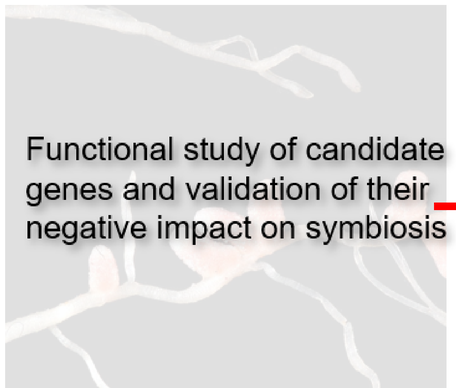
Genomes:
Lotus japonicus
Medicago truncatula

2. Screening of transcriptomic profiles



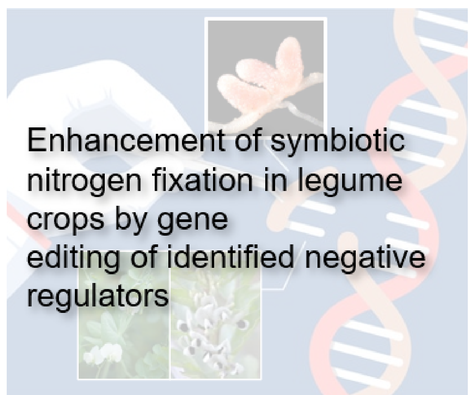
Transcriptomic profiles of interactions:
Medicago – *S. meliloti*
Lotus – *M. loti*

3. Reverse genetics on model legumes



Lotus *LORE1* mutants
Medicago *Tnt1* mutants

4. Translational research on legume crops



EMS mutagenized populations of pea, broad bean and other legume crops