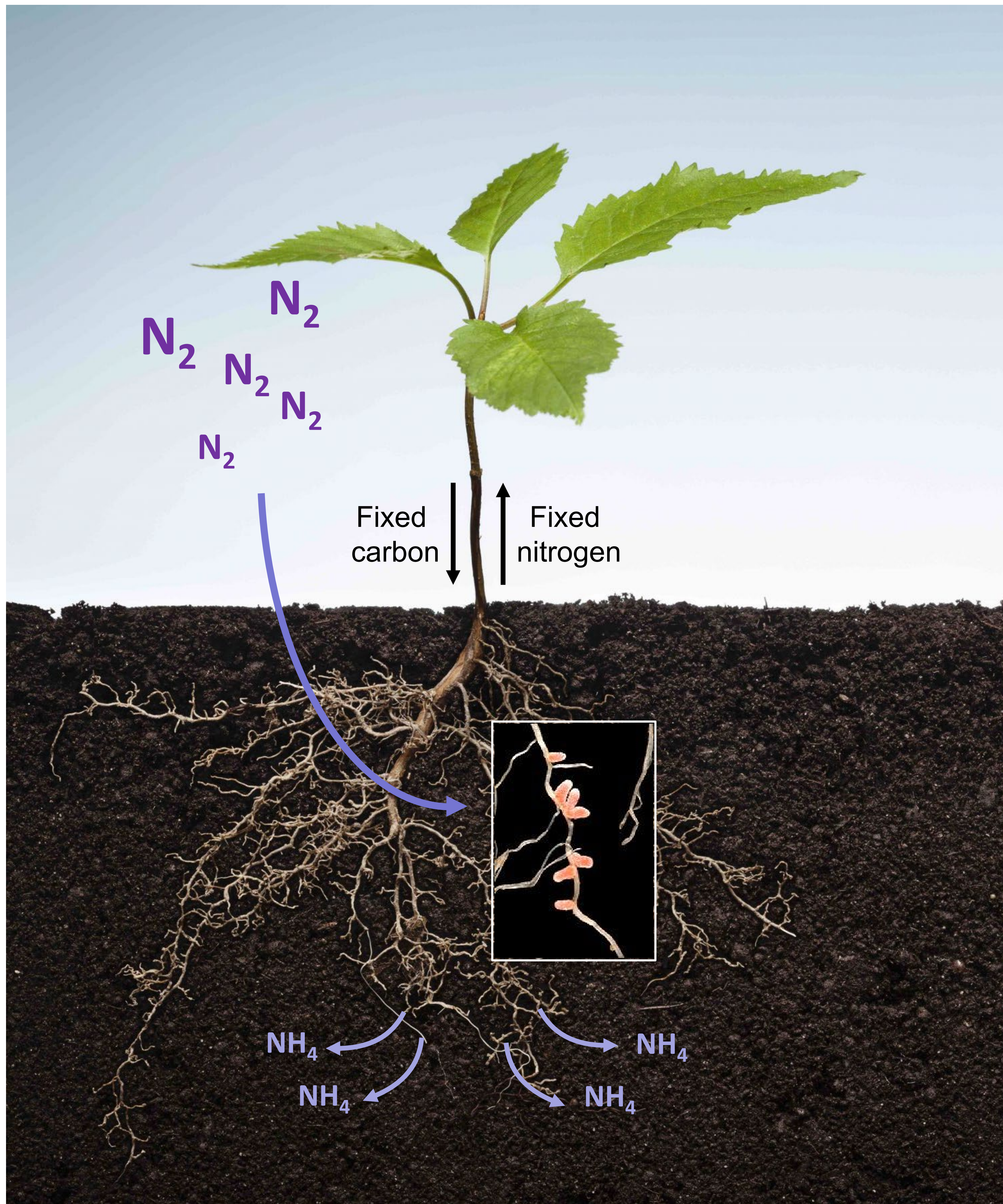
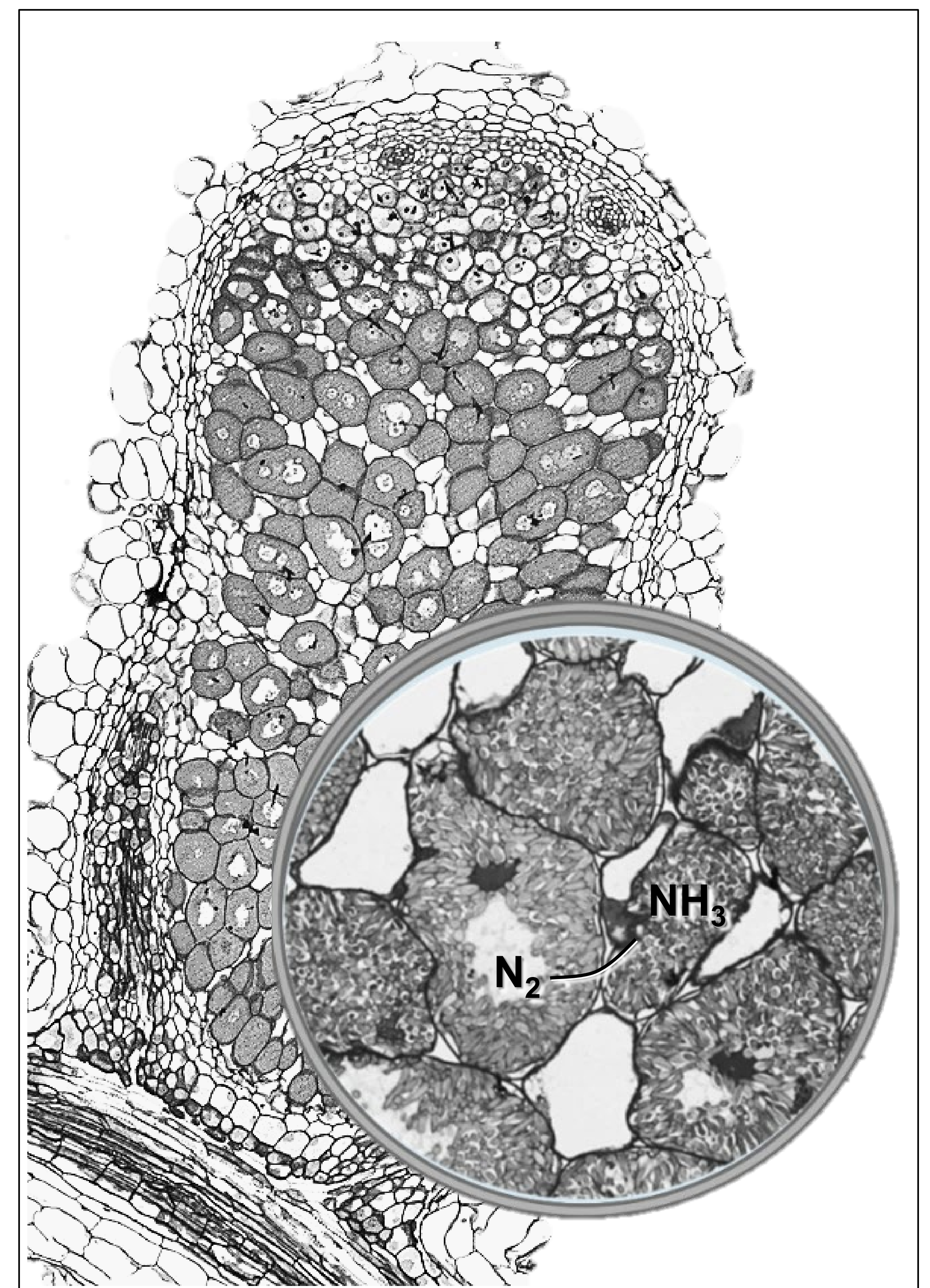




Enhancing symbiotic nitrogen fixation for sustainable agricultural production

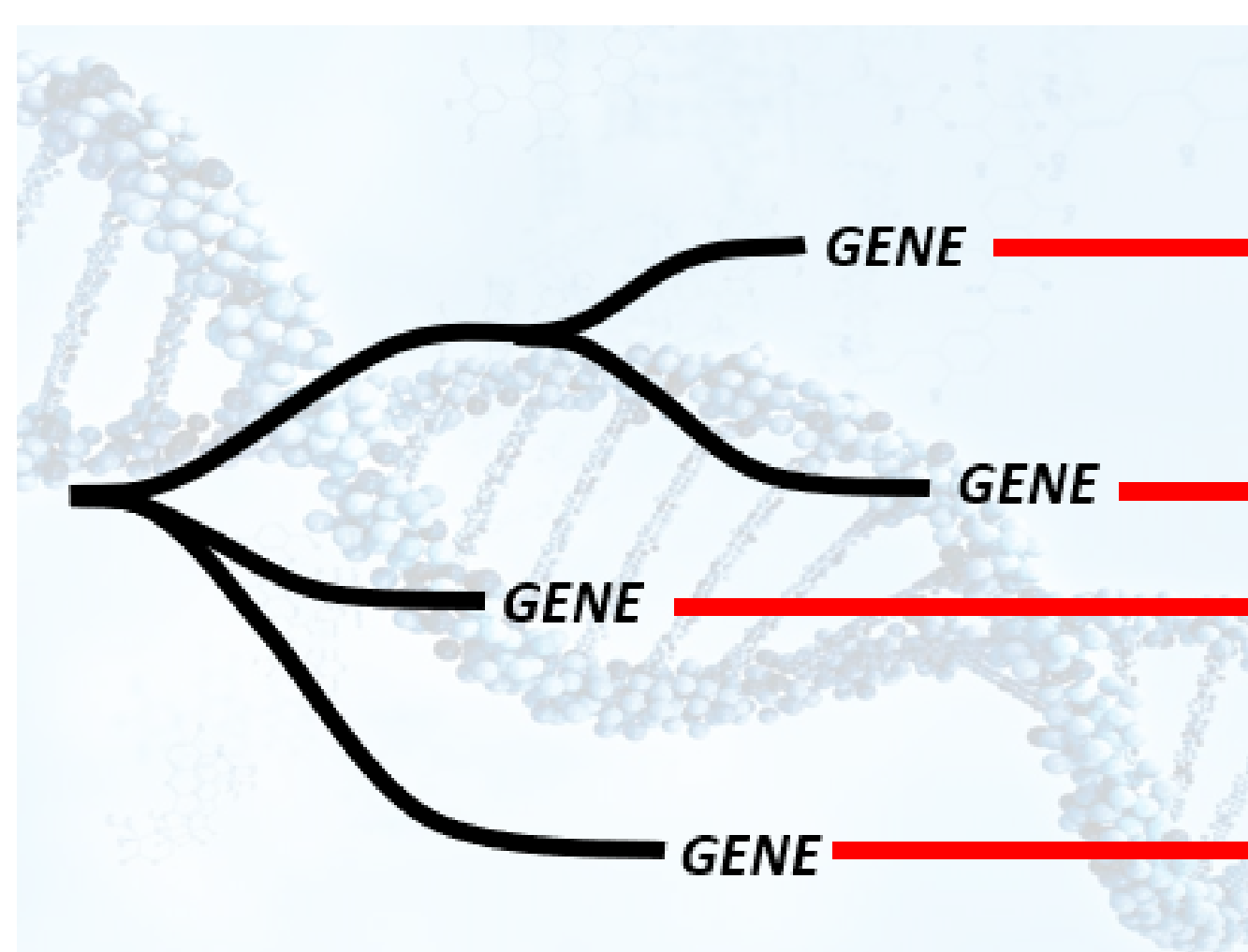


Legumes accommodate symbiotic rhizobacteria within plant cells of special organs, the root nodules, where rhizobia bind elementary nitrogen from the air. As a result of this symbiosis, cultivated legumes are able to provide themselves and subsequent rotation crops with nitrogen, reducing requirements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



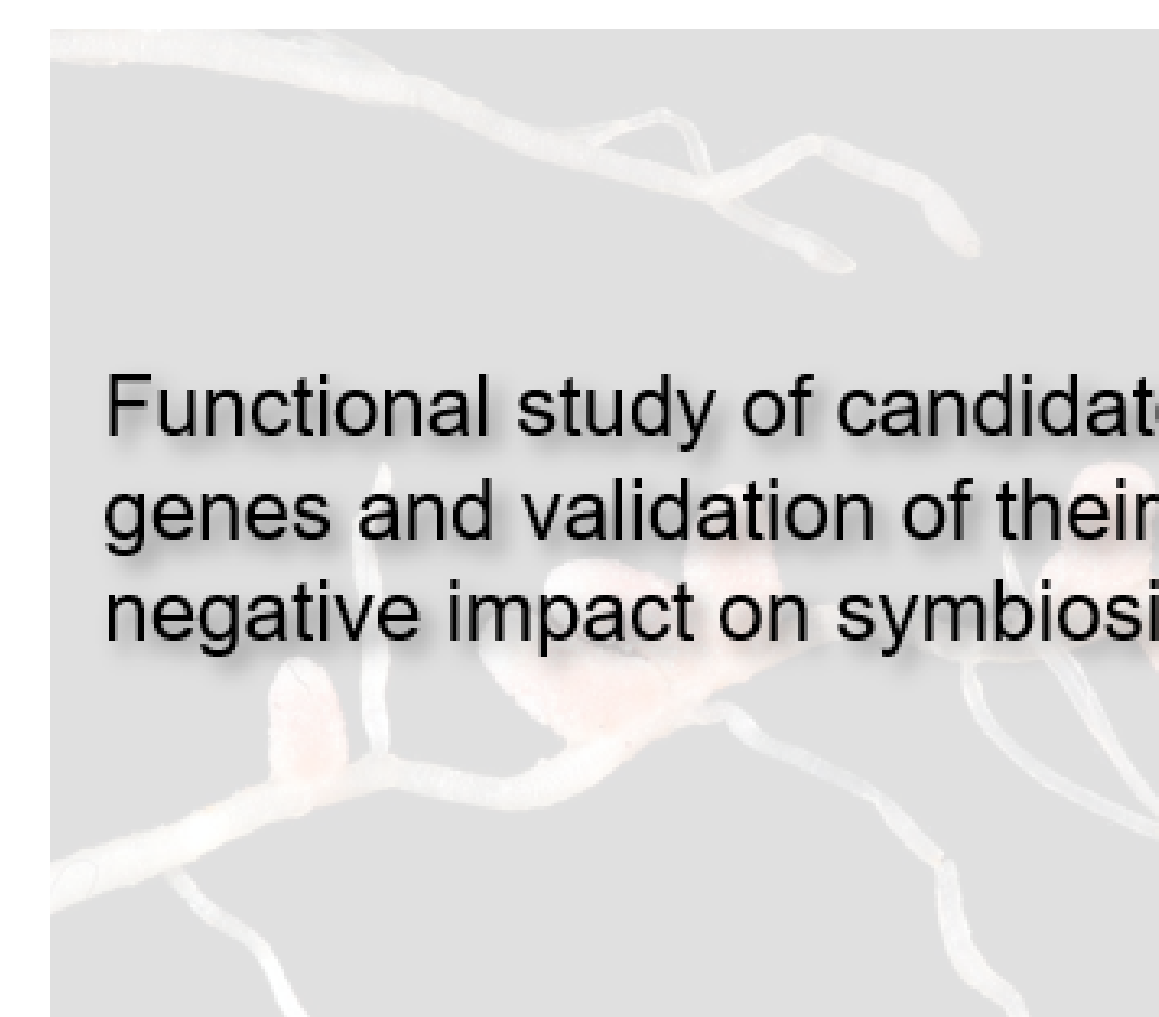
Genomes:
Lotus japonicus
Medicago truncatula

2. Screening of transcriptomic profiles

	Pathogenesis	Root nodules symbiosis
GENE	High expression (yellow)	Low expression (purple)
GENE	Low expression (purple)	High expression (yellow)
GENE	High expression (yellow)	High expression (yellow)
GENE	Low expression (purple)	Low expression (purple)
GENE	High expression (yellow)	Low expression (purple)

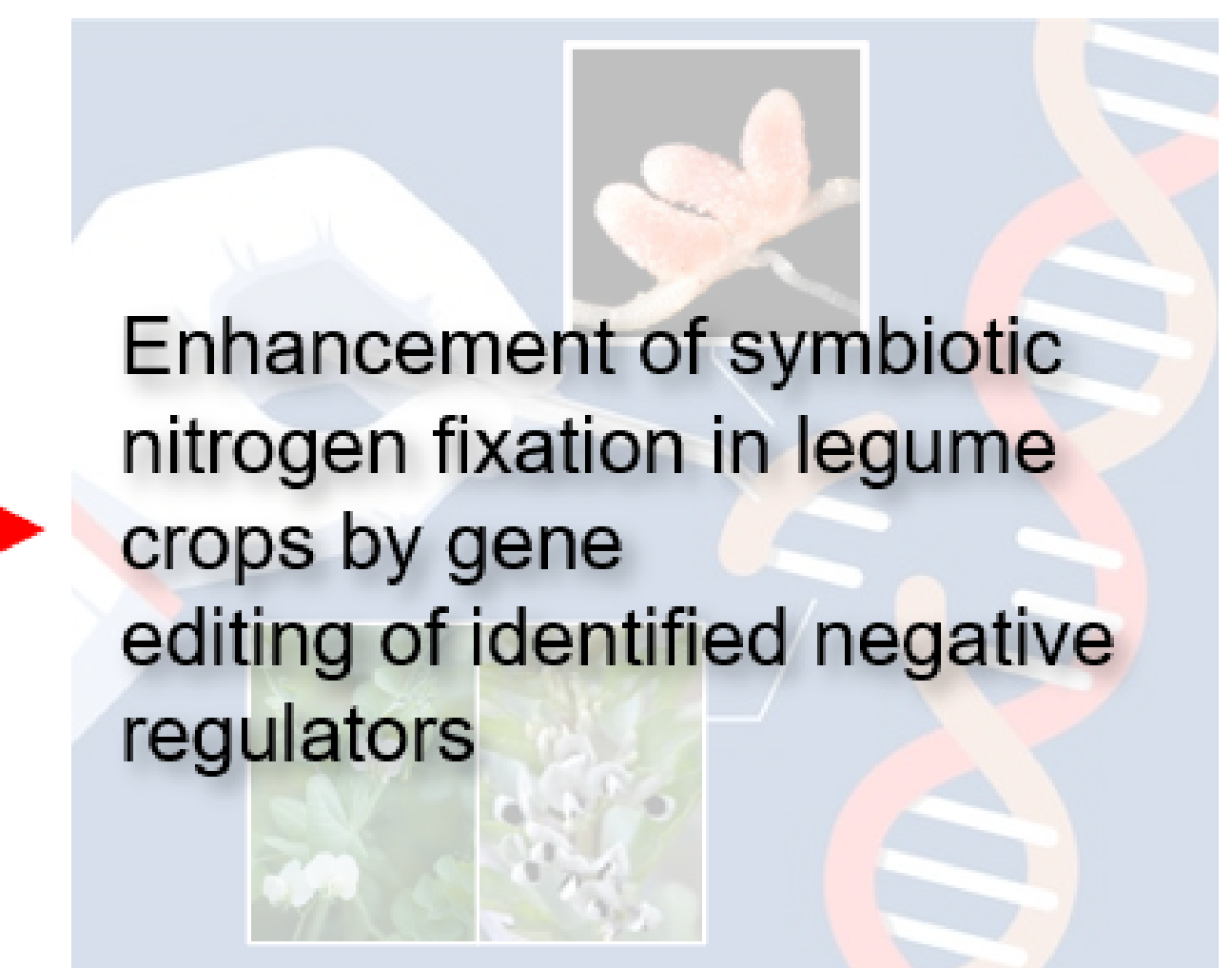
Transcriptomic profiles of interactions:
Medicago – *S. meliloti*
Lotus – *M. loti*

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

