

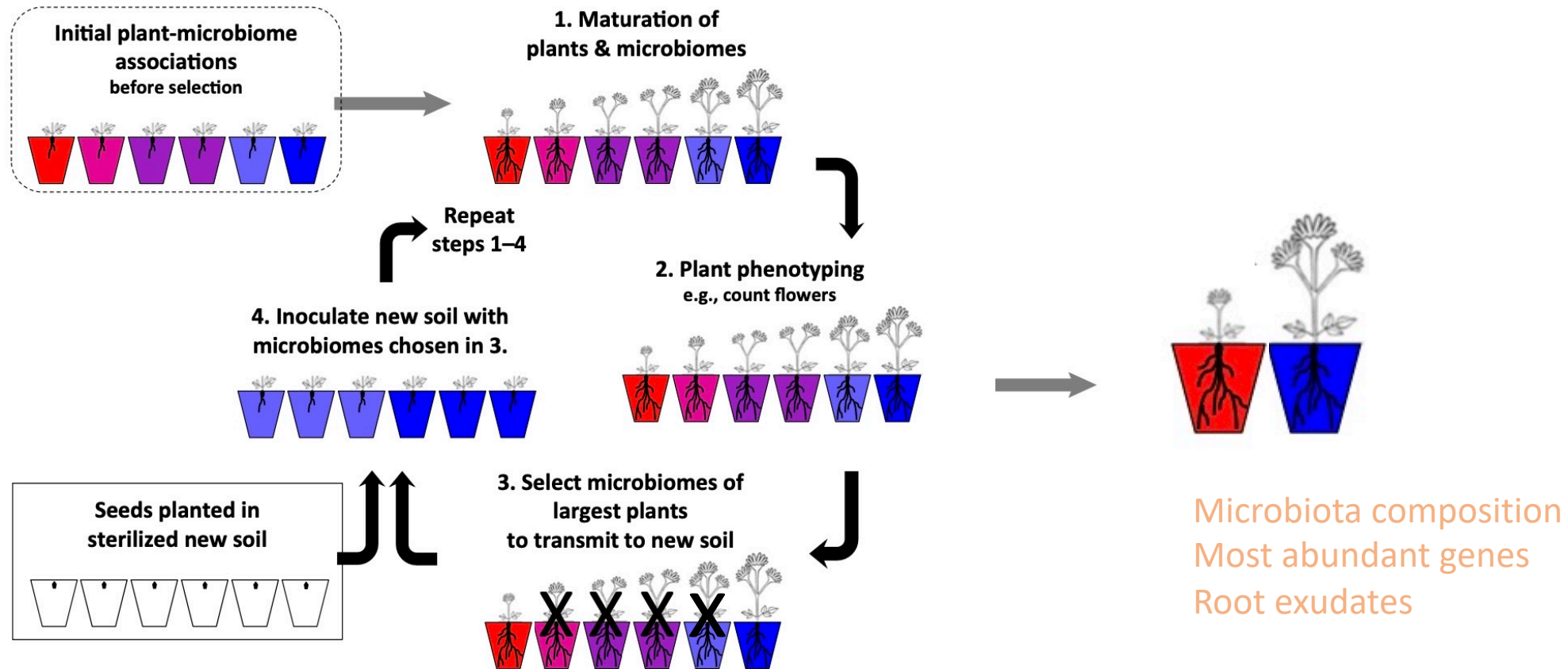
Soil the fabric of life

The Living Soil
How Climate Mitigation Affects the Food We Eat



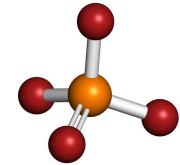
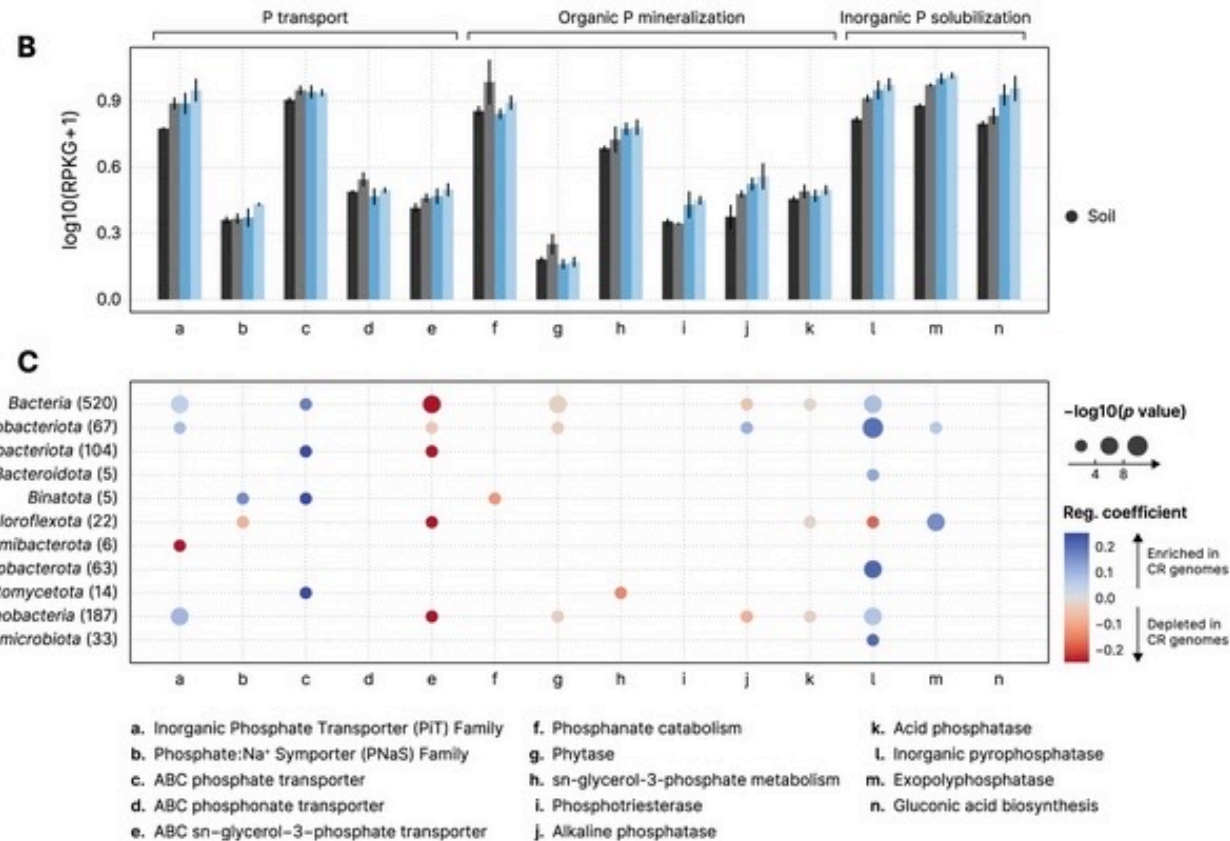
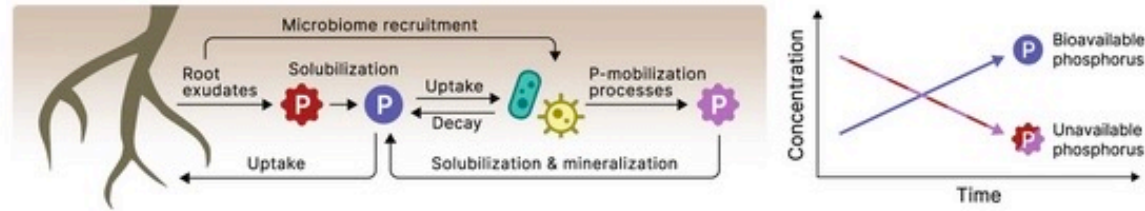
They are game changers

Introduction to biofertilizers in the context of soil ecology



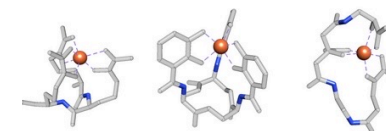
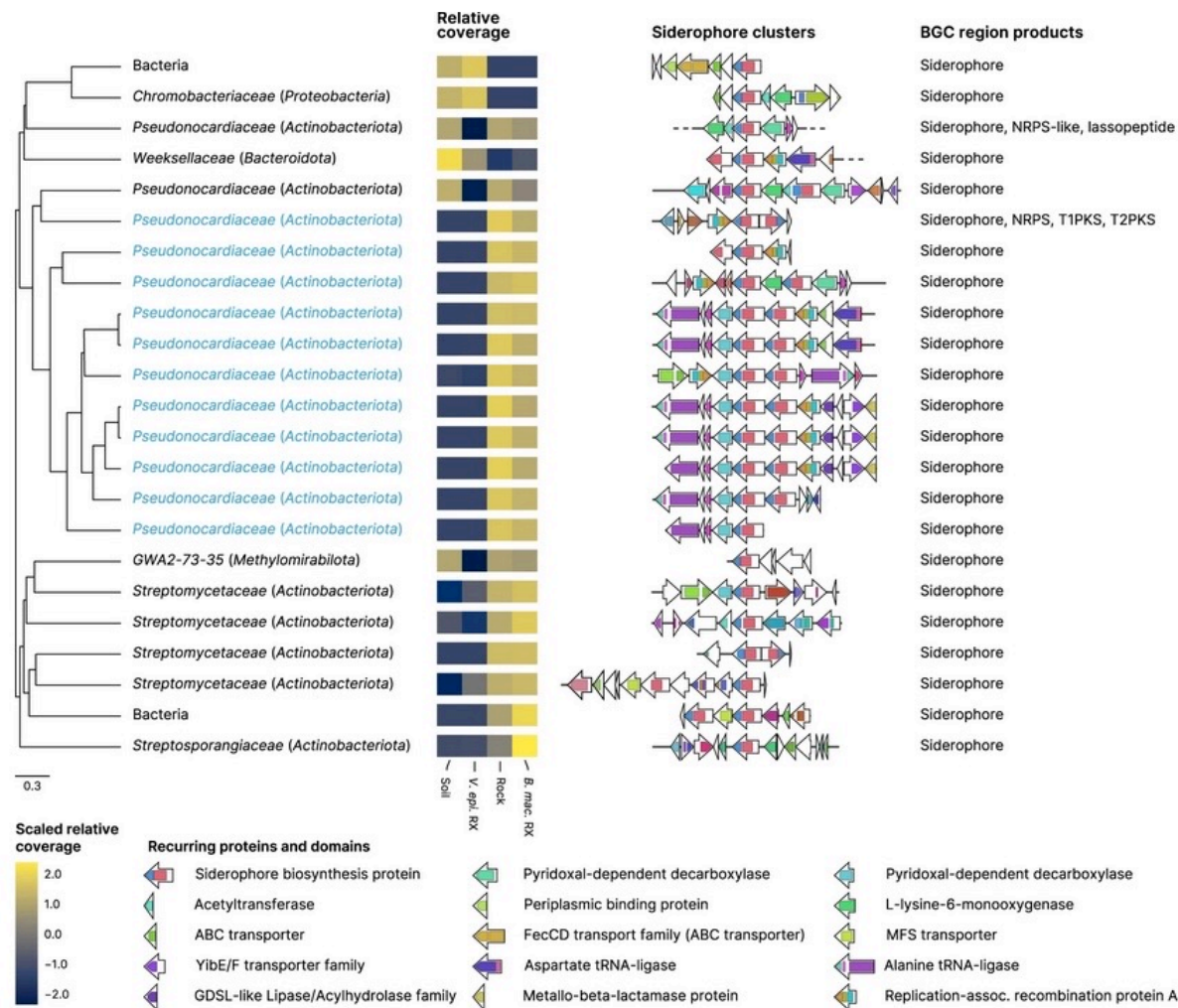
Plants select for their best partners, when they are available!

Introduction to biofertilizers in the context of soil ecology



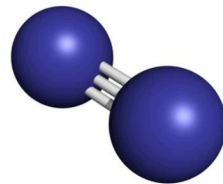
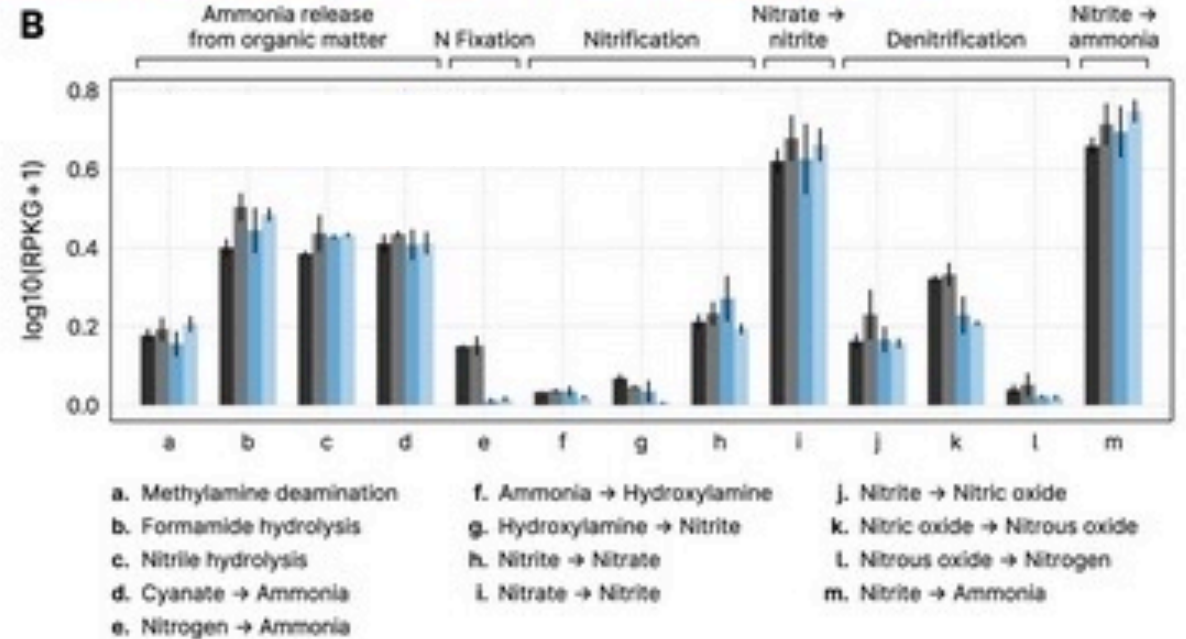
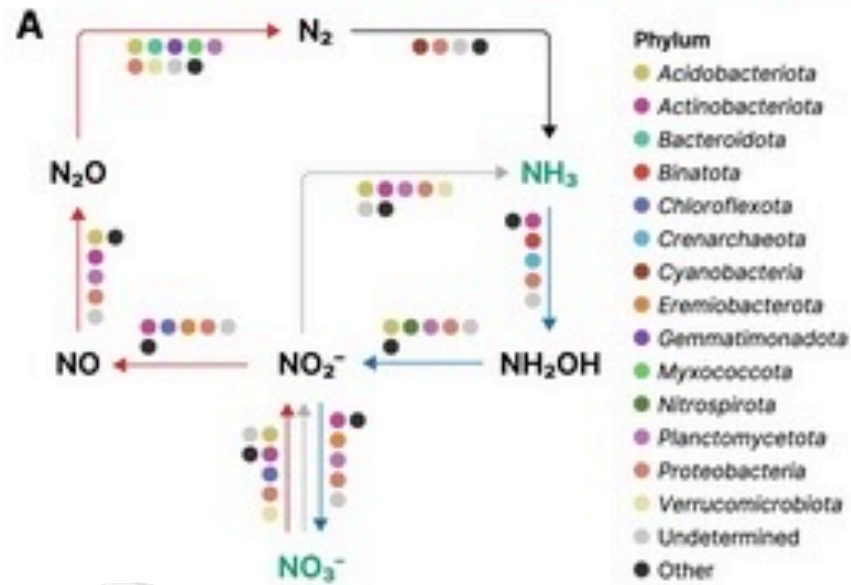
Compared to the bulk soil, the rhizosphere is increased in genes involved in **phosphate solubilization and uptake**

Introduction to biofertilizers in the context of soil ecology



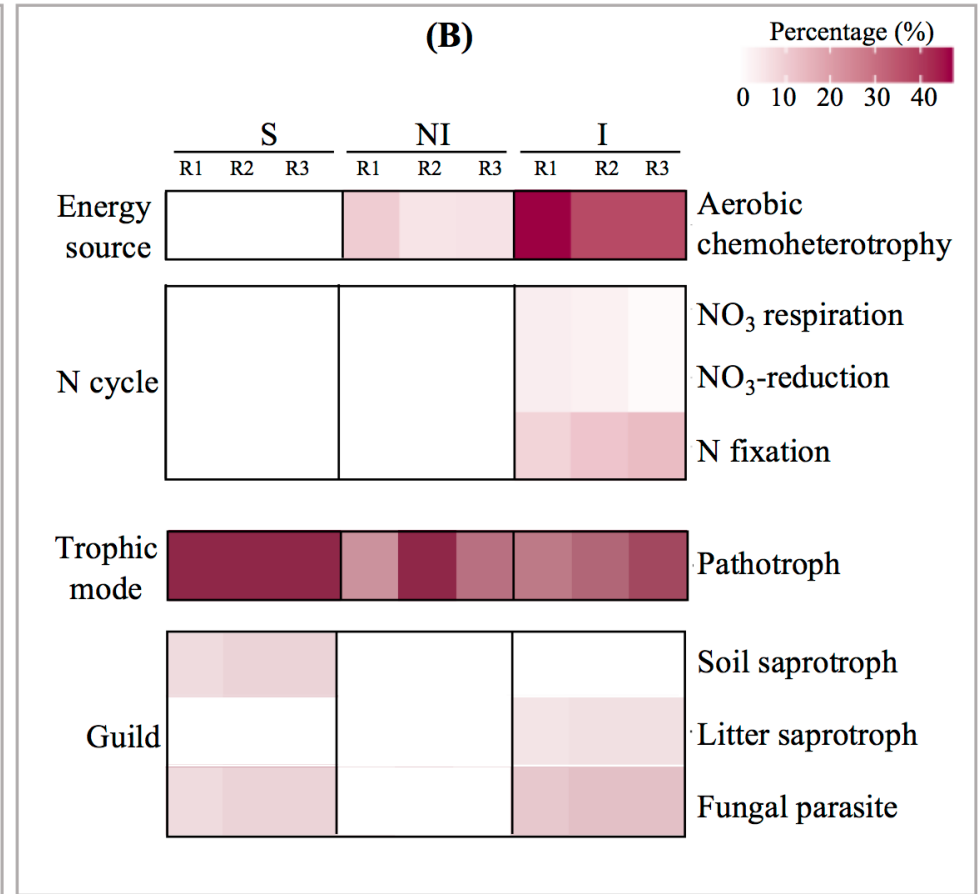
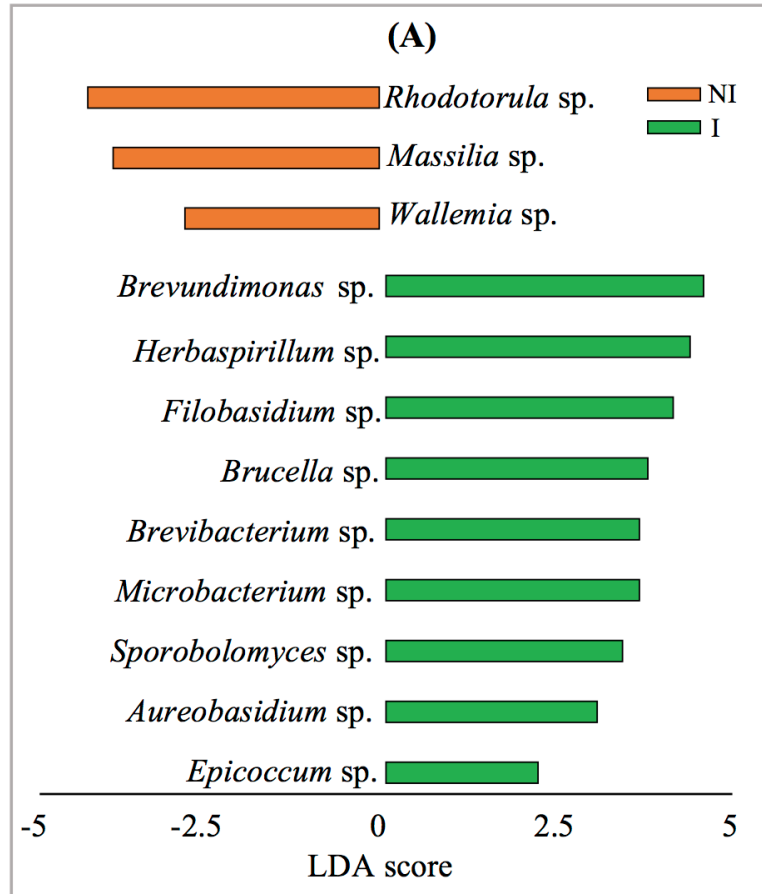
Compared to the bulk soil, the rizosphere is increased in **siderophore diversity**

Introduction to biofertilizers in the context of soil ecology

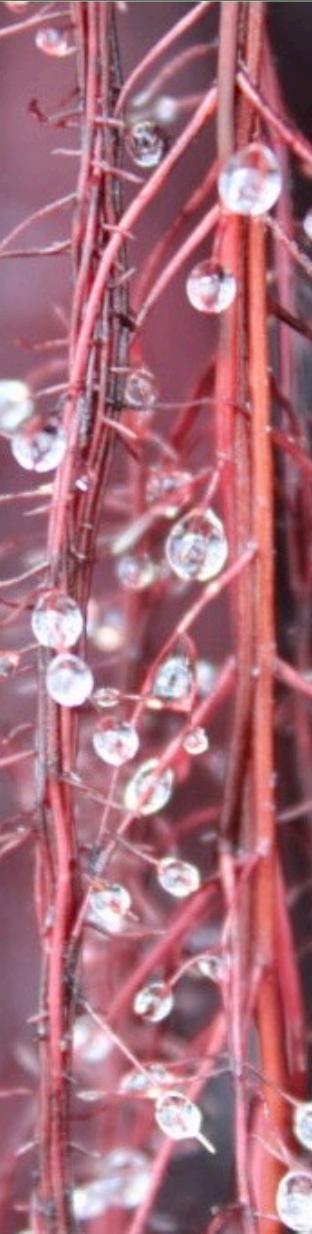


Compared to the bulk soil, the rizosphere has higher potential for the **biotransformations of nitrogen**

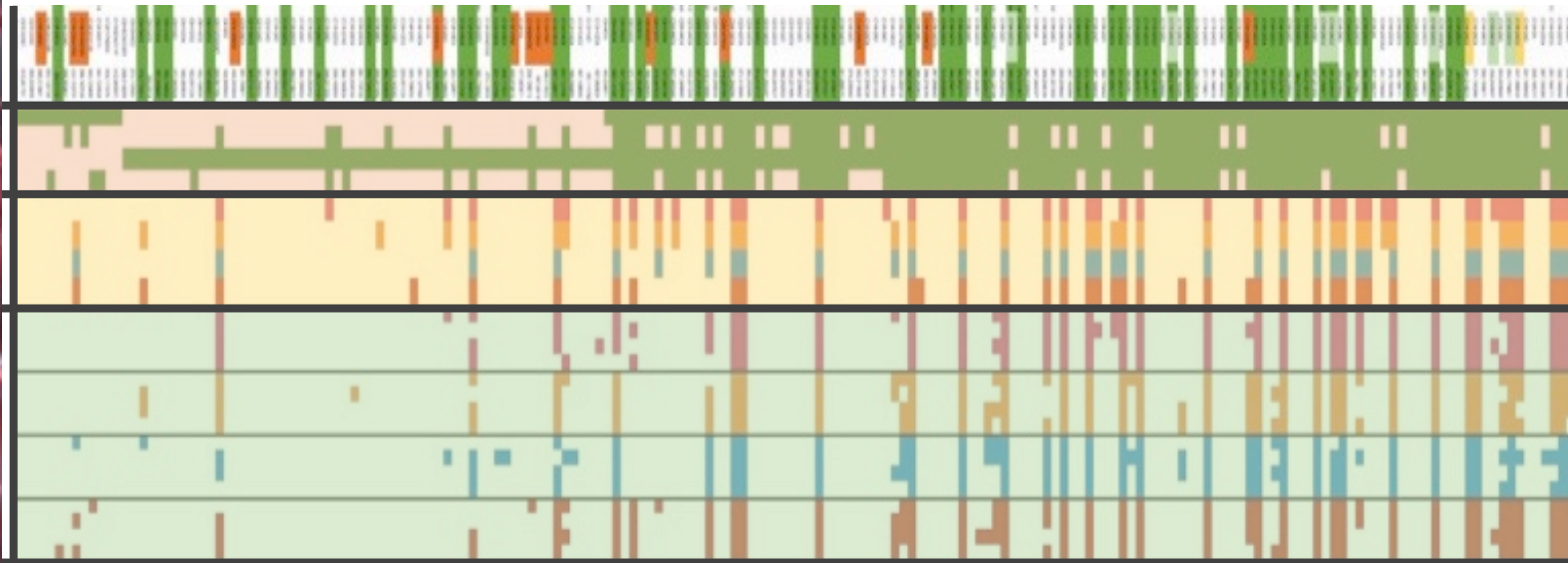
How can soil and plant microbiome affect plant nutrition?



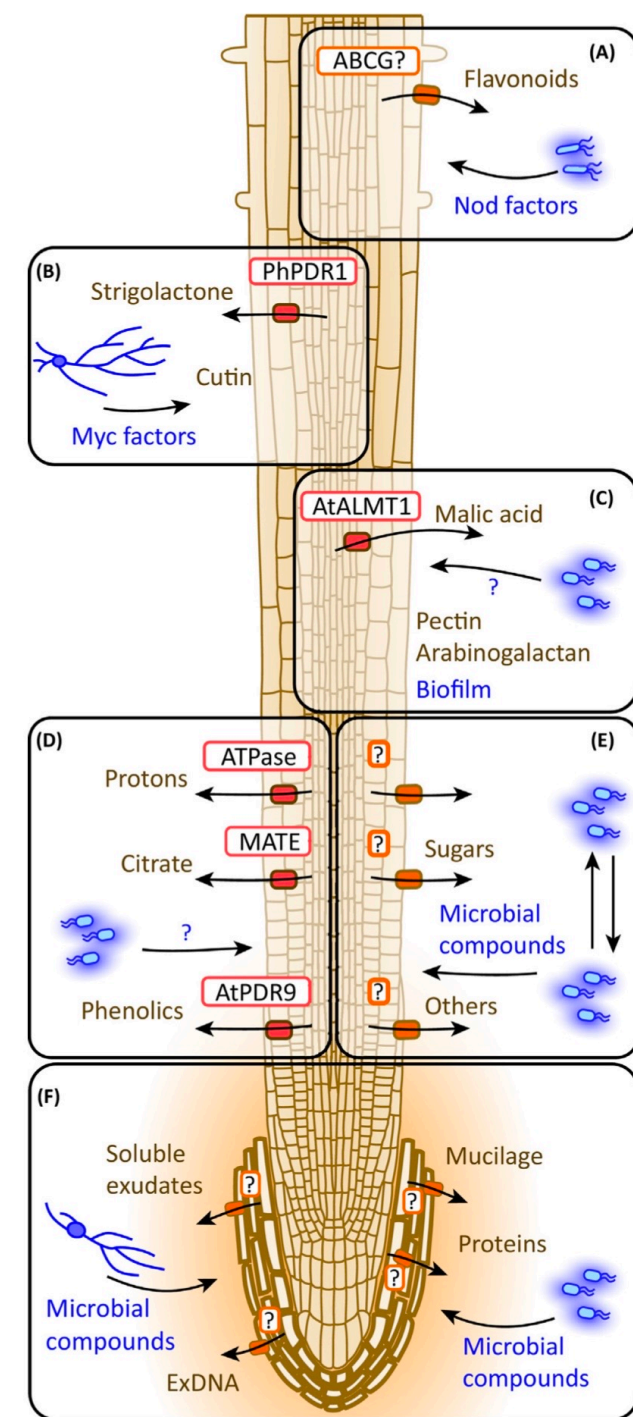
How can soil and plant microbiome affect plant nutrition?



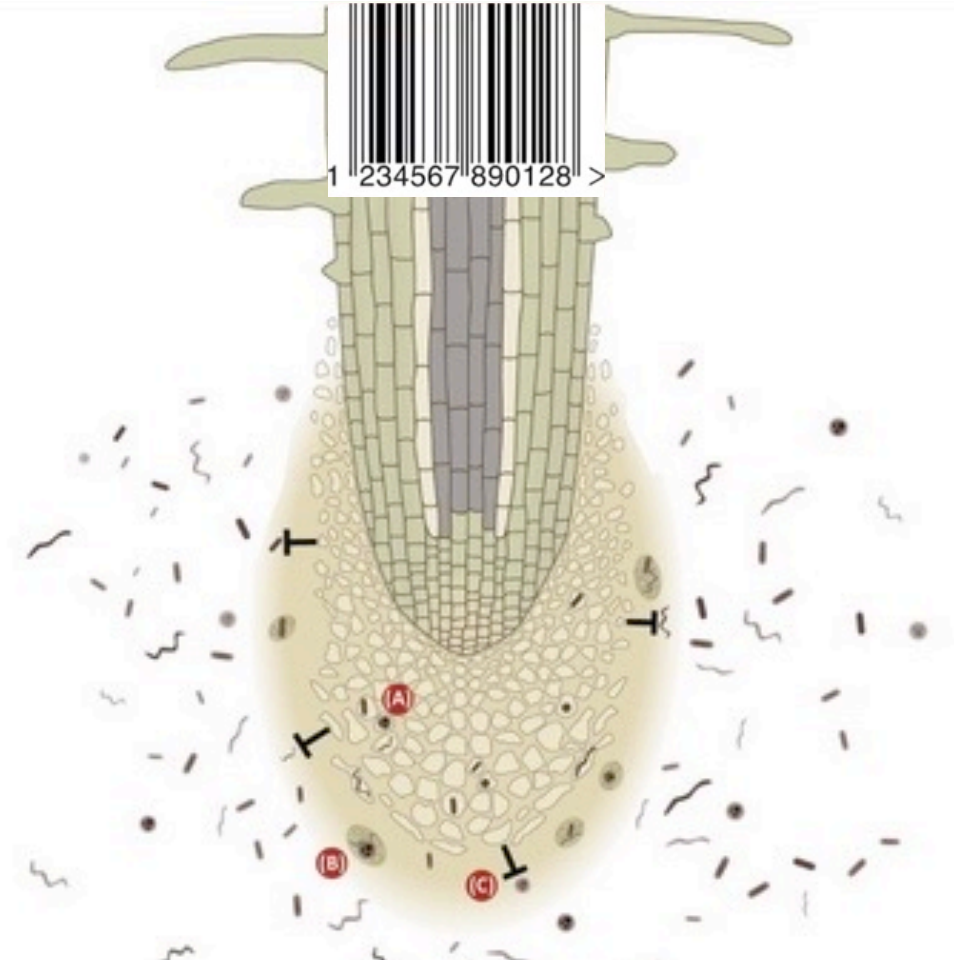
867 compounds identified in the root exudates



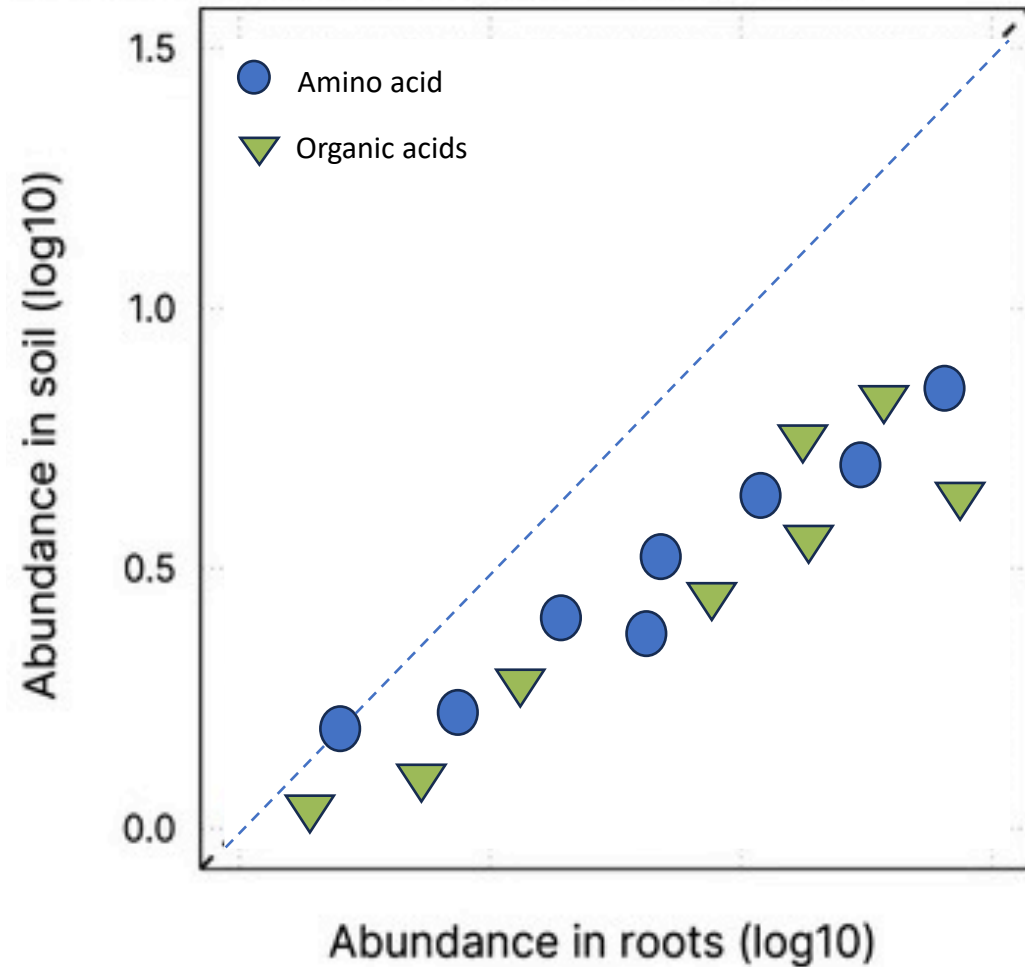
FTICR-MS – Fourier Transform Ion Cyclotron Resonance Mass Spectrometry



How can soil and plant microbiome affect plant nutrition?

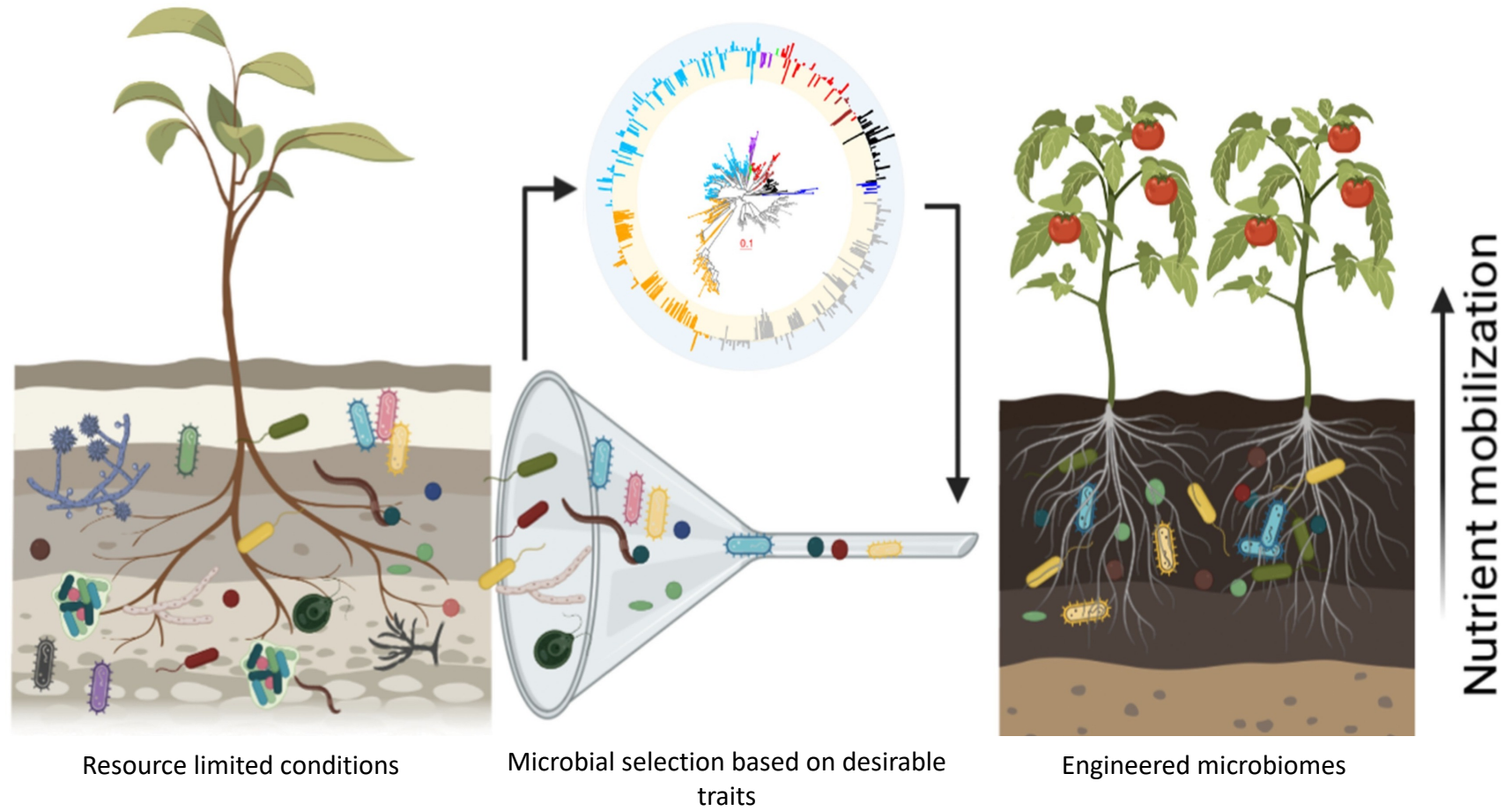


Expression of receptors for amino and organic acids

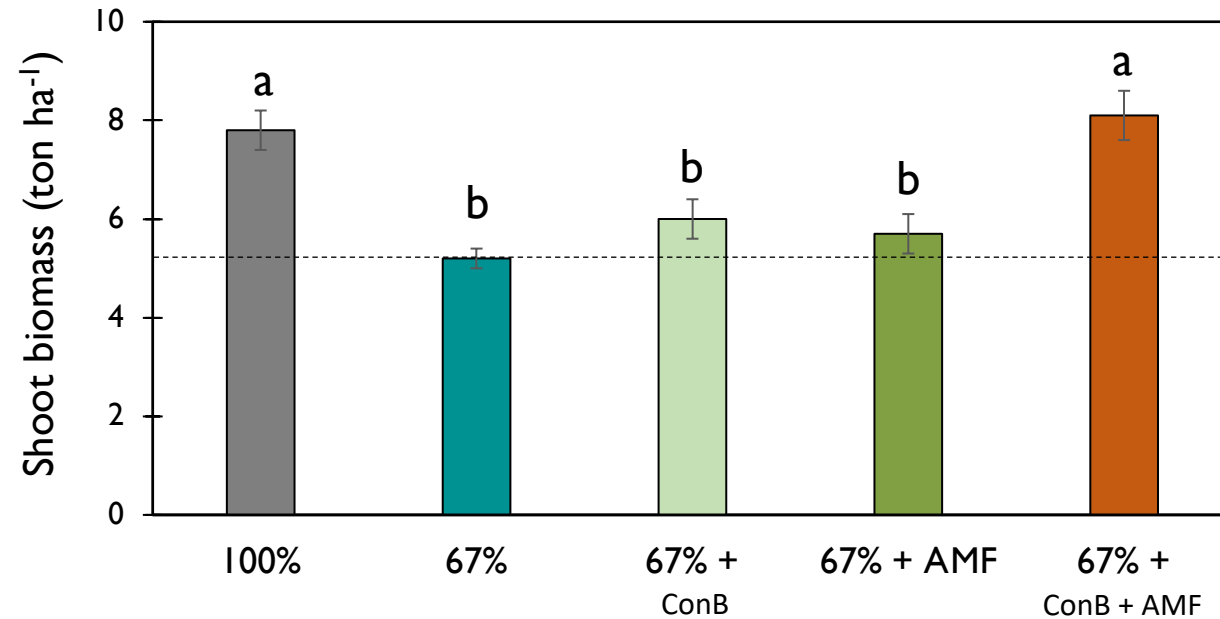


Compared to the bulk soil, **the rhizosphere is enriched in amino acid and organic acid receptors**, main components of the root exudates

The microbiome is a community working as a team

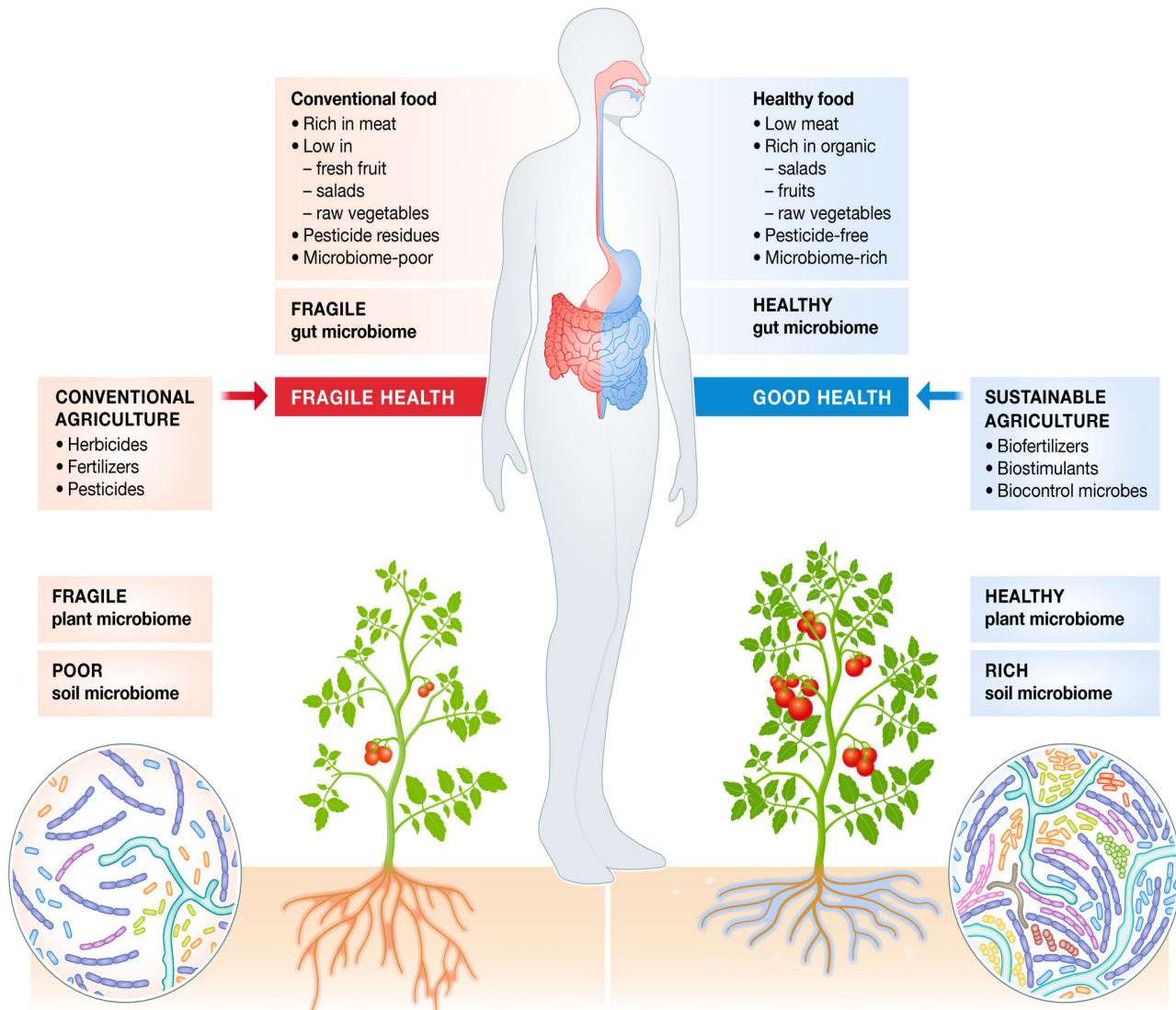


PLANT NUTRITION | BIOFERTILIZERS

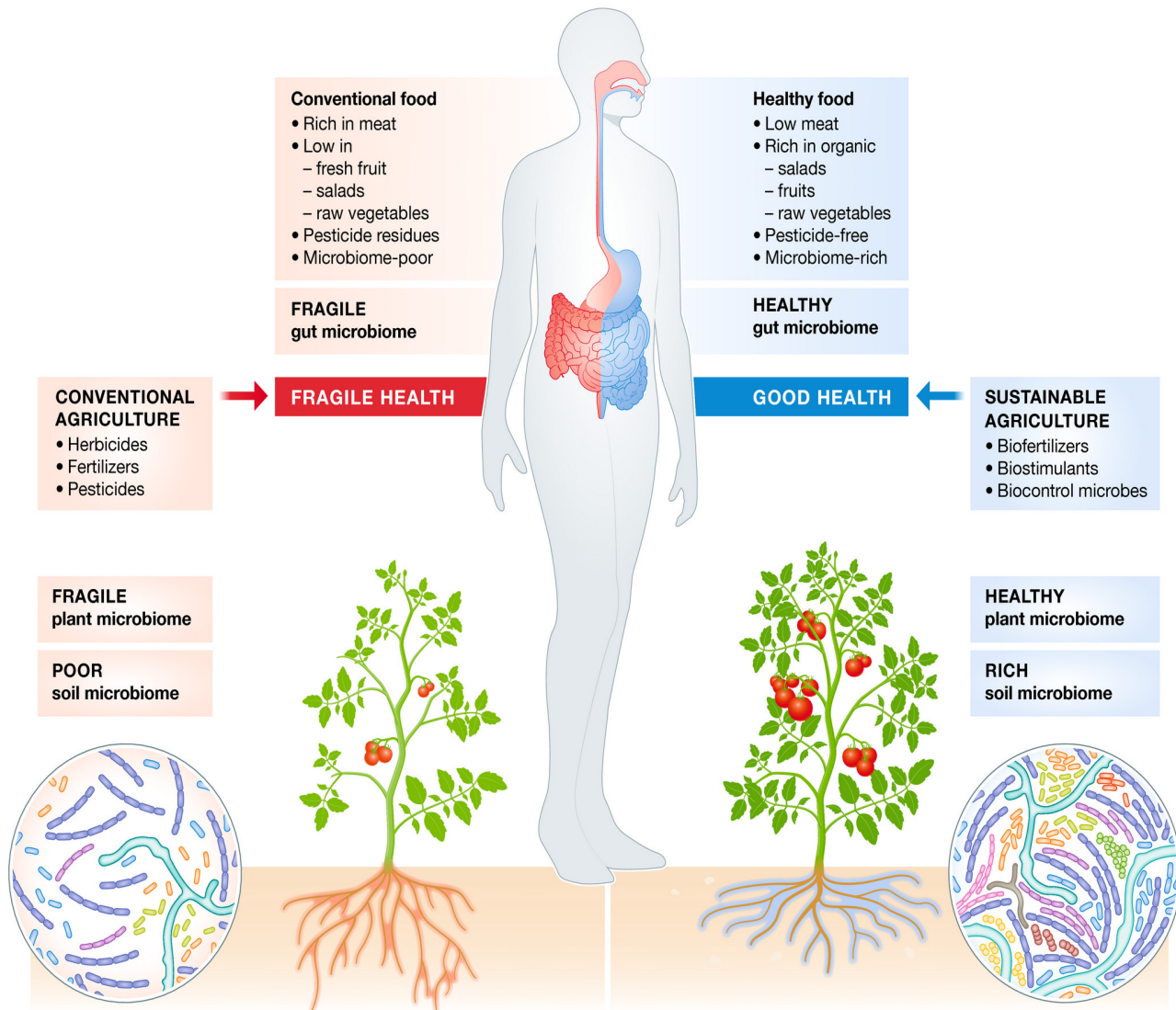


Letras diferentes correspondem a diferenças significativas entre os tratamentos. As barras representam a média \pm desvio padrão (n=3). 100% - adição da dose de fertilizante mineral recomendada; 67% - adição de 67% da dose de fertilizante mineral recomendada. ConB: Consórcio bacteriano com *Bacillus megaterium*; *Bacillus pumillus*; *Bacillus licheniformis*; *Rhizobium loti*; *Azospirillum brasiliense*; *Azotobacter chroococcus*. AMF: *Rhizophagus intraradices*.

How can soil and plant microbiome affect human wellbeing?



How can soil and plant microbiome affect human wellbeing?

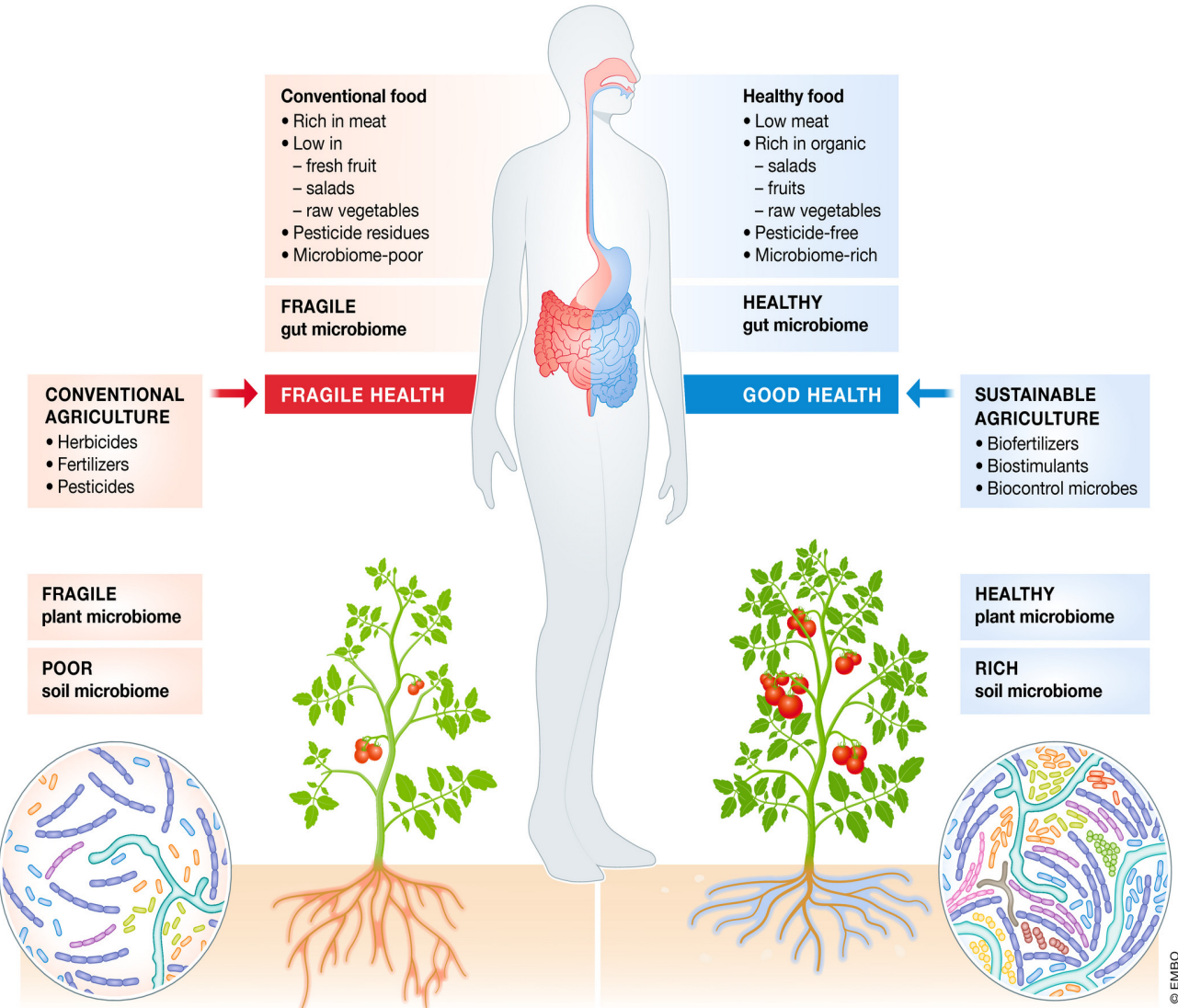


To be healthy we have to eat

- **Fermicutes**
- **Bacteroidetes**
- **Proteobacteria**
- **Actinobacteria**

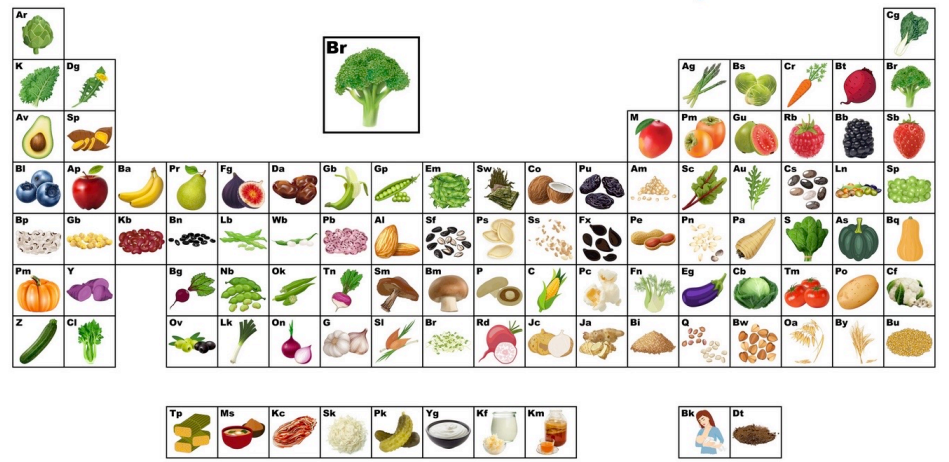
- **Where are there?**

How can soil and plant microbiome affect human wellbeing?



- To be healthy we have to eat
- Firmicutes
 - Bacteroidetes
 - Proteobacteria
 - Actinobacteria
 - Where are there?

Periodic Table of Microbiome-Friendly Foods



© EMBO

Communication between plants and microbes | METABOLOMICS



Like plants we need nutrients, **but we need our food for more than nutrients. We need microbes!**

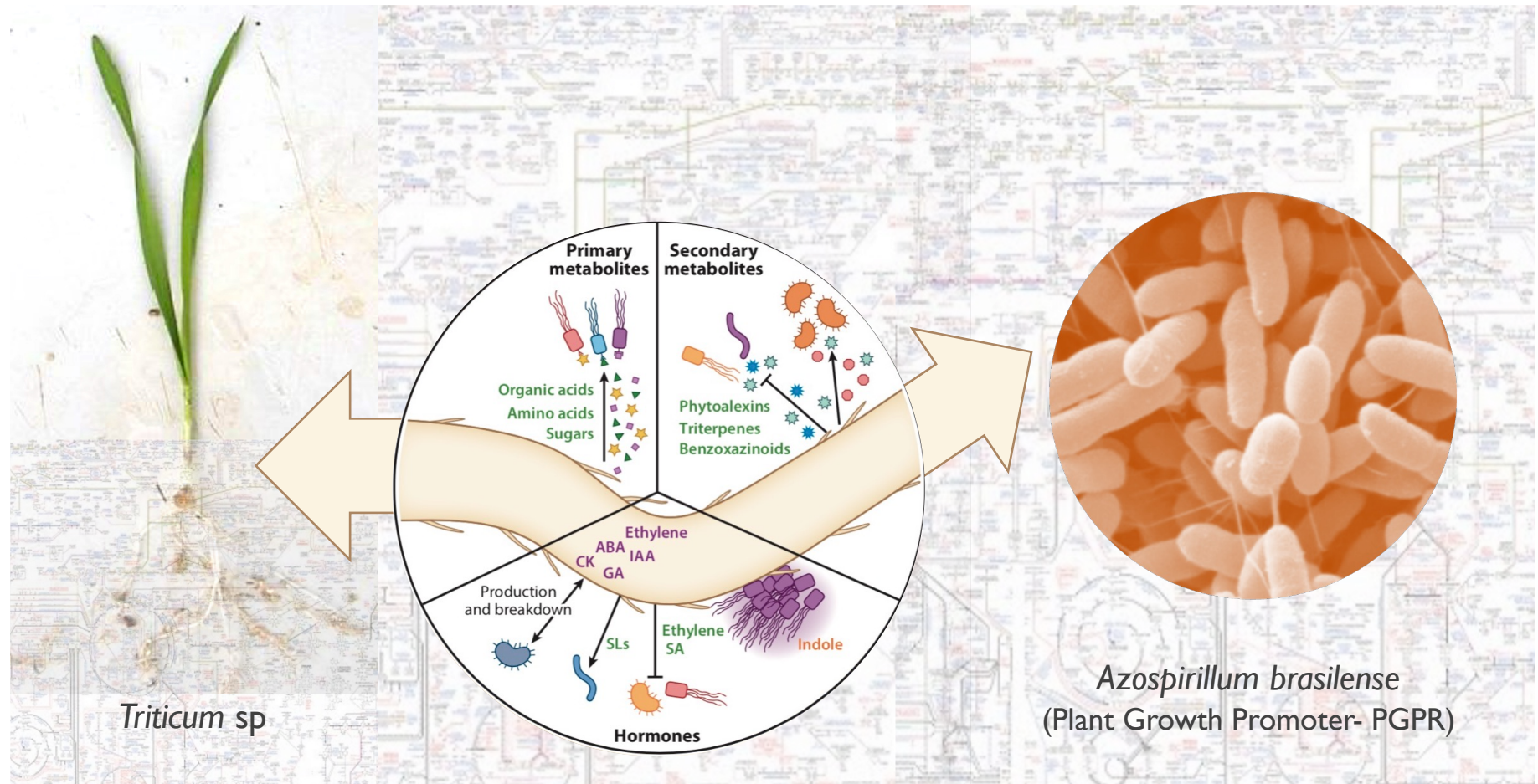
We eat bacteria!.....

COMUNICAÇÃO ENTRE PLANTAS E MICRORGANISMOS | ANÁLISE METABOLÓMICA



We eat endophytes.....

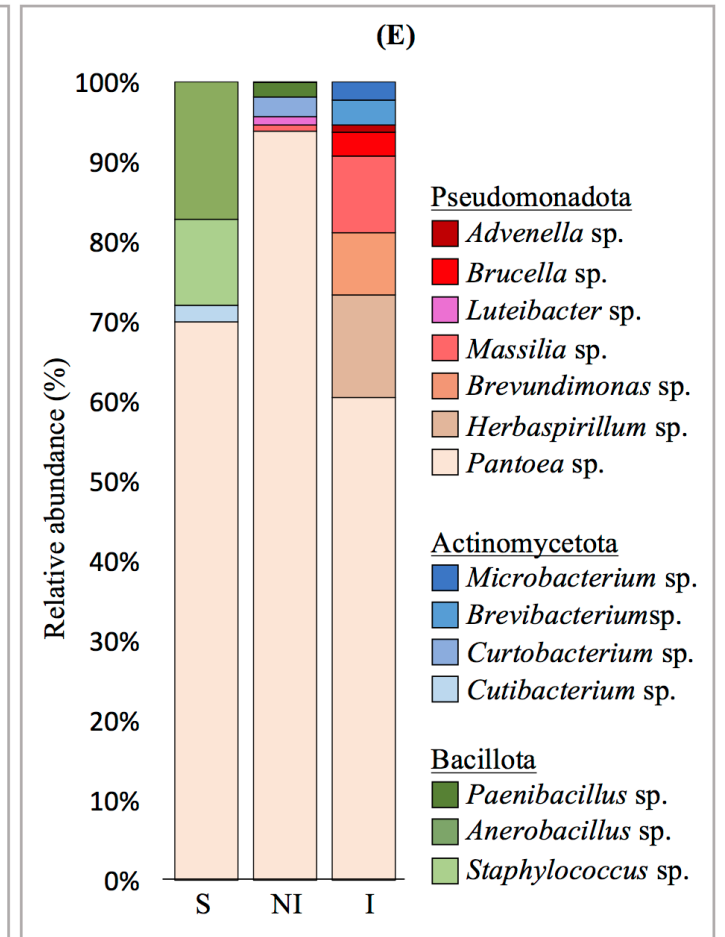
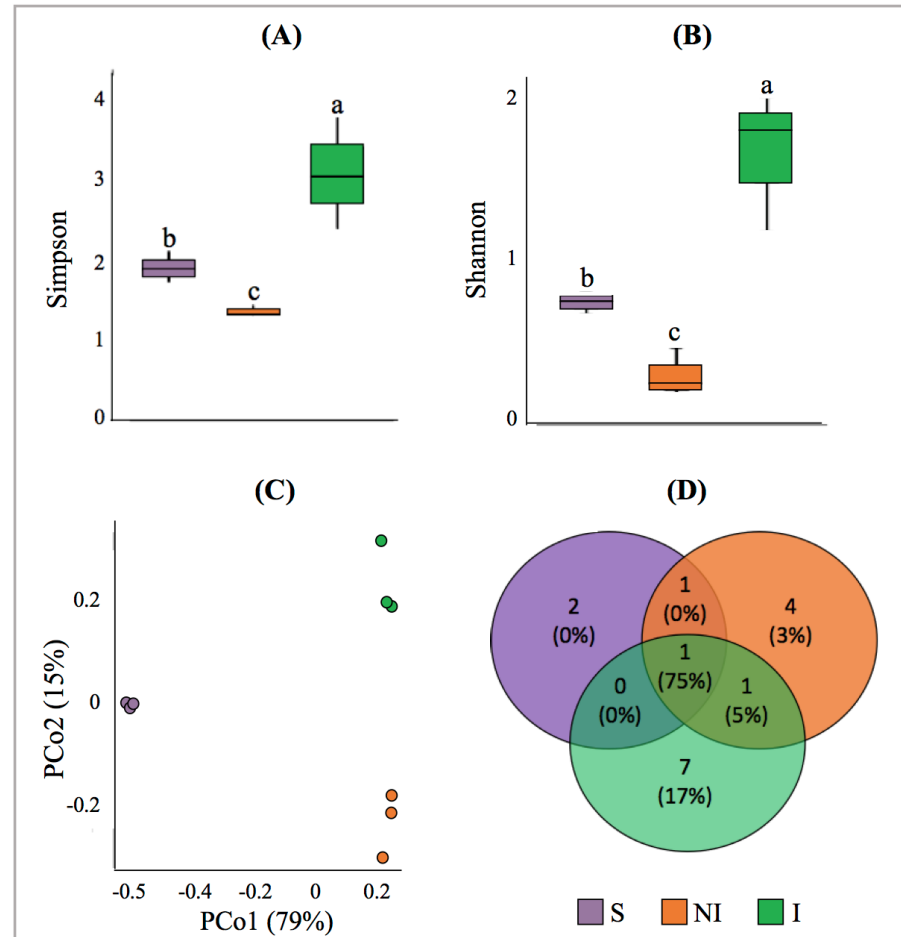
Plants and microbes are in communication | METABOLOMICS



COMUNICAÇÃO ENTRE PLANTAS E MICRORGANISMOS | ANÁLISE METABOLÓMICA



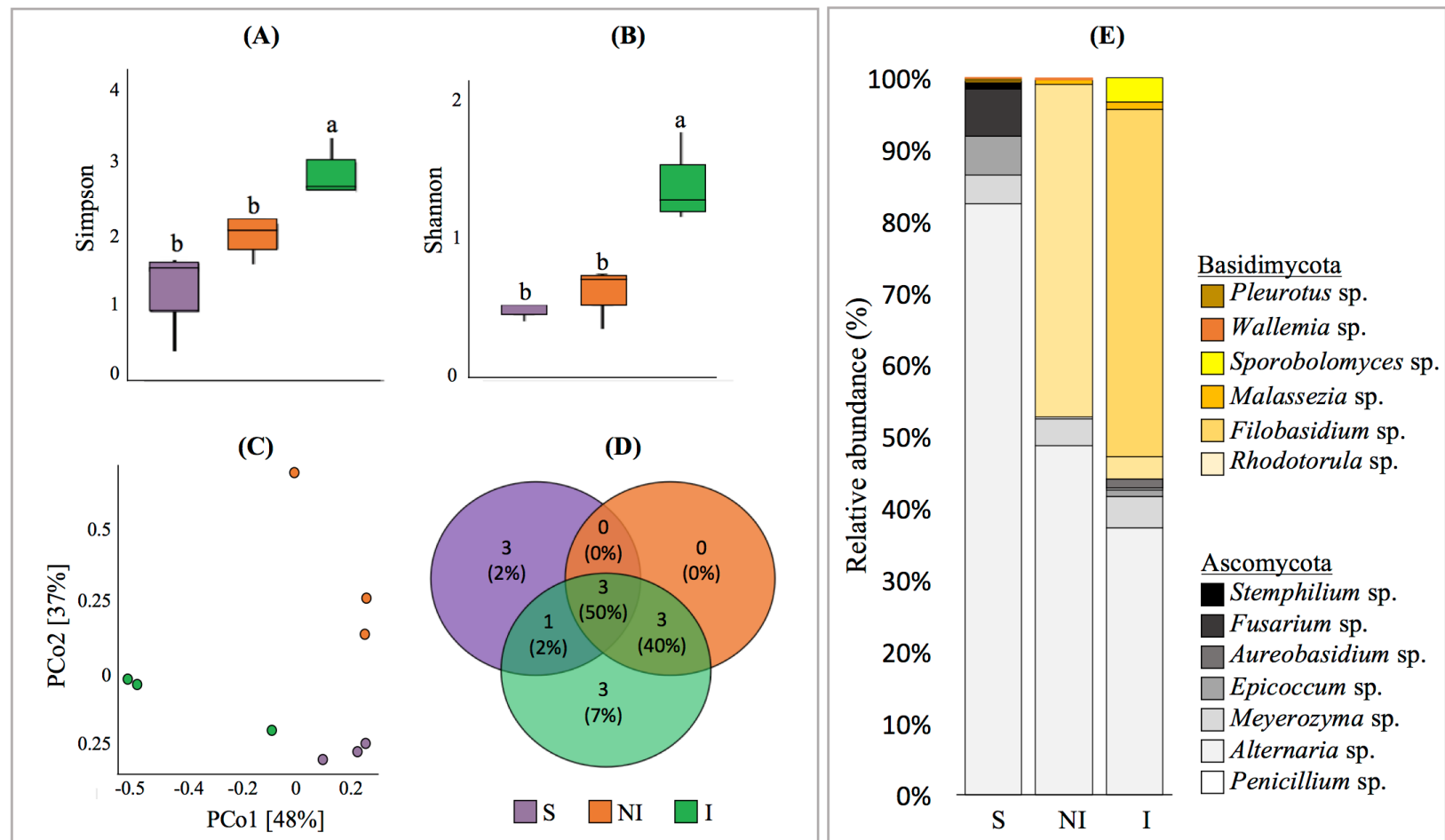
Soil microbiome determines plant endophytic community | bacteria



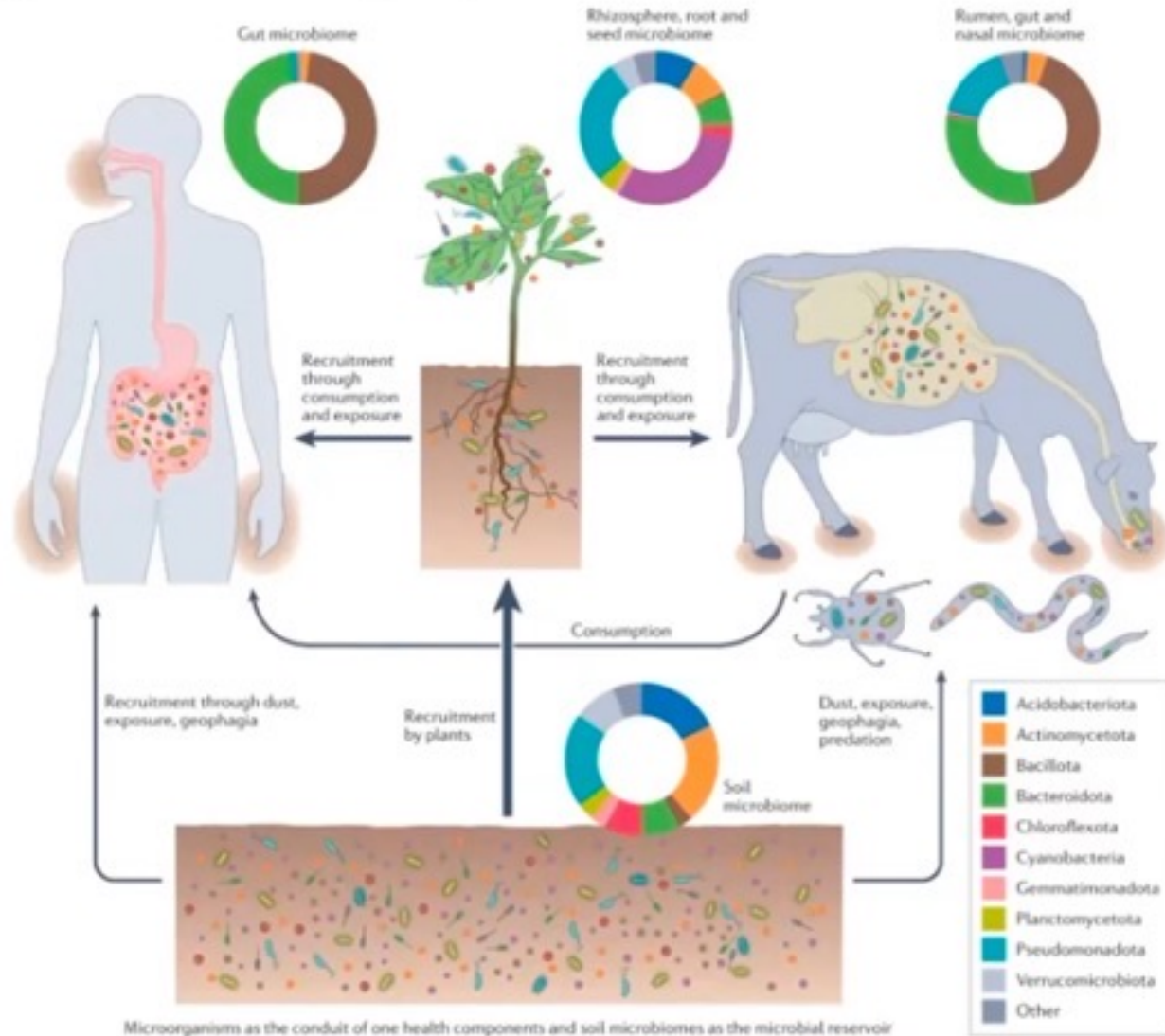
COMUNICAÇÃO ENTRE PLANTAS E MICRORGANISMOS | ANÁLISE METABOLÓMICA



Soil microbiome determines plant endophytic community | Fungi



Integrating plant and soil microbiome in plant nutrition and the “one health” concept



“ONE HEALTH”

=

Microbial Diversity

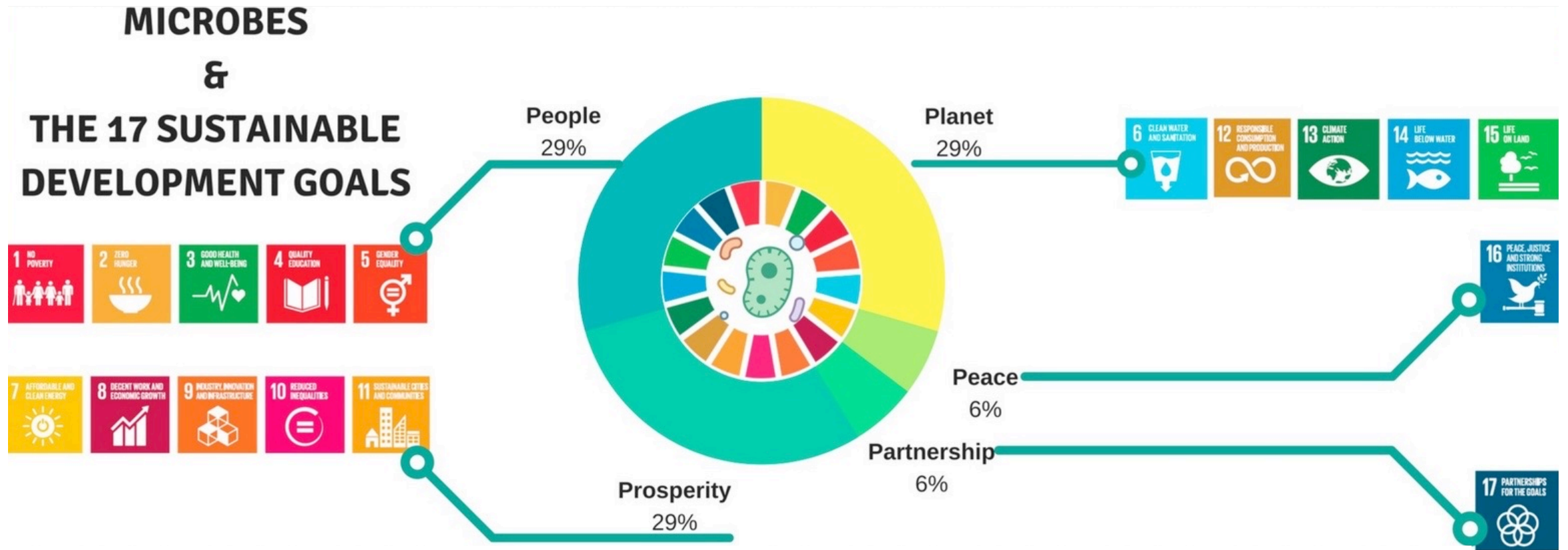
Integrating plant and soil microbiome in plant nutrition and the “one health” concept

Our diet needs..... 30 plants a week for a healthy microbiome



Because we eat endophytes!

Integrating plant and soil microbiome in plant nutrition and the “one health” concept



We need microbial agriculture to provide us a healthy microbiome!



A EQUIPA