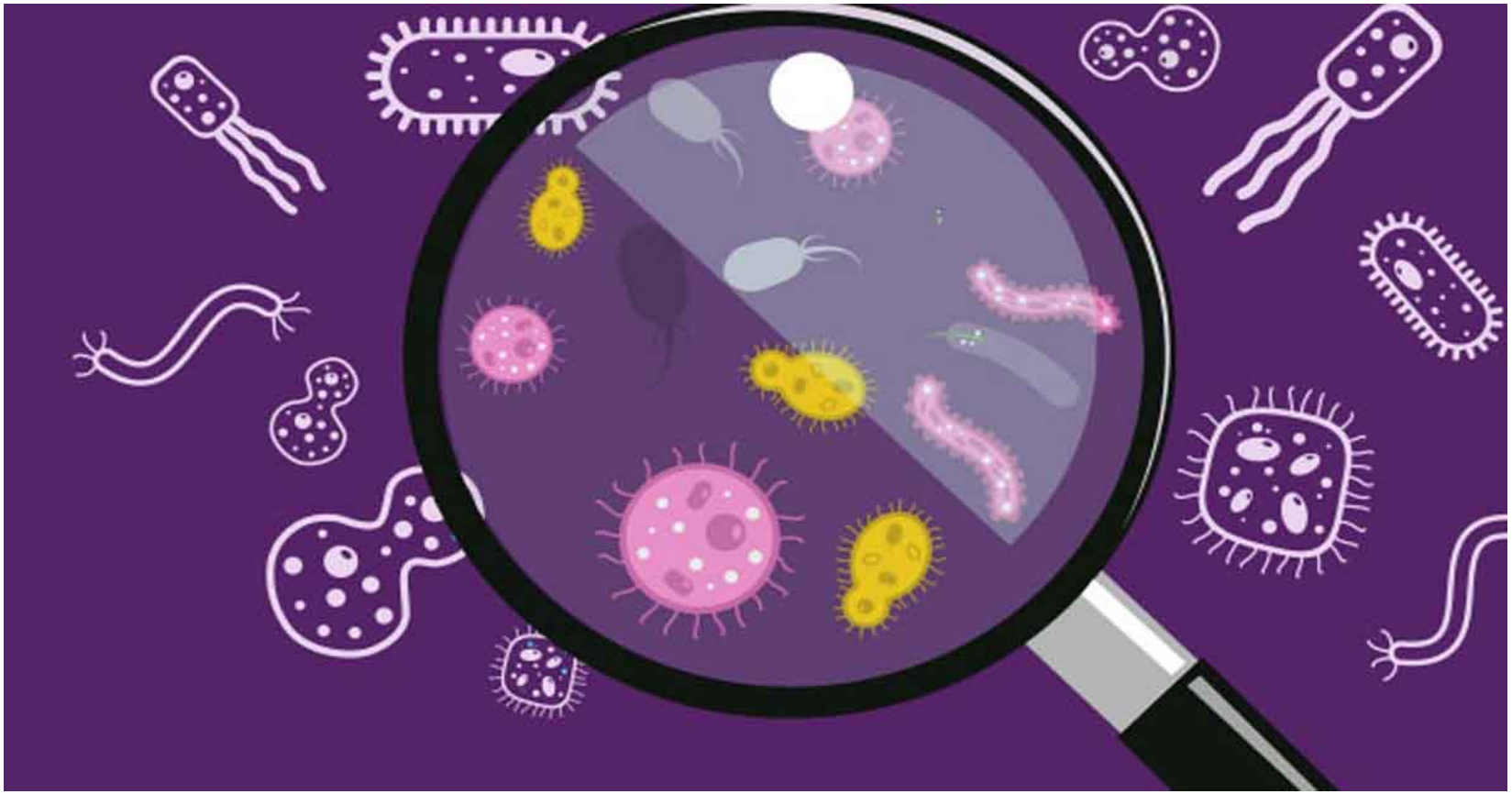
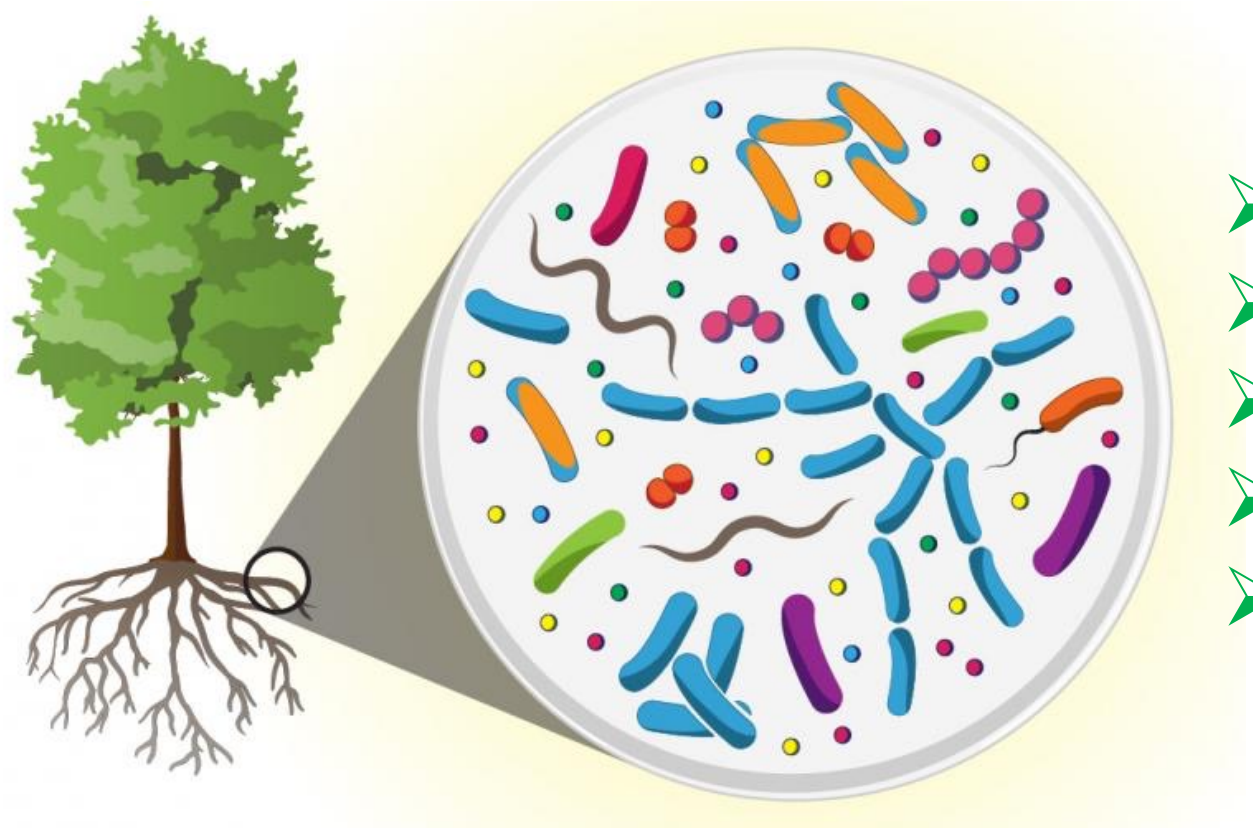

결명자
모과
치자
벌나무
응화씨
잔대
유근피
삼백초
봉잎
익모초
헛개열매
오가피
당귀
치커리
인진쑥
오미자
구기자
헛개나무
산수유
맥문동
장미차
5,000
구기자
햇녹차
녹차


BY 2050 WE WILL BE MORE THAN
9 billion HUMANS
ON Earth
AND WE WILL NEED
TO produce
60%
MORE FOOD

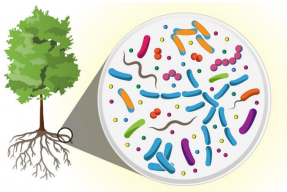




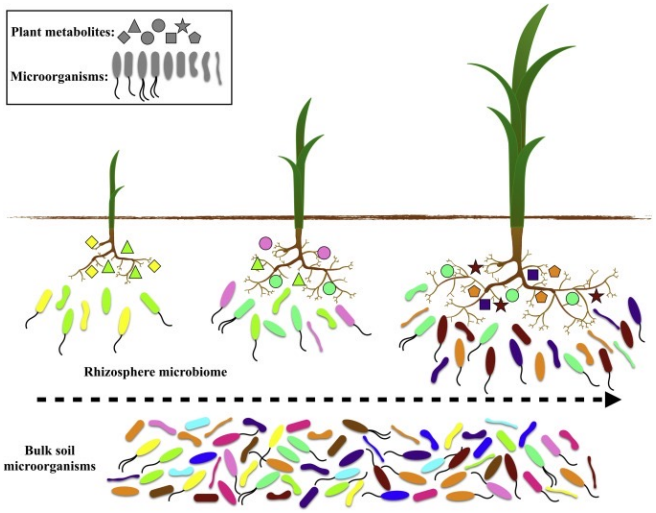
- Crescita
- Nutrienti
- Sistema Immunitario
- Stress Ambientali
- Antagonismo patogeni

ornl.gov

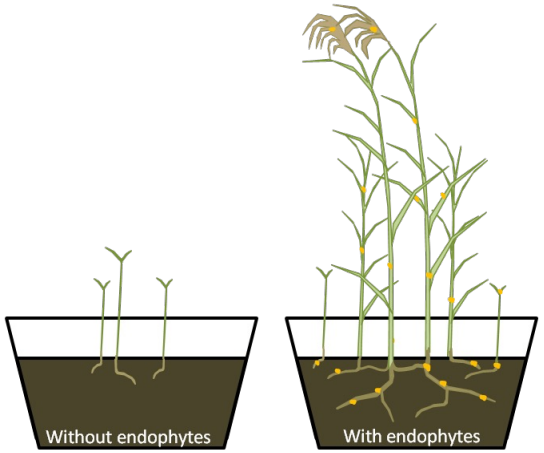
# Microorgansisms and plant health



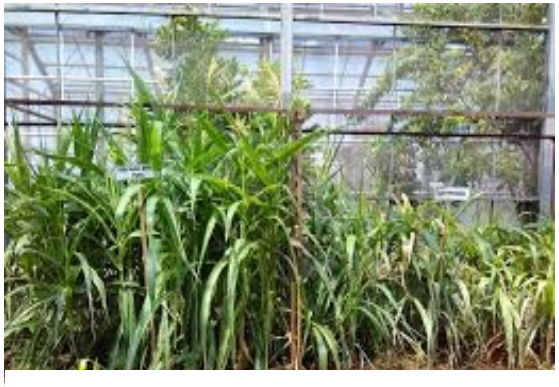
- Growth
- Nutrient acquisition
- Induction of immunity
- Abiotic stress tolerance
- Biotic stress tolreance

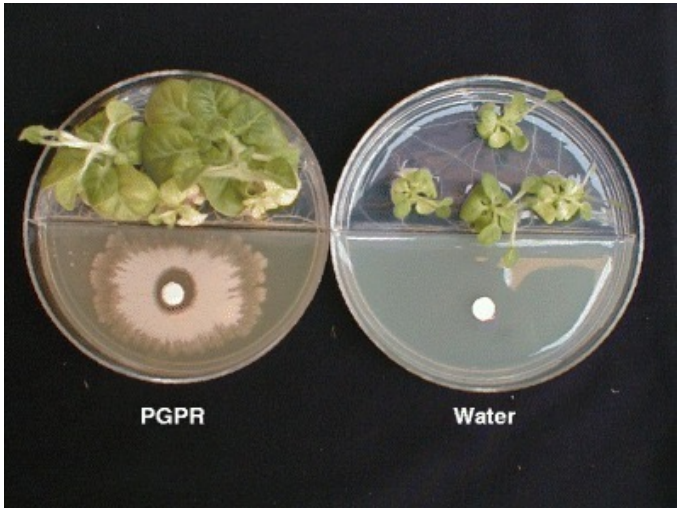


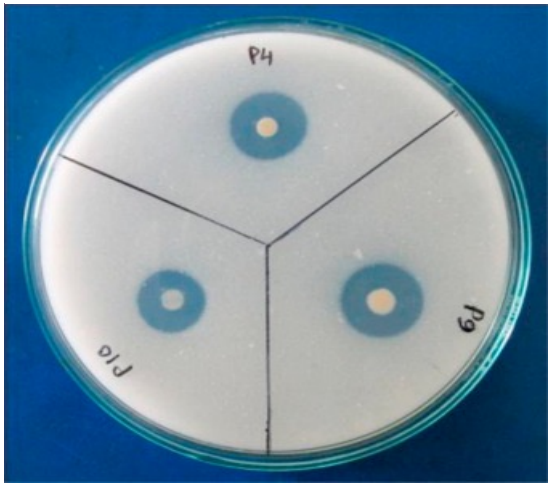

**Rhizosphere**

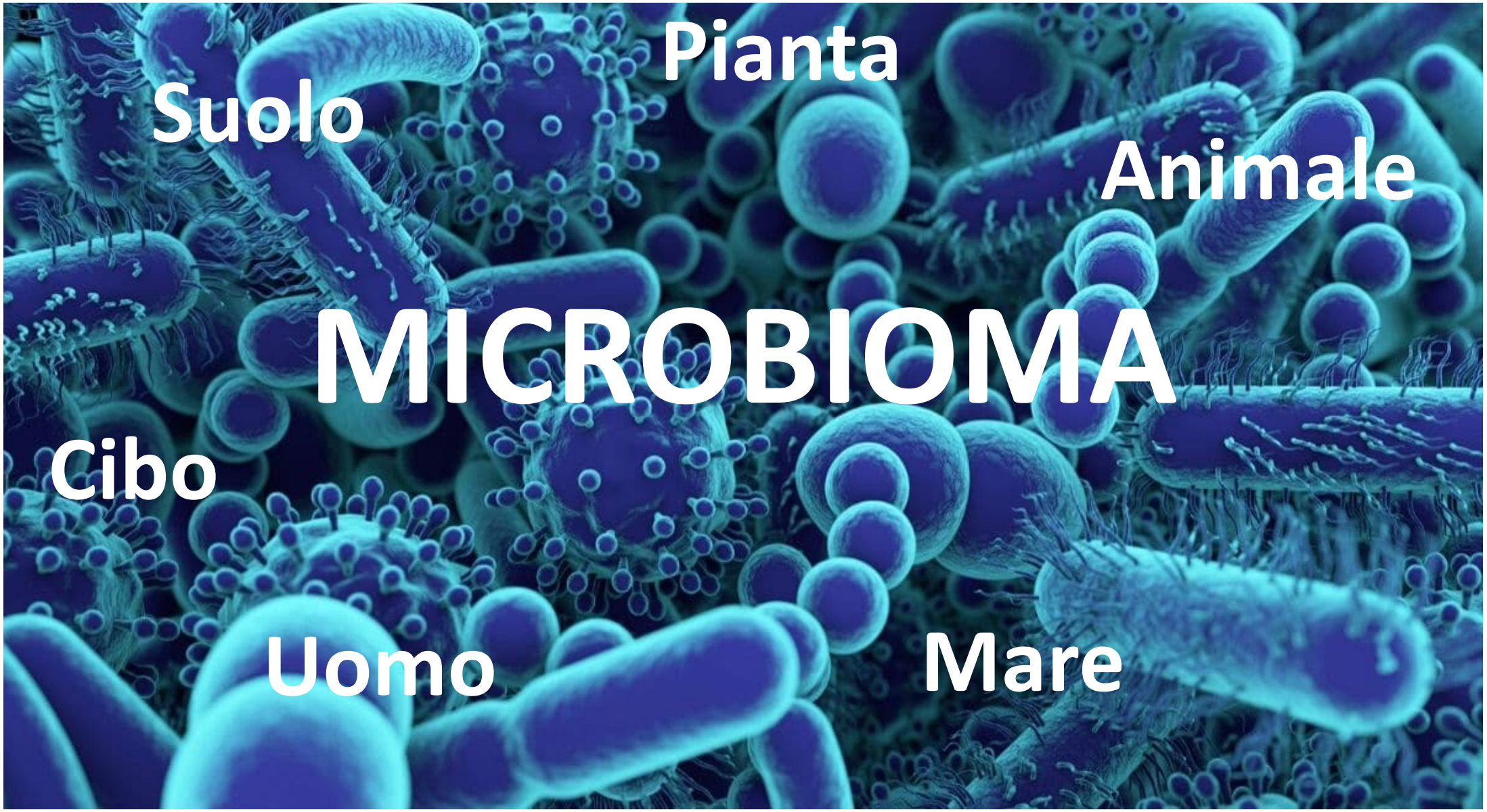



**Endosphere**

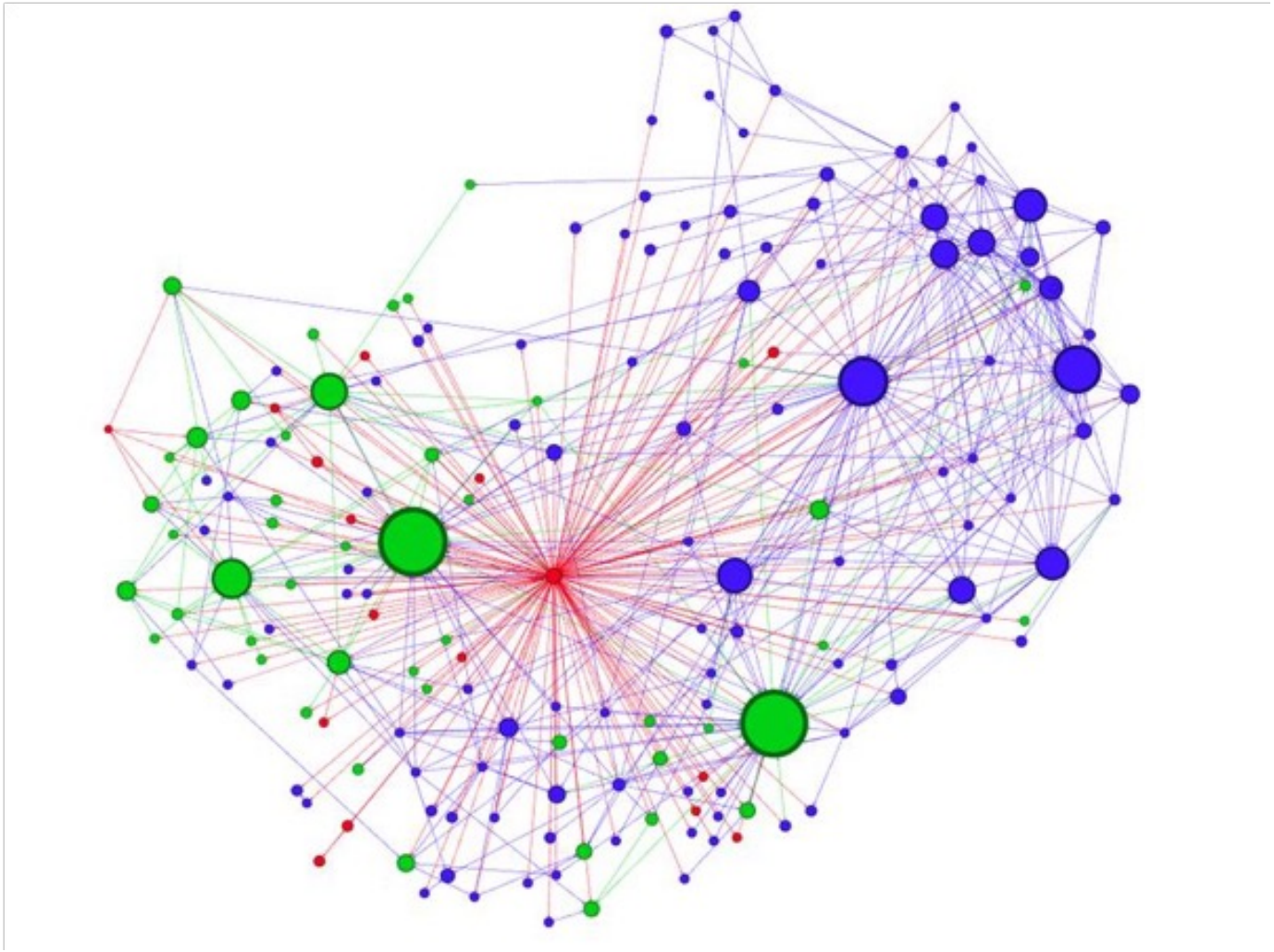



PGPR
Water


P4
P3
P10


Pianta
Suolo
Animale
MICROBIOMA
Cibo
Uomo
Mare

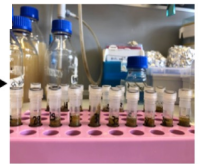
1 g di suolo
100 milioni di microbi



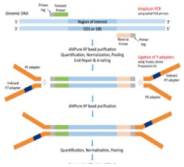
# Microbiome and Plant Health

WORKFLOW

Sampling



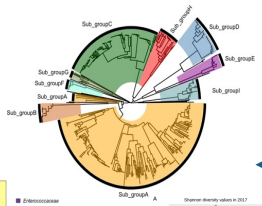
DNA purification

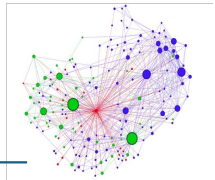


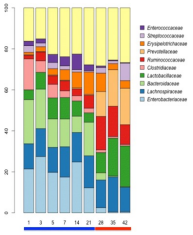
Amplicon Libraries

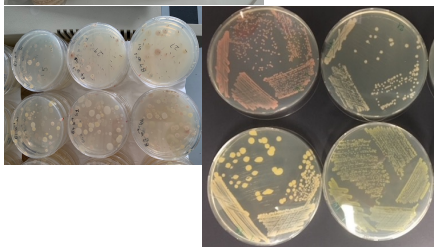
NGS

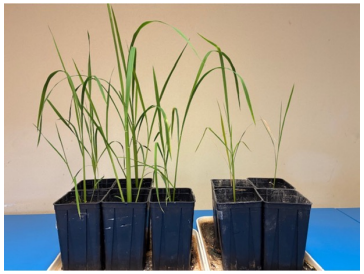
Data analysis



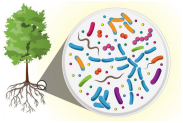


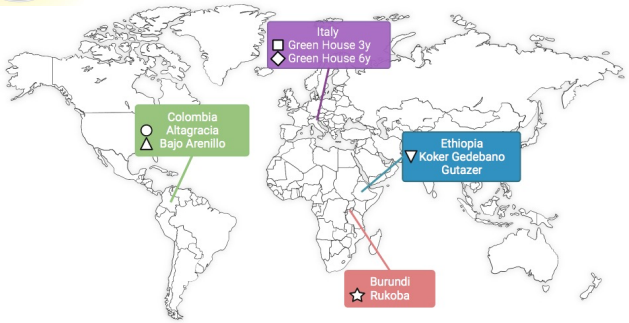




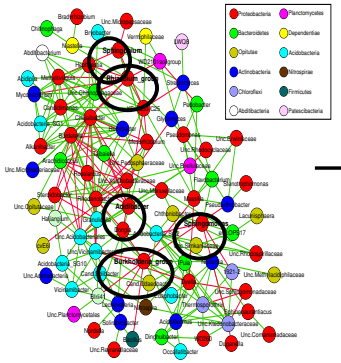


# RHIZOMICROBIOME of Coffea arabica: identifying keystone rhizosphere members






| Country | Location | #Sample | Year | State of plantation | Management | Age |
|---|---|---|---|---|---|---|
| Burundi | Rukoba, ISABU | 12 | December, 2018 | early fruitful state | shade-exposed monoculture | 18y |
| Colombia | Altagracia, Pereira (Risaralda) | 12 | February, 2019 | early fruitful state | sun-exposed monoculture | 15y |
| | Bajo Arenillo, Manizales (Caldas) | 12 | | | | 25y |
| Ethiopia | Koker Gedebano Gutazer | 24 | December, 2018 | late fruitful state | shade-exposed monoculture | 18y |
| Italy | Greenhouse, Udine | 12 | January, 2019 | early fruitful state | greenhouse conditions | 3y |
| | Greenhouse, Udine | 12 | | | | 6y |



Biofertilizer for coffee plantations

FONDAZIONE ERNESTO ILLY

SIMBIOTICA
bio-solutions for crops

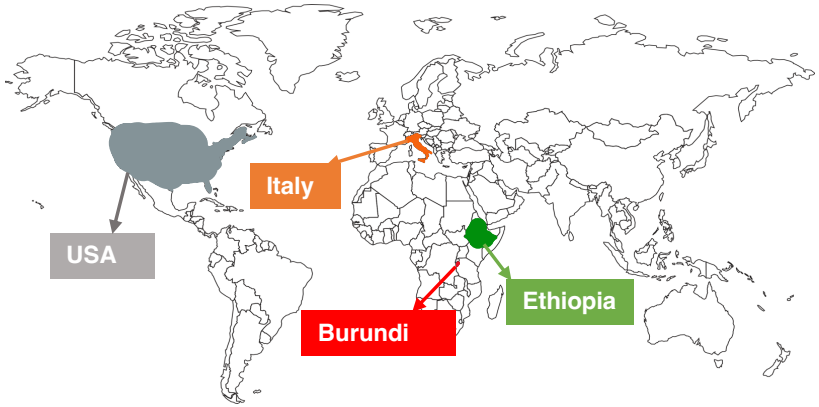
Comparative study of the rhizosphere microbiome of *Coffea arabica* grown in different countries reveals a small set of prevalent and keystone taxa

Cristina Bez [a,1], Alfonso Esposito [a,1], Samson Musonerimana [b,g], Thu Ha Nguyen [c], Lucio Navarro-Escalante [d], Kassahun Tesfaye [e,h], Luca Turello [f], Luciano Navarini [f], Silvano Piazza [a], Vittorio Venturi [a,*]

[a] International Centre for Genetic Engineering and Biotechnology (ICGEB), Trieste, Italy
[b] Institute des Sciences Agronomiques Du Burundi (ISABU), Bujumbura, Burundi
[c] Soils and Fertilizers Research Institute, Hanoi, Viet Nam
[d] Colombian National Coffee Research Center - CENICAFE, Chinchiná, Caldas, Colombia
[e] Bio and Emerging Technology Institute, Addis Ababa, Ethiopia
[f] Illycaffè S.p.a, Via Flavia 110, 34147, Trieste, Italy
[g] University of Burundi, Faculty of Agronomy and Bioengineering, Bujumbura, Burundi
[h] Institute of Biotechnology, Addis Ababa University, Addis Ababa, Ethiopia

Ethiopian Biotechnology Institute

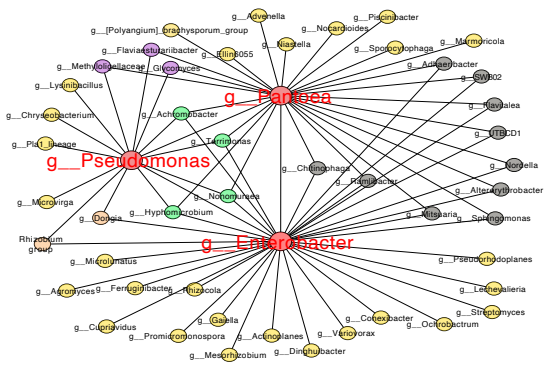
# RHIZOMICROBIOME of Sorghum: identifying keystone rhizosphere members




Sorghum Rhizosphere Samples

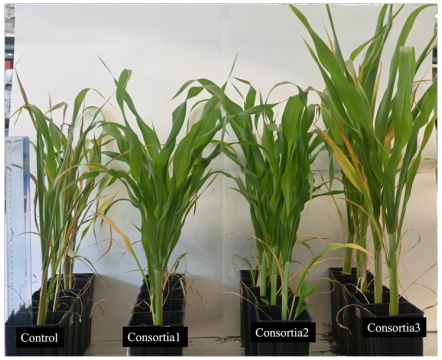
| State | Sample No |
|---|---|
| Italy | 141 |
| United States | 600 |
| Ethiopia | 30 |
| Burundi | 16 |
| **Total no of samples** | **781** |

# RHIZOMICROBIOME of Sorghum: identifying keystone rhizosphere members

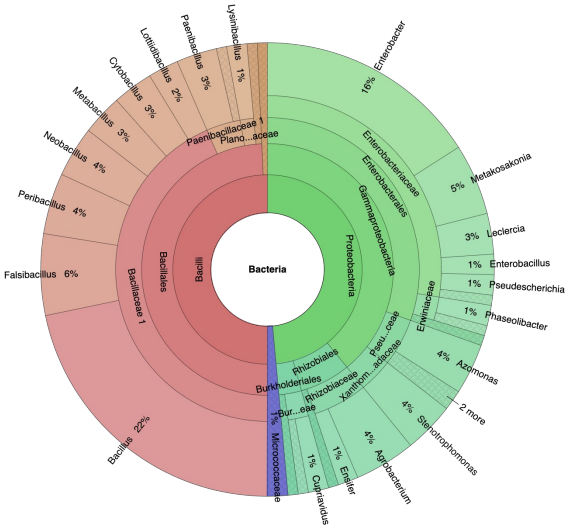



Legend

- Most prevalent genera Enterobacter, Pantoea and Pseudomonas
- Connection between Enterobacter, Pantoea and Pseudomonas
- Connection between only Pantoea and Pseudomonas
- Connection between only Enterobacter and Pseudomonas
- Connection between only Enterobacter and Pantoea
- Only one connection with Enterobacter, Pantoea and Pseudomonas separetly




| | Consortia | Genus |
|---|---|---|
| Co-occurrence Network | Consortia 1 | *Pantoea sp* |
| | | *Enterobacter sp* |
| | | *Pseudomonas* |
| Most abundant Genera | Consortia 2 | *Streptomyces sp* |
| | | *Bacillus sp* |
| | | *Rhizobium sp* |
| | Consortia 3 | *Paenibacillus sp* |
| | | *Paraburkholderia sp* |




Sorghum rhizosphere bacteriome studies and generation of multistrain beneficial bacterial consortia


Chandan Kumar[a], Alfonso Esposito[a,b], Iris Bertani[a], Samson Musonerimana[b,c], Mulissa Jida Midekssa[d], Kassahun Tesfaye[d,e], Devin Coleman Derr[f,g], Lara Donaldson[i], Silvano Piazza[a], Cristina Bez[a,*], Vittorio Venturi[a,j,*]

[a] International Centre for Genetic Engineering and Biotechnology, Trieste, Italy
[b] Institut des Sciences Agronomiques du Burundi (ISABU), Bujumbura, Burundi
[c] Faculté d'Agronomie de de Bioingenière (FABI), Université du Burundi, Bujumbura, Burundi
[d] Bio and Emerging Technology Institute, Addis Ababa, Ethiopia
[e] Institute of Biotechnology, Addis Ababa University, Addis Ababa, Ethiopia
[f] Plant Gene Expression Center, USDA-ARS, Albany, CA, USA
[g] Department of Plant and Microbial Biology, University of California, Berkeley, CA, USA
[h] Department of Biotechnology, University of Verona, Verona 37134, Italy
[i] International Centre for Genetic Engineering and Biotechnology, Cape Town, South Africa
[j] African Genome Center, University Mohammed VI Polytechnic (UM6P), Ben Guerir, Morocco

Interreg Italia–Österreich | Co-funded by the European Union | CEDRIC

# Il progetto CEDRIC

## Creazione di un agroecosistema transfrontaliero sostenibile attraverso la valorizzazione della biodiversità del microbioma radicale.

Duration: 2024-2026

Costo totale: 1.192.815,18 €

Finanziamento dell'UE: 910.254,06 €

**CEDRIC ha l'obiettivo di rafforzare la biodiversità microbiologica di aree e suoli caratterizzati da un ecosistema microbico povero o alterato.**

Ispirato dal successo del trapianto di microbioma umano, CEDRIC mira a trapiantare microbiomi radicali di piante sane in terreni poveri e/o impoveriti per migliorare la struttura del suolo, la microbiologia, la densità dei nutrienti e i livelli complessivi di carbonio del suolo.

Il progetto si sviluppa lungo tre assi principali:

- Sviluppo di un'alleanza transfrontaliera per la collaborazione scientifica per sviluppare e convalidare la metodologia per il trapianto di microbioma radicale
- Creazione di una piattaforma transfrontaliera per gli stakeholder del settore agronomico, della produzione agricola e della ricerca per promuovere l'uso di tecniche sostenibili che valorizzino la biodiversità;
- Un programma di formazione per educare gli operatori sul ruolo del microbioma nell'ecosistema e sui potenziali benefici del suo utilizzo.

www.cedricproject.eu

PROJECT PARTNERS

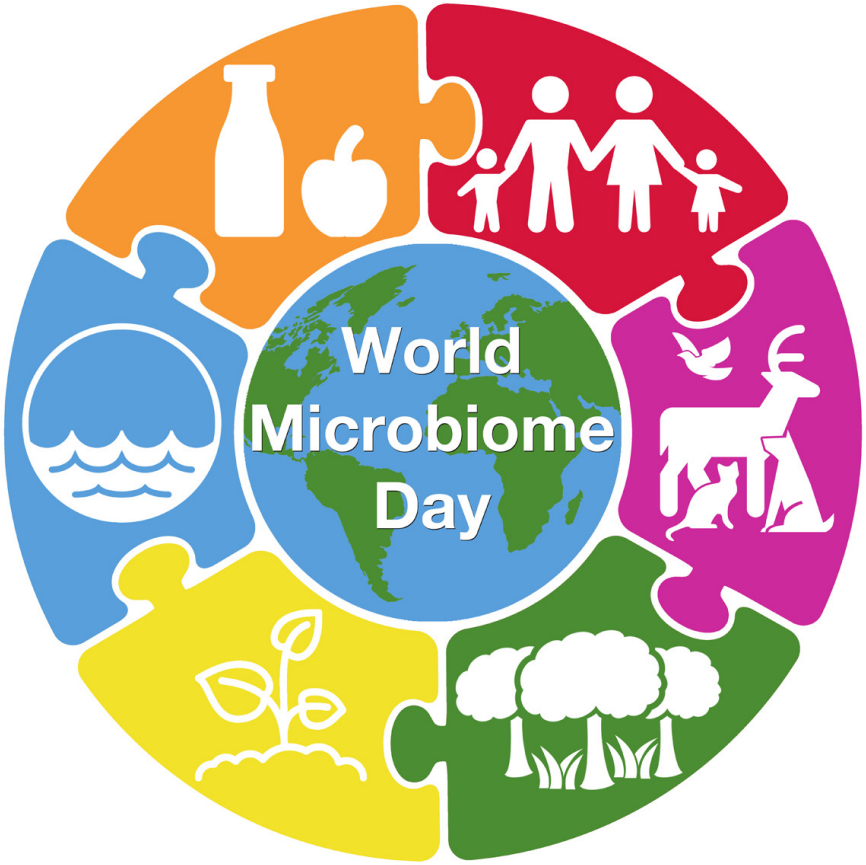
International Centre for Genetic Engineering and Biotechnology | Università degli Studi di Udine | unibz Freie Universität Bozen Libera Università di Bolzano Università Liedia de Bulsan | SICIT GROUP | universität innsbruck | BioTreaT GmbH | HECHENBICHLER

ASSOCIATED PARTNER

ersa Agenzia regionale per lo sviluppo rurale

# Microbioma

## Rivitalizzazione Suolo
## Migliorare le rese
## Diminuire uso agrochimici




| 27 Giugno

# La diversità è importante

worldmicrobiomeday.com

University Mohammed VI Polytechnic

AGC African Genome Center

ICGEB International Centre for Genetic Engineering and Biotechnology

UC San Diego SKAGGS SCHOOL OF PHARMACY AND PHARMACEUTICAL SCIENCES

LEVYLAB

OCP

FONDAZIONE ERNESTO ILLY

SIMBIOTICA bio-solutions for crops

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