Use of seed-associated microbiota of alfalfa (*Medicago sativa*) and pitch clover (*Bituminaria bituminosa*) to enhance drought tolerance in sensitive lentils (*Lens culinaris*)

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Ask Me anything

What has been happening...

As we know **agriculture production** is being affected by increasingly harsh conditions due to **climate change**, right? And we also know that legumes are **one of the main crops** due to their nutritional richness, being them the most affected ones. Eventhough drought events don´t have the same impact on all legume species, in some it can affect how the **plant performs.** But even so, some legume species can adapt to drought conditions, due to the microbiota that they can associate with and this is what we studied!

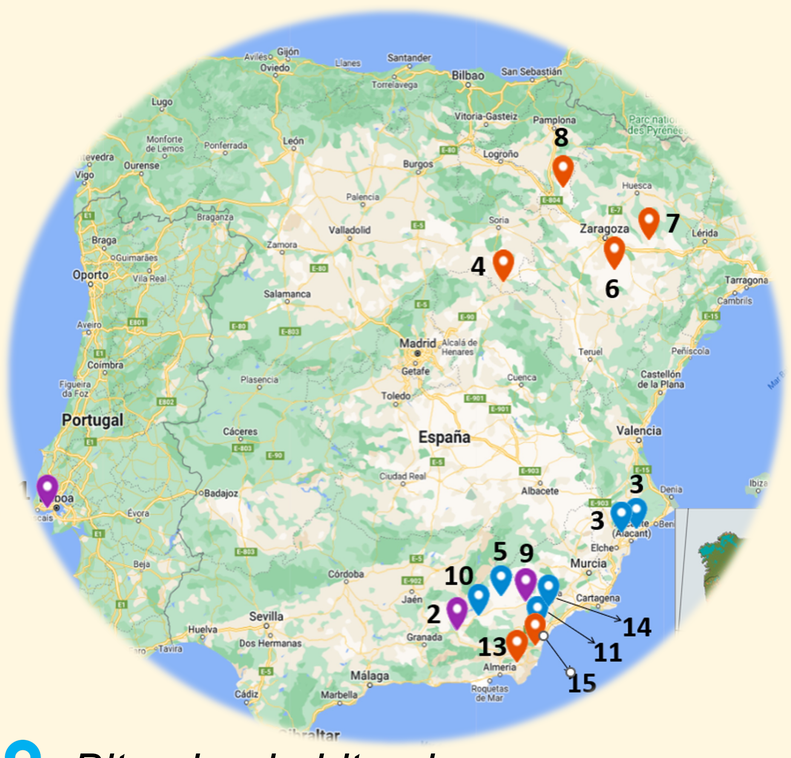
LET´S SEE

...how did we solve it?

Our goal is to study the **microbiota associated** with alfalfa soil, roots, nodules and seeds, and how this influences the **plant performance** under **drought and stress conditions.** We took samples from areas that were considered to be under these conditions, and then processed and identified the isolates. After the biofilm production, auxins, ACCd and survival mechanisms were studied. At the end we did some plant tests to see this microbiota in action.

What are we doing?

Sampling locations and **geographical distribution** of model plants

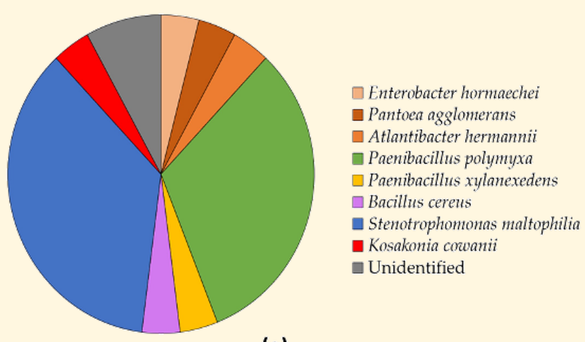


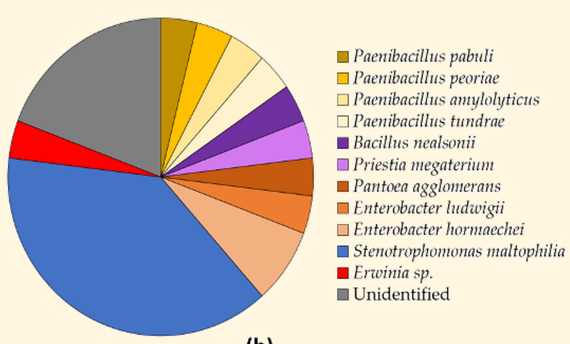
- *Bituminaria bituminosa*
- *Medicago sativa*
- Both species

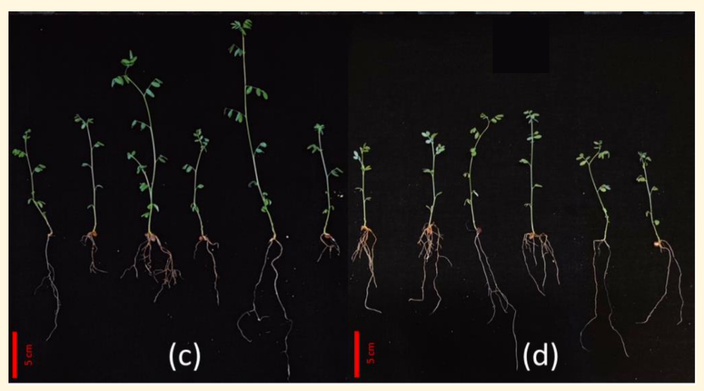
Strains	Biofilm production	Auxins production	Growth in ACC	Siderophores production	Phosphate solution
Paenibacillus amylolyticus	+++	++	+++	++	-
Paenibacillus xylanexedens	+++	++	+++	-	+++
Paenibacillus pabuli	+++	+++	++	-	+++
Stenotrophomonas maltophilia	+++	++	++	-	+++
Enterobacter hormaechei	+++	++	++	++	+++

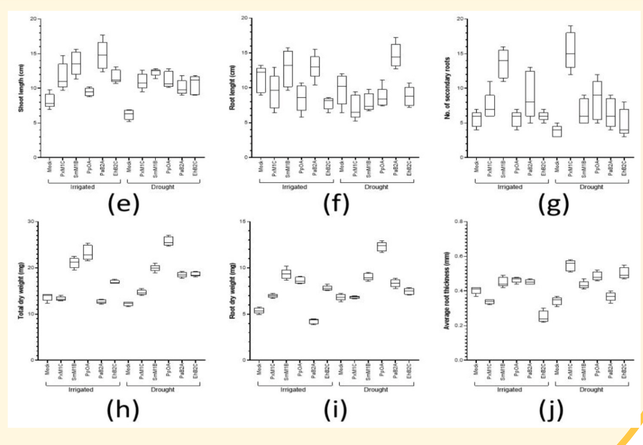
Plant growth promotion and drought-tolerance enhancement by **inoculant treatment**

Selected strains for plant tests









More than **450** strains were isolated and identified and **>80%** had at least **2 stress-tolerance skills**. (a) *Medicago sativa* and (b) *Bituminaria bituminosa*

What have we learn and what does the future hold...

Seedborne microbiota from the wild, drought adapted legumes, may consist in a new source for **drought tolerance-enhancers.**

New assays are required to include **treatments with consortia** that may offer more solid results and **better resistance** to plants under **drought stressing** conditions.

Some more info:

SCAN ME

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[1] Lange, M.A. Impacts of Climate Change on the Eastern Mediterranean and the Middle East and North Africa Region and the Water–Energy Nexus. *Atmosphere* **2019**, *10*, 455.
[2] Nadeem, M.; Li, J.; Yahya, M.; Sher, A.; Ma, C.; Wang, X.; Qiu, L. Research Progress and Perspective on Drought Stress in 949 Legumes: A Review. *Int J Mol Sci* **2019**, *20*, E2541, doi:10.3390/ijms20102541.