



## DRECHS LERA TERES, THE BARLEY PATHOGENETIC FUNGUS

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# Drechslera teres, the barley pathogenetic fungus

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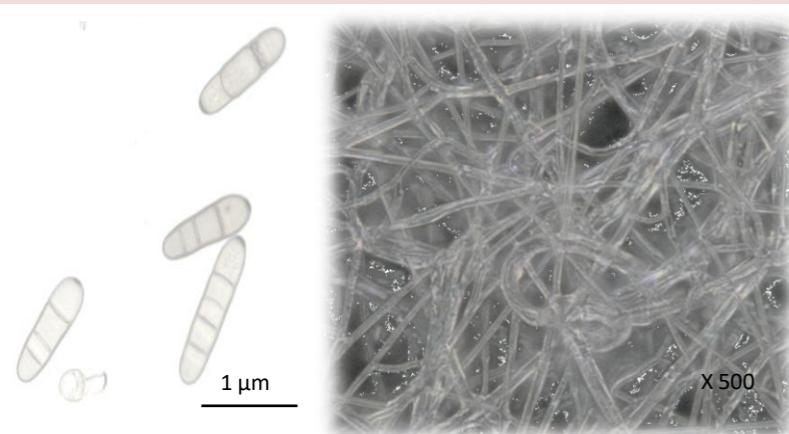
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## The strong comeback of *D. teres*

### Presentation of pathogen



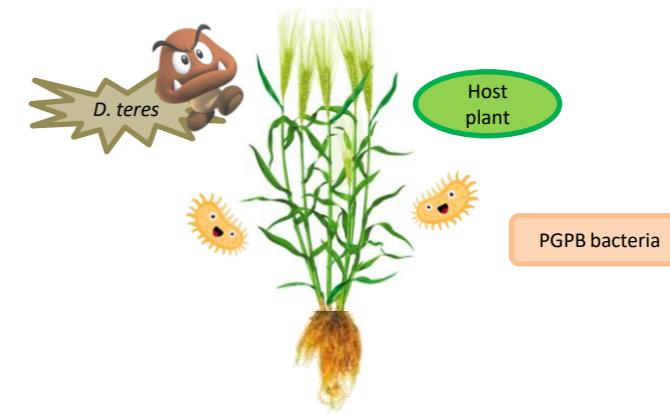
- ✓ *Drechslera teres*, asexual form [1]
- ✓ Ascomycete
- ✓ Hemibiotroph
- ✓ Speed infection
- ✓ Host: barley (*Hordeum vulgare*)

### Symptoms and damages



- ✓ Net blotch then necrosis, foliar disease
- ✓ Loss of production (10 to 40%) [2]
- ✓ Serious economic problem
- ✓ Spread throughout the world
- ✓ Resistance developed by fungus

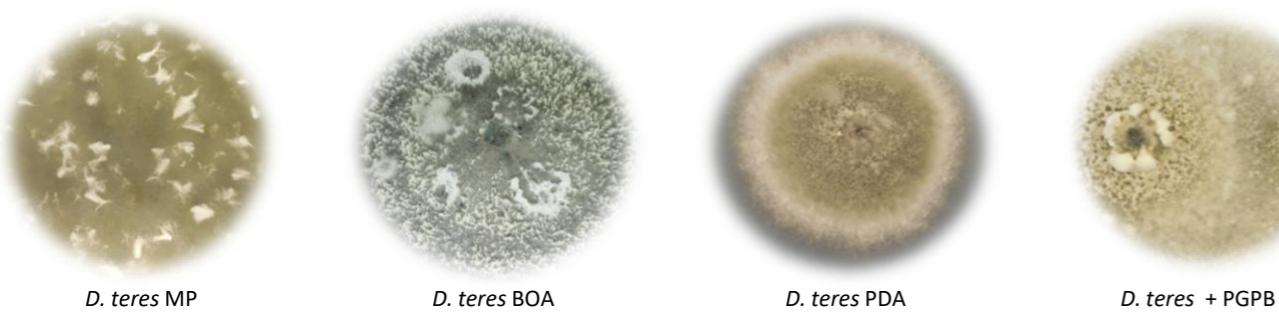
### Lutte BiHO project



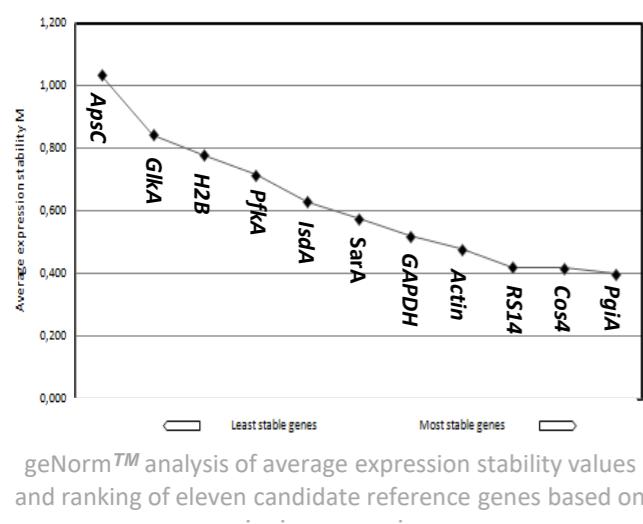
- ✓ Objective: To design and develop a biological control system based on the use of a beneficial bacteria to control barley leaf spot
- ✓ Fundamental objective: Study the cell wall of fungi with the aim of developing new antifungal products

### Materials and methods

- ✓ Analyze the differential expression genes in *D. teres* spores and mycelium after cultivation in different media in presence or absence in PGPB bacteria :



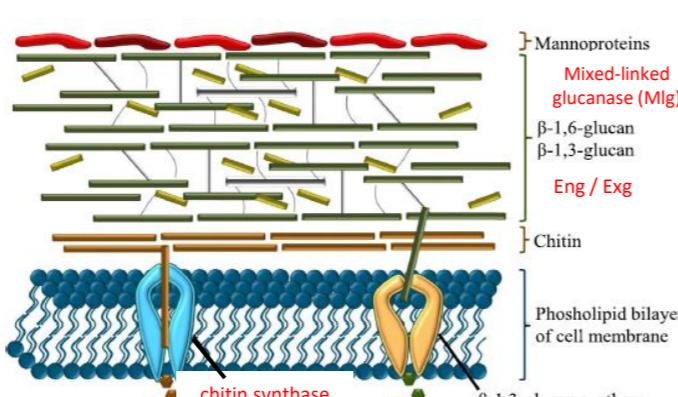
### Selection of reference genes



geNorm™ analysis of average expression stability values and ranking of eleven candidate reference genes based on pairwise comparison

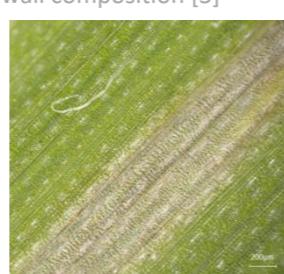
→ *Cos4* and *PgiA* are more suitable reference genes for qPCR normalization

### Selection of target genes



Schematic overview of fungal cell wall composition [3]

- ✓ Study of PTK1 (protein kinase) gene responsible for conidiation, appressoria formation and pathogenicity of barley



### Conclusions and perspectives

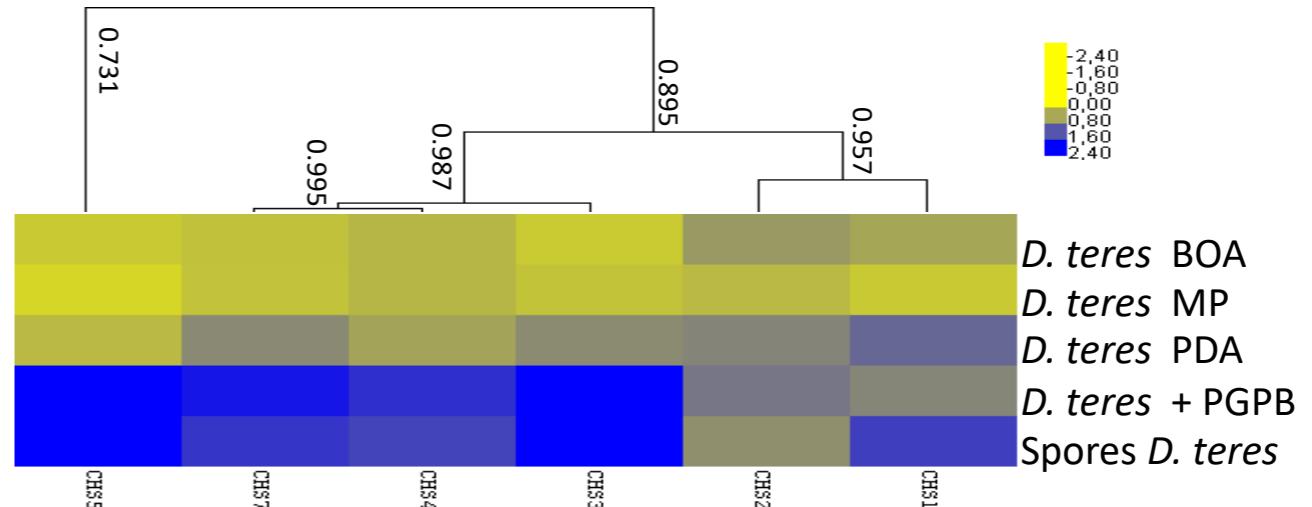
- ✓ The first study on the cell wall-related genes in *D. teres*
- ✓ Genes associated with the cell wall of *D. teres* are more expressed in spores

→ Is the composition of the barley cell wall modulated when attacked by the pathogen using microscopy?



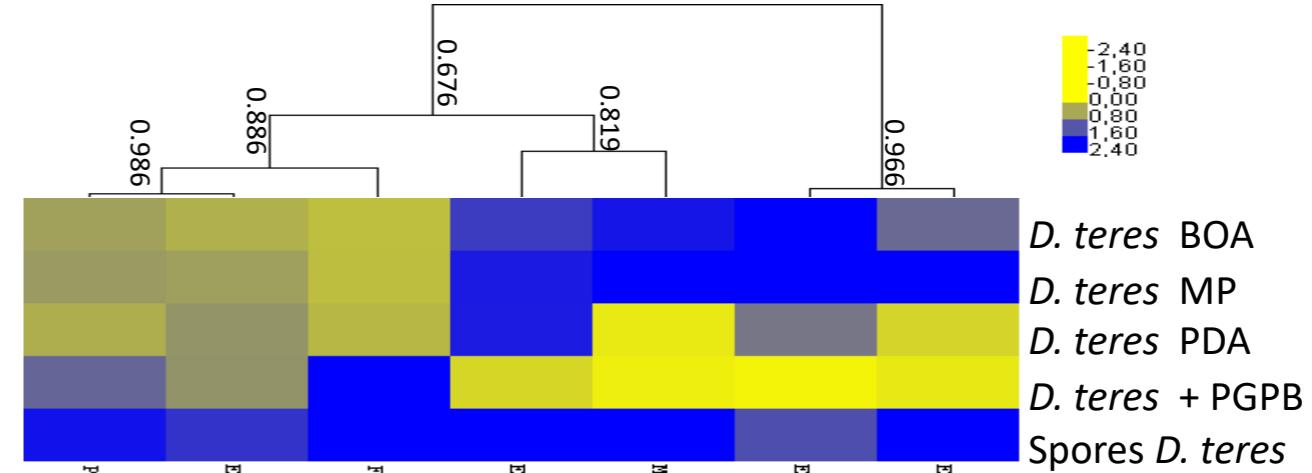
### Results

#### Analyze of CHS expression in *D. teres*



- ✓ *CHS1* and *CHS2* have a similar expression profile
- ✓ *CHS3*, *CHS4*, *CHS5* and *CHS7* are more expressed in *D. teres* spores and mycelium in presence PGPB

#### Analyze of genes related β-(1,3)-glucan and protein kinase in *D. teres*



- ✓ Expression of genes related β-(1,3)-glucan and protein kinase increase in spores of *D. teres*

#### Principal component analysis



#### References:

- [1] Lightfoot, D-J., and Able, A-J., (2010). Growth *Pyrenophora teres* in planta during barley net blotch disease. *Australasian Plant Pathology* 39, 499-507
- [2] McLean, M-S., et al., (2009). Epidemiology and control of spot form of net blotch (*Pyrenophora teres* f. *maculata*) of barley: a review. *Crop and Pasture Science* 60, 303-315
- [3] Fesel, P-H and Zuccaro, A., (2016). B-glucan: Crucial component of the fungal cell wall and elusive MAMP in plants. *Fungal Genetics and Biology* 90, 53-60