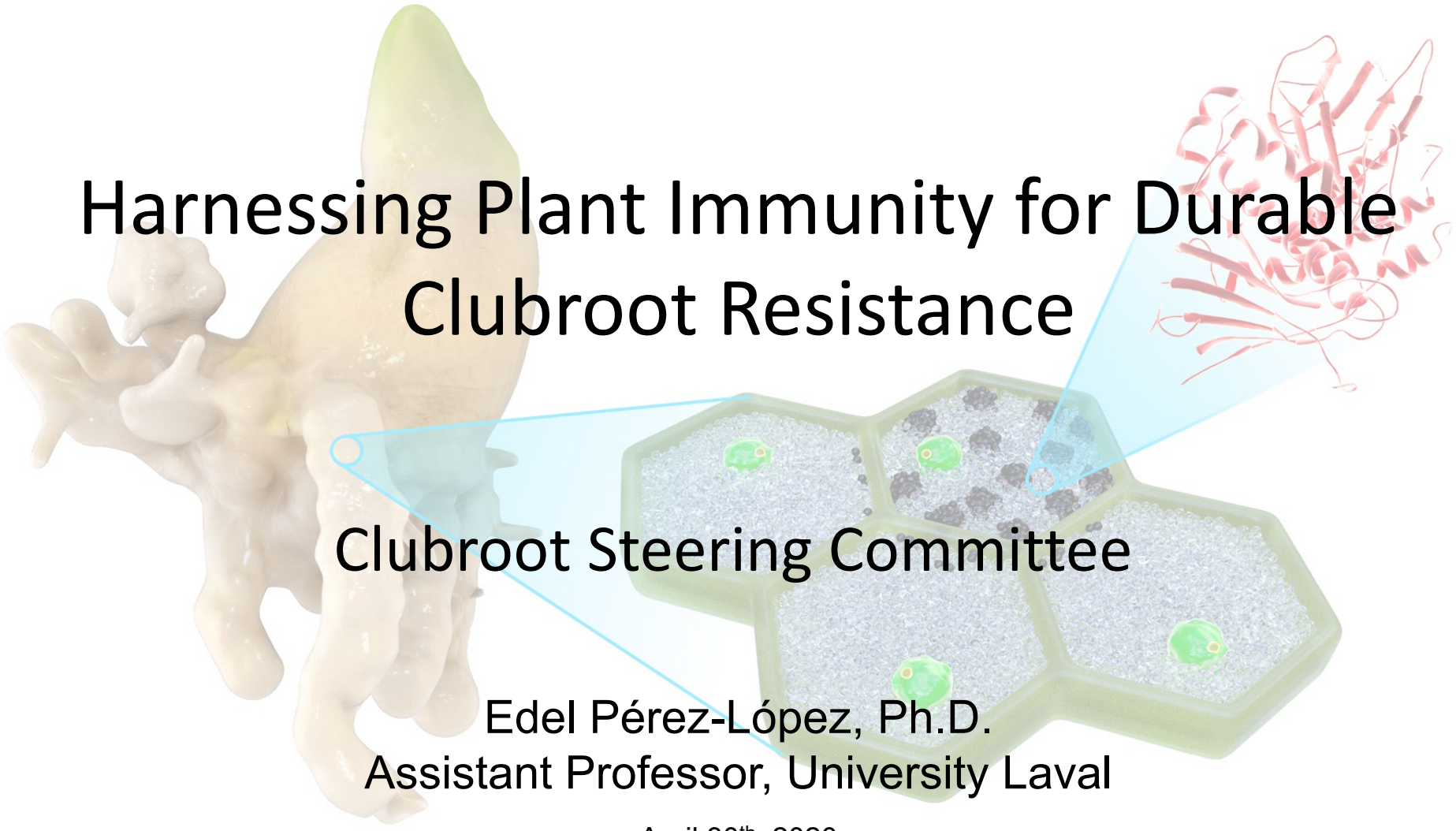
Harnessing Plant Immunity for Durable Clubroot Resistance



Clubroot Steering Committee

Edel Pérez-López, Ph.D.
Assistant Professor, University Laval

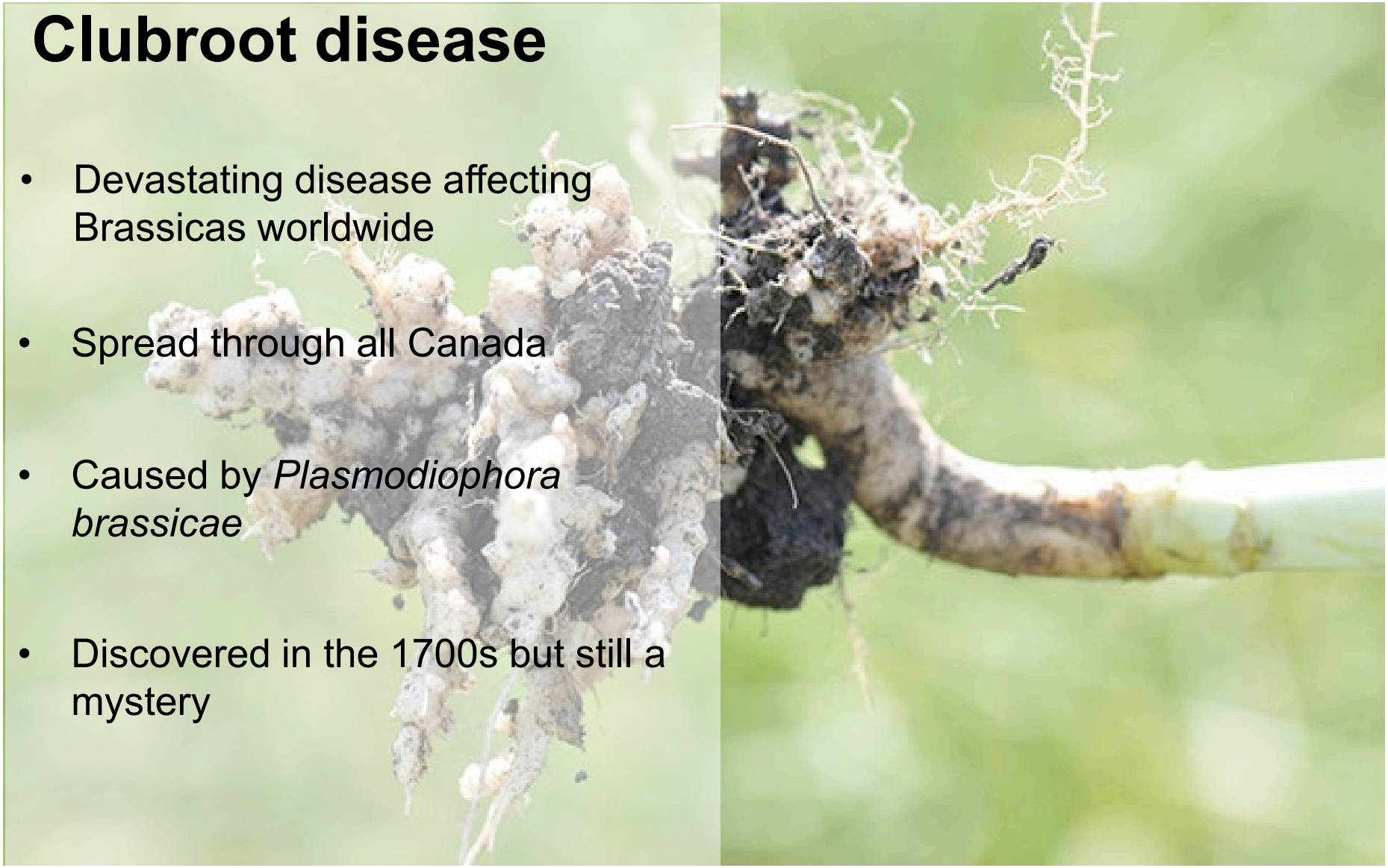
April 30th, 2020

@EdelLab

@Edel_PLopez

Clubroot disease

- Devastating disease affecting Brassicas worldwide
- Spread through all Canada
- Caused by *Plasmodiophora brassicae*
- Discovered in the 1700s but still a mystery



Botero et al. 2019-Plant Pathology

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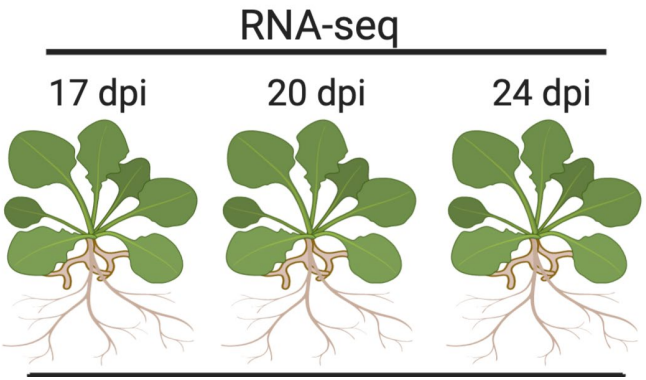
Pb candidate effectors

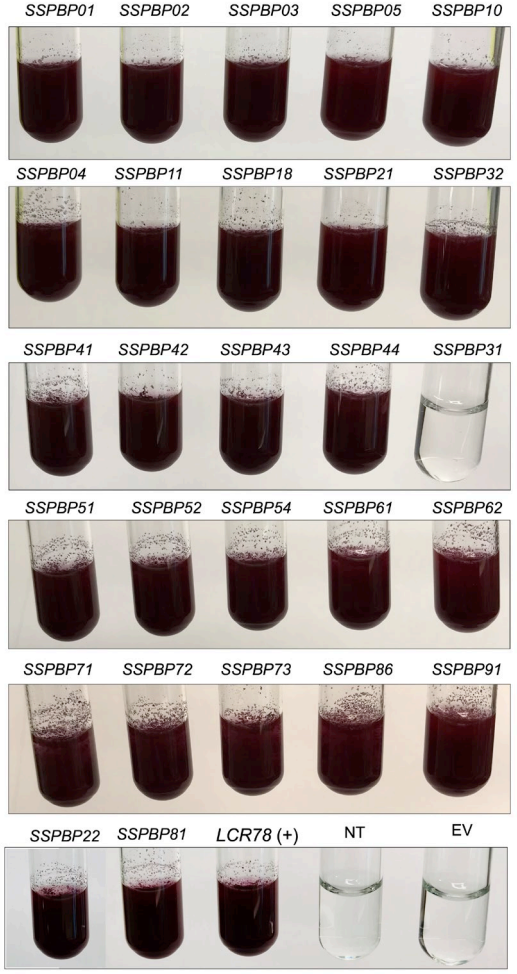
Expression



Pb proteins
≤ 400 aa
Signal peptide
No transmembrane domain
Fungi and oomycetes effector domains

→ 32 SSPbPs

Signal peptide



Confirmatory Analysis

Pérez-López et al. 2018-Virulence; Pérez-López et al. 2020-Journal of Eukaryotic Microbiology

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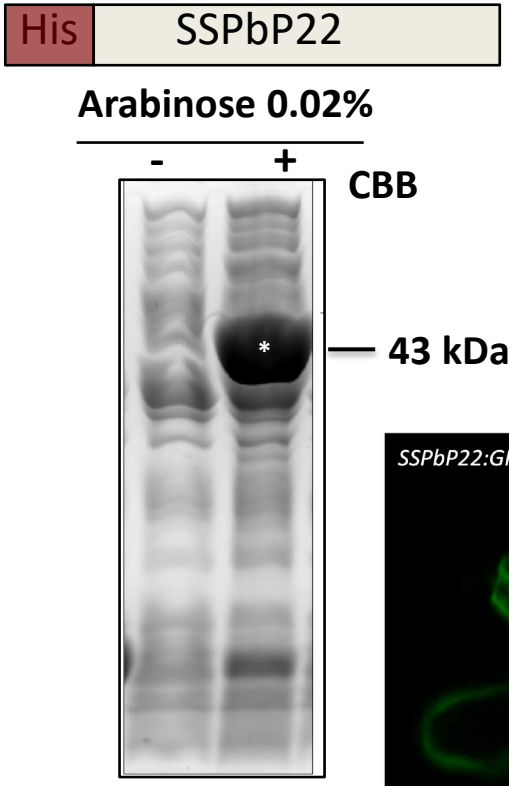
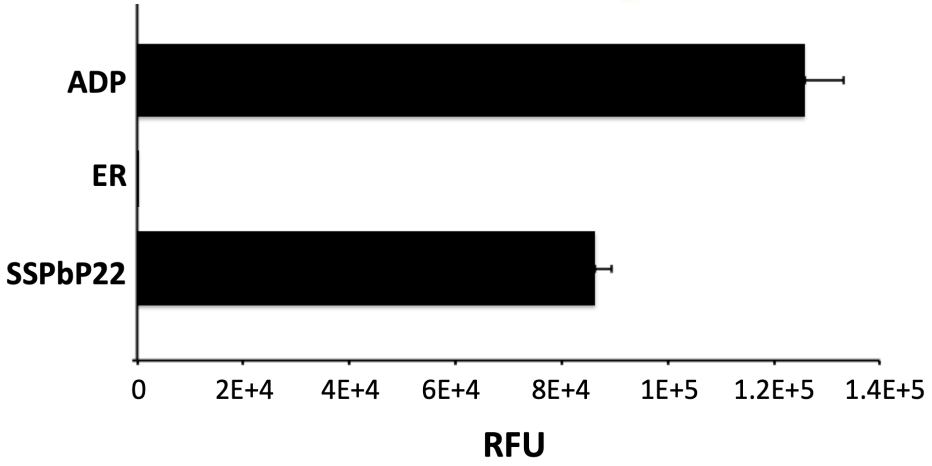
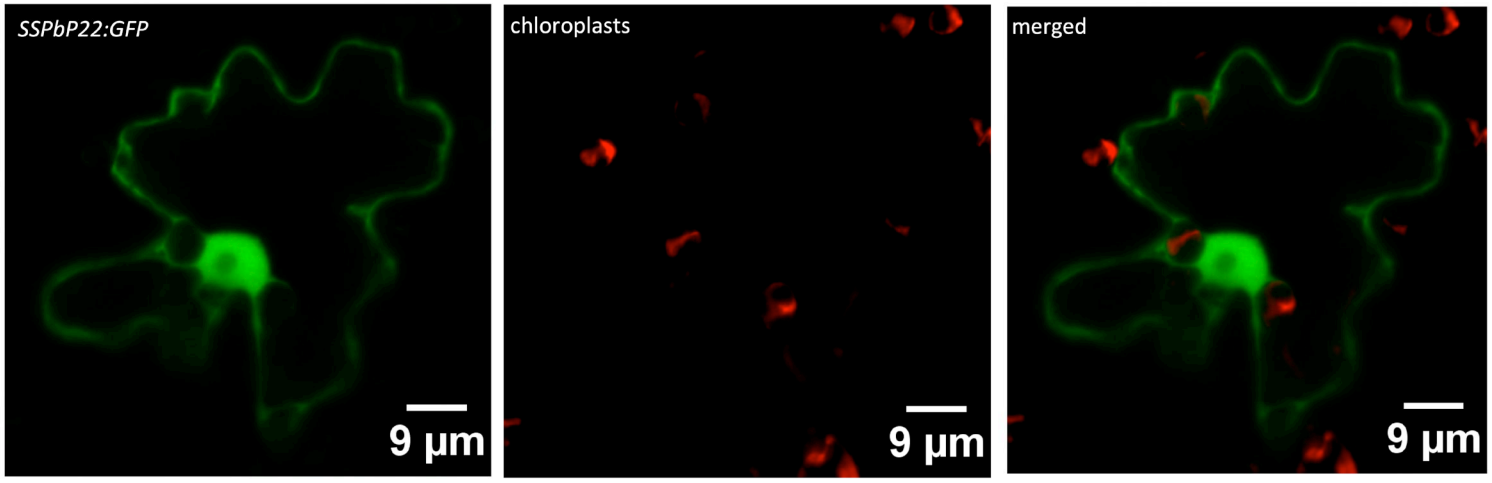
Is SSPbP22 a cytoplasmic and nuclear kinase







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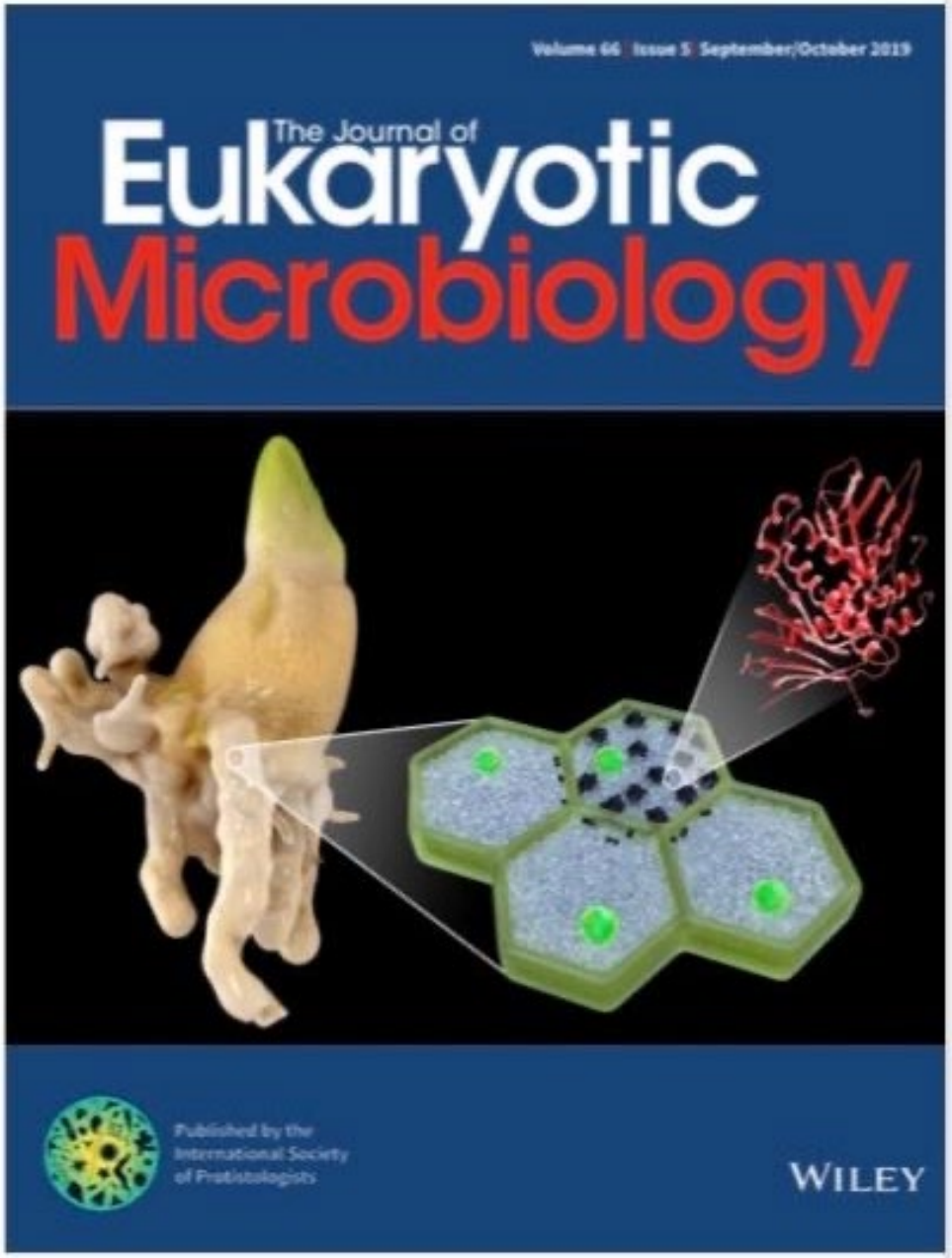
Cover May/June issue



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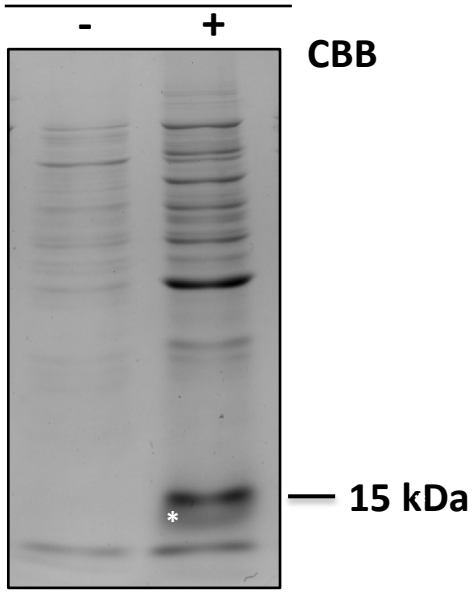
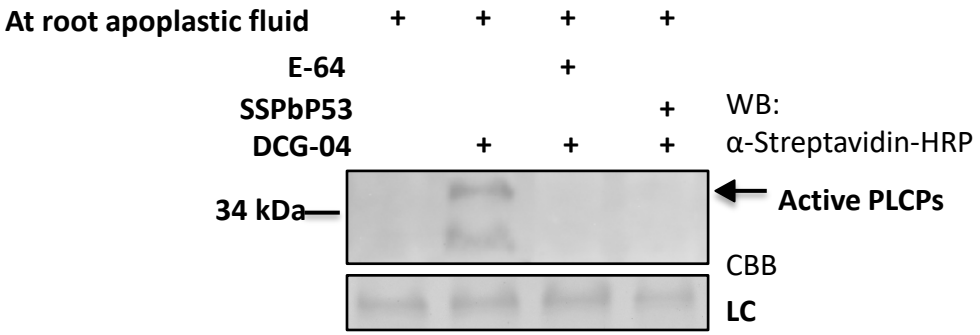
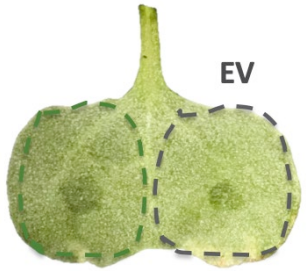
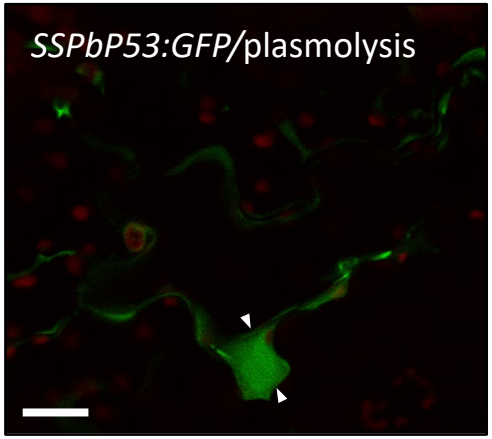
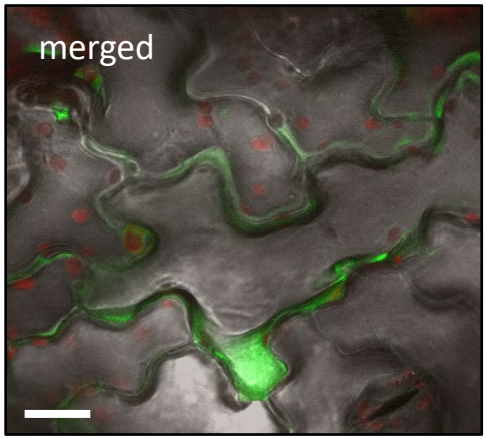
SSPbP53 is a cysteine protease inhibitor











Pérez-López et al. 2020-MPMI

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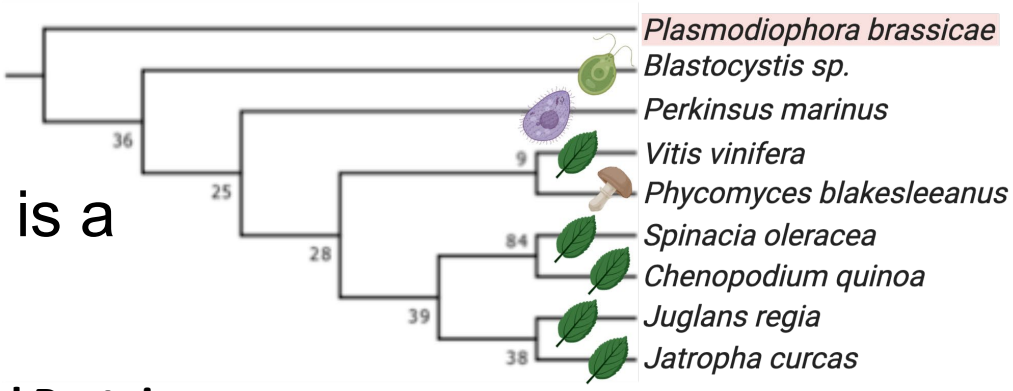
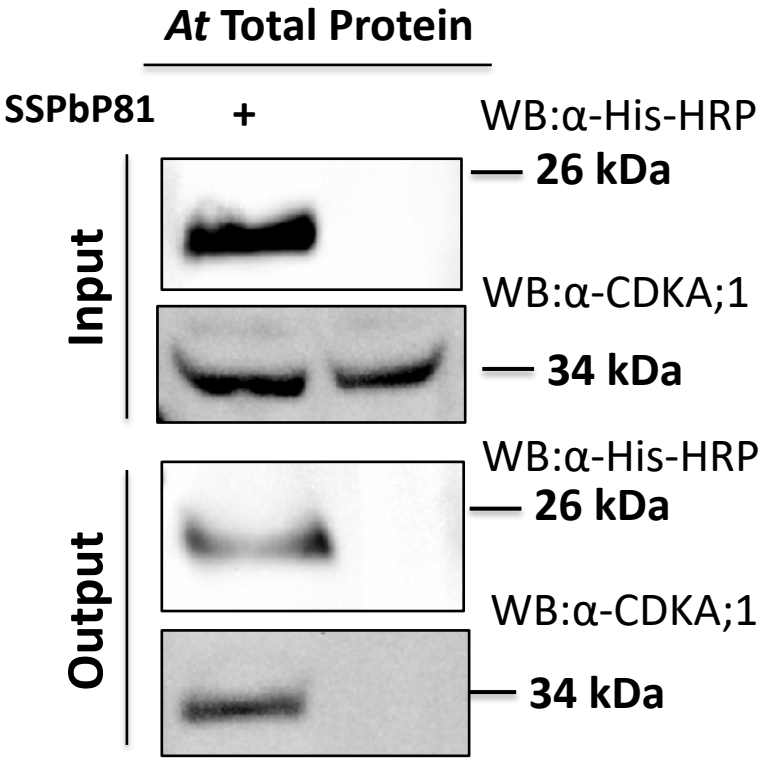
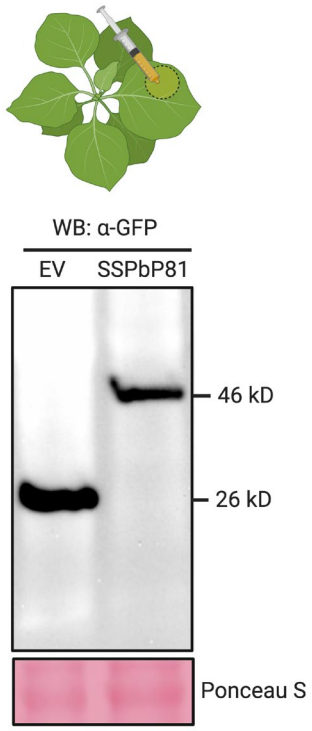
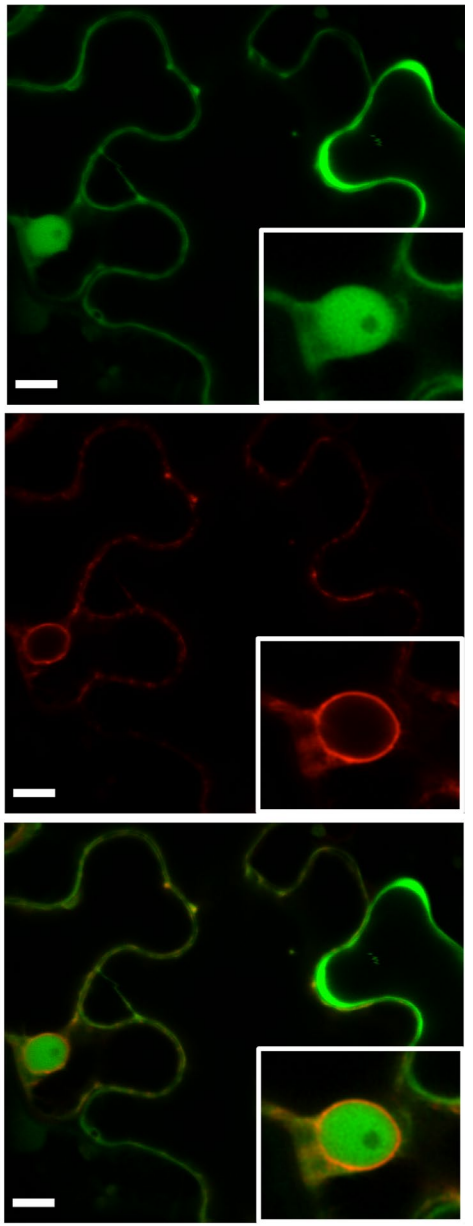
SSPbP81 is a cyclin









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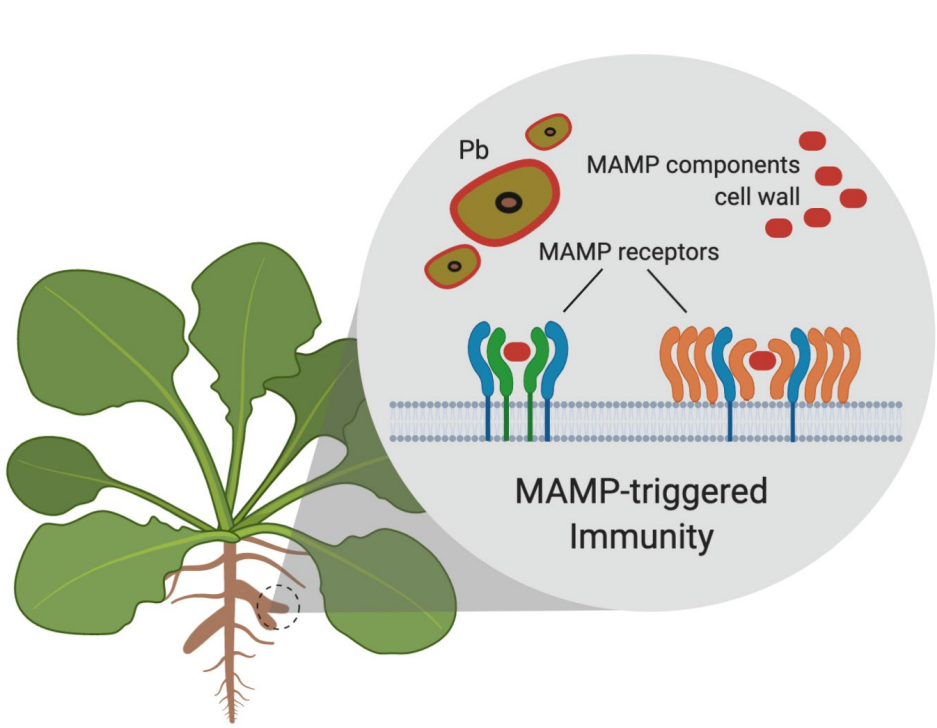
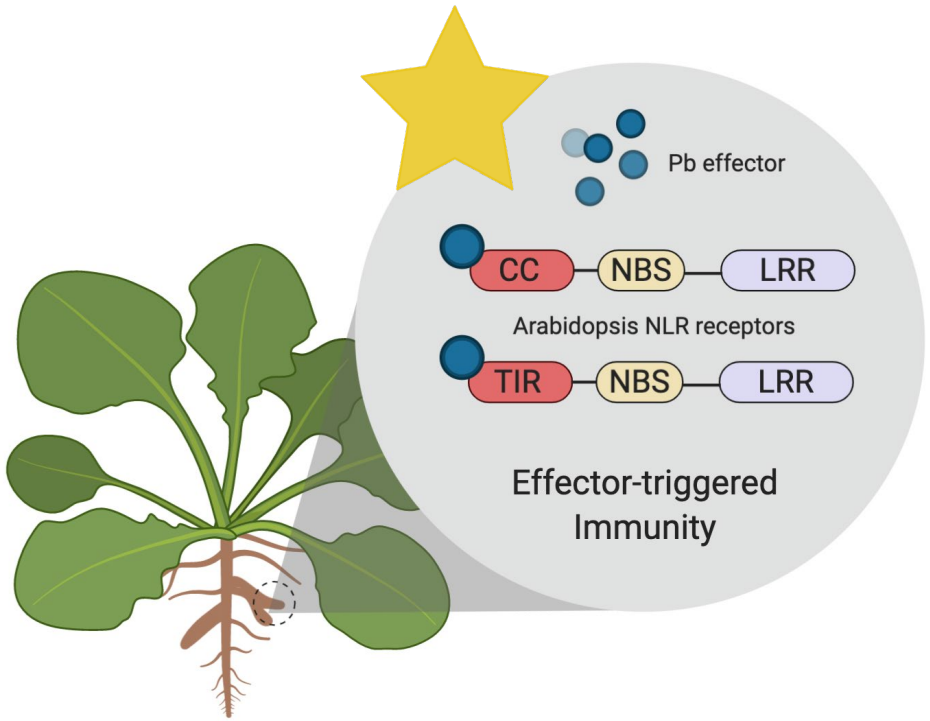
EdeLab

Improve plant resistance to *P. brassicae* through the elucidation of the mechanisms used by the clubroot pathogen to infect its hosts and to escape plant immunity





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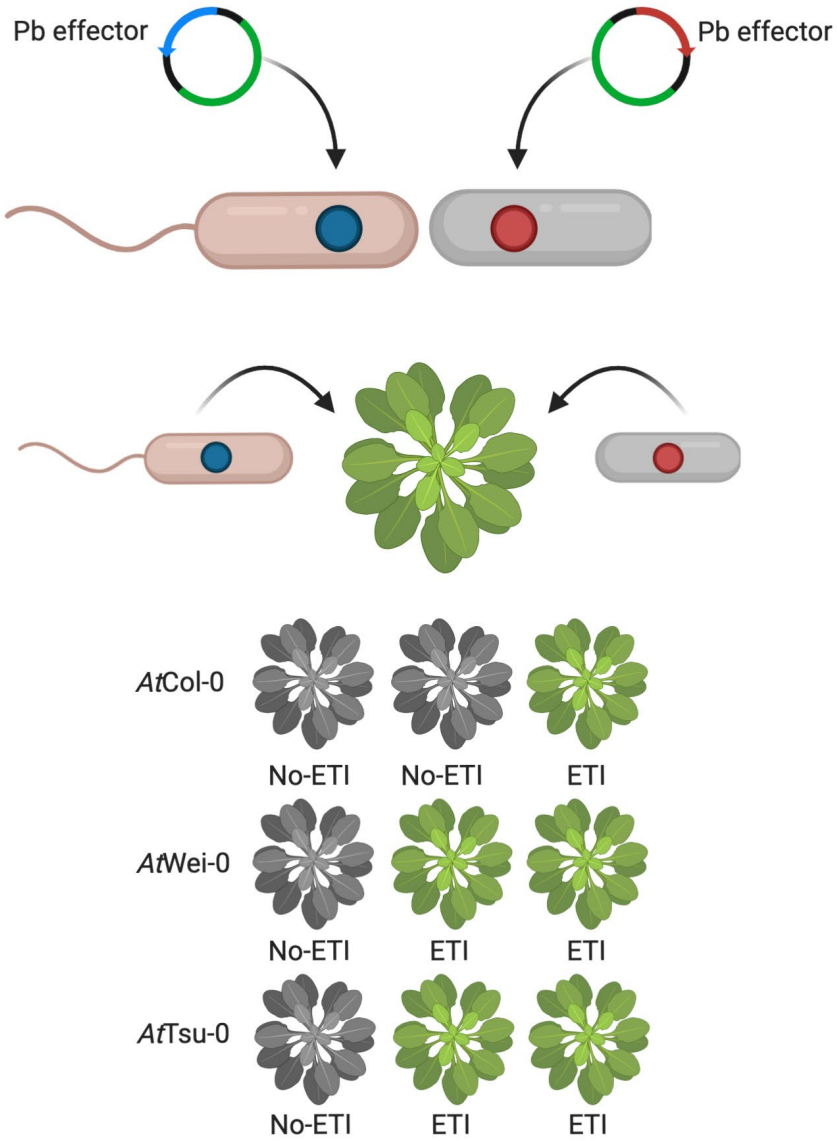
Resistance from immunity



- Screening of effector by effector without "bodyguard" mechanism interfering on the NLR receptors recognition of Pb effectors
- Unveiling of new R genes sources of resistance that can be exploid to generate resistant canola

EdeLab

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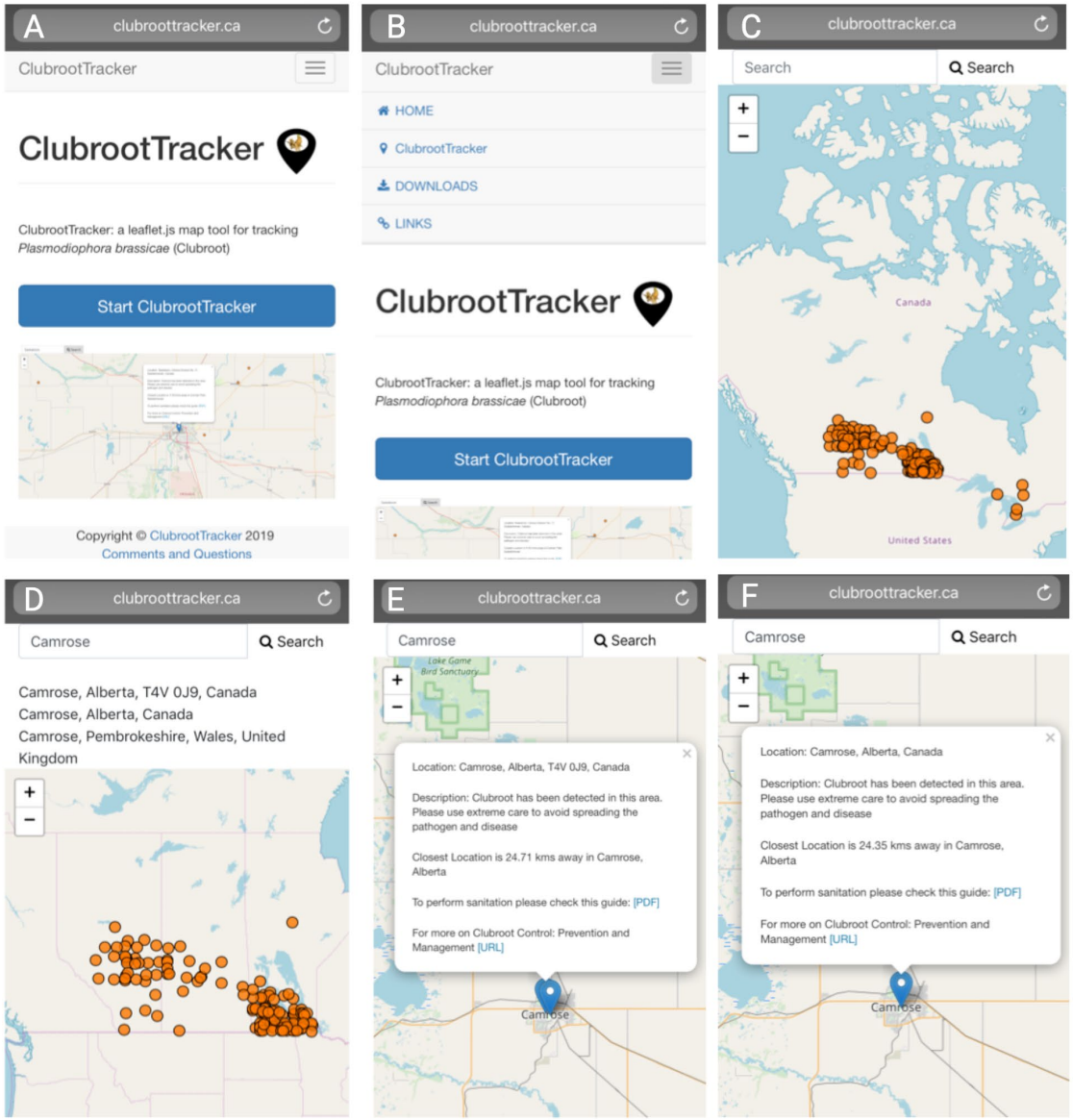
EdeLab

- ClubrootTracker: http://clubroottracker.ca
- Interactive map tool for tracking *Plasmodiophora brassicae* (clubroot) around the world
- Uses GPS data
- We implemented a registration feature to know who upload data



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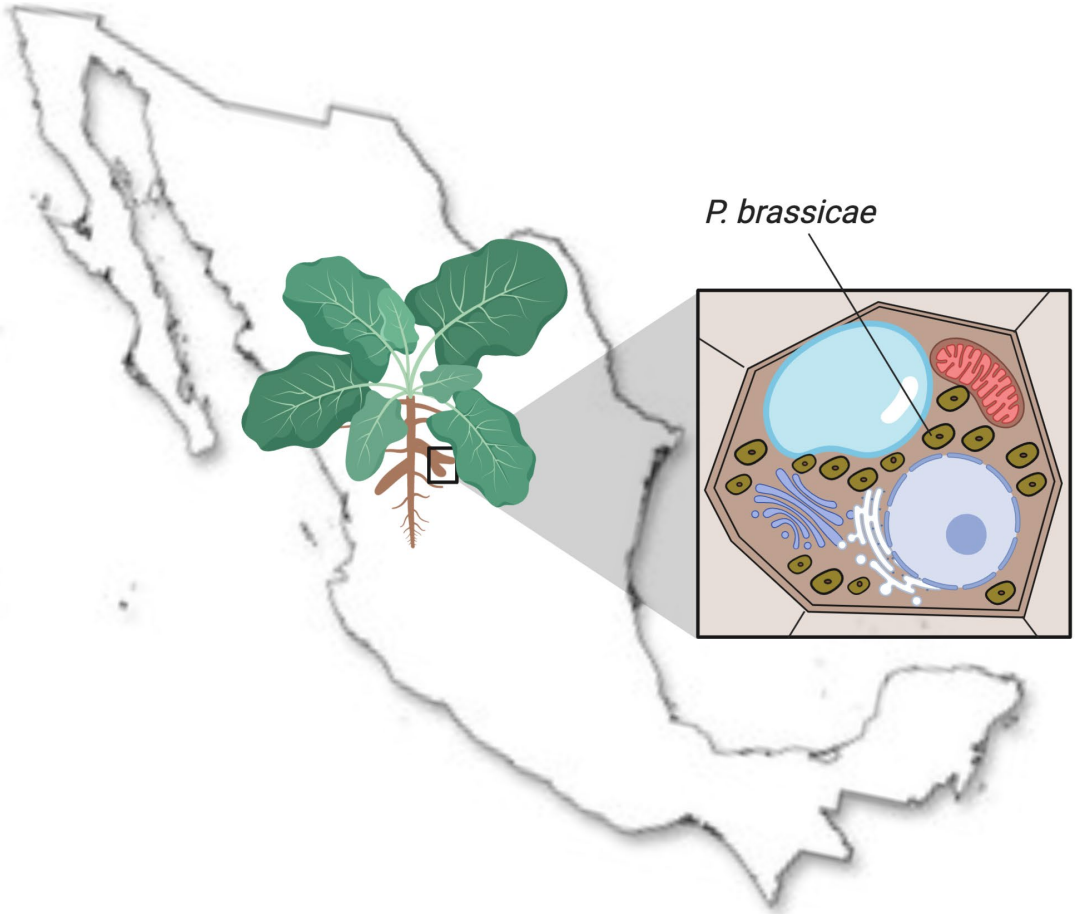

- Identification and characterization of *P. brassicae* affecting cruciferous crops in Mexico
- Expand the genomic information available for *P. brassicae*
- Will contribute to the identification of an accurate Pb effectoromic

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Thank You!

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Saskatchewan Canola Development Commission

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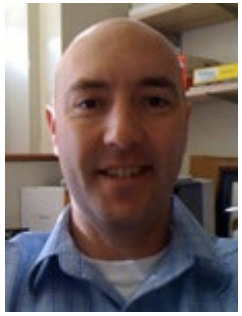
Prof. Christopher Todd



Prof. Peta Bonham-Smith

…we, as scientists, speak the same language of science…
Prof. Karl Maramorosch