



The citrus industry under attack, no more organic citrus?

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Der **Coop Fonds für Nachhaltigkeit**
unterstützt dieses Projekt.



Content

What is Greening or HLB?

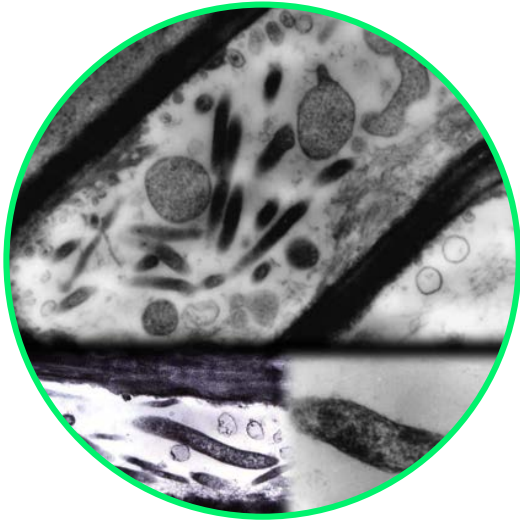
Project Background

Project Modules



What is greening or HLB (HUANGLONGBING) disease?

Candidatus Liberibacter



Diaphorina citri



❖ Citrus greening or HLB:

→ is the most important citrus diseases globally

→ is caused by the bacteria “*Candidatus Liberibacter*”

→ is propagated by psyllids vectors

→ dissemination is fast and difficult to control

Citrus greening disease



❖ Citrus greening disease:

→ quickly decreases tree life

→ affects young and adult citrus trees

→ reduced the yields, and fruit and juice quality

→ cause problems on the sourcing and supply of organic citrus

❖ There is currently no cure

Citrus greening's disease vectors

Trioza erytreae

It is adapted to cold regions
→ e.g. Africa (21) and **new
Spain, Portugal**



Diaphorina citri

It is tolerant of high temperatures and survives in various climatic conditions
→ e.g. Florida, Brazil, Mexico, etc.



Ten most important orange producers have already presence of the greening disease



The bacteria that cause huanglongbing have been detected in 7 of the top 10 orange-producing countries across the globe.

Sources: CAB International's Invasive Species Compendium 2019, Food and Agriculture Organization of the United Nations.

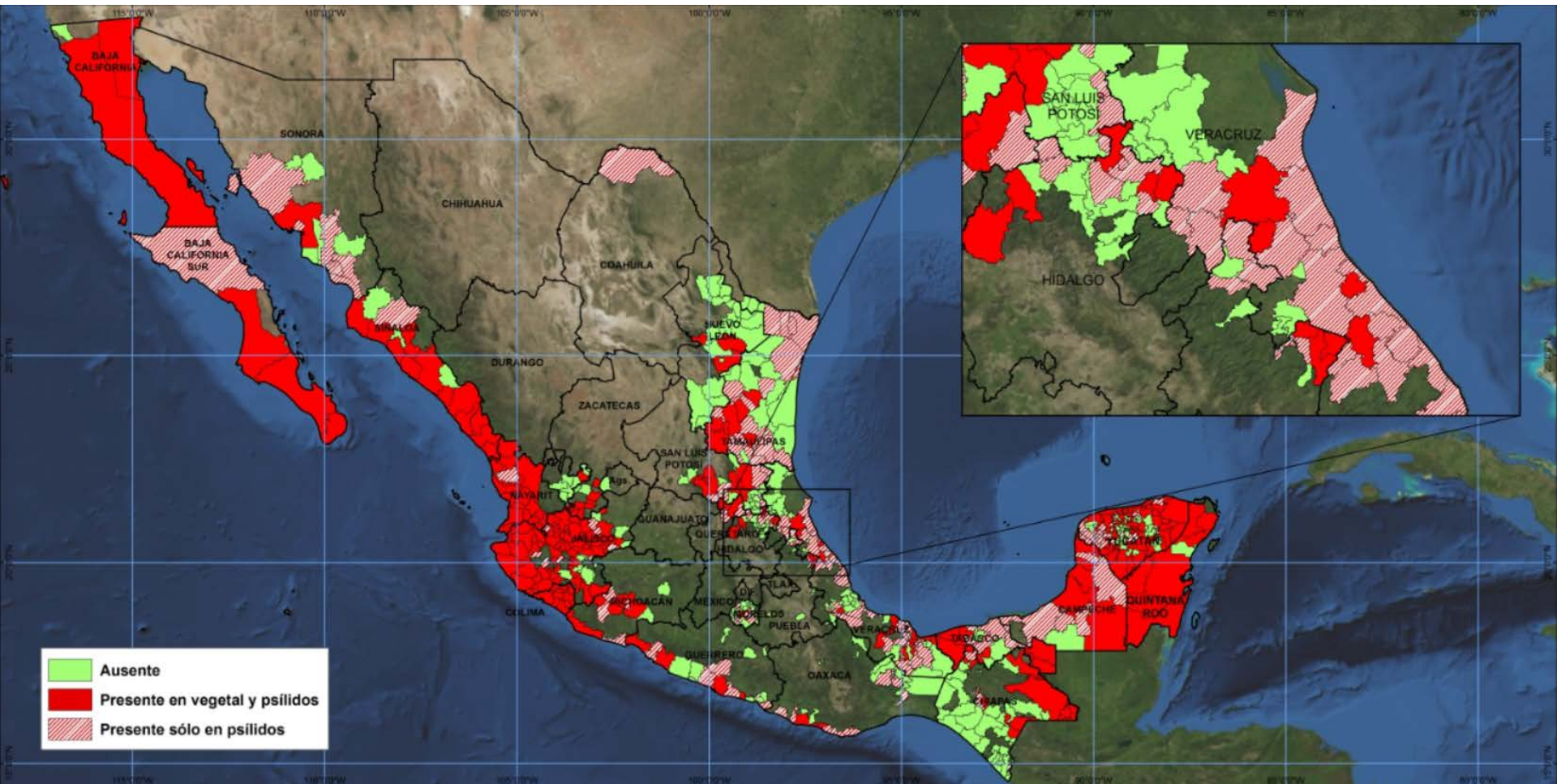
Note: Three species of *Candidatus Liberibacter* cause huanglongbing: *Ca. L. asiaticus*, *Ca. L. africanus*, and *Ca. L. americanus*. The Asian form is the most widespread.

Detection of the *Diaphorina citri* in Veracruz

June, 2010



Detections of greening in Mexico, July 2018



Background: sourcing & supply project for coop (2007)



Main Objectives of the citrus greening Project (2011)



Improve Bio management



Obtain practical results

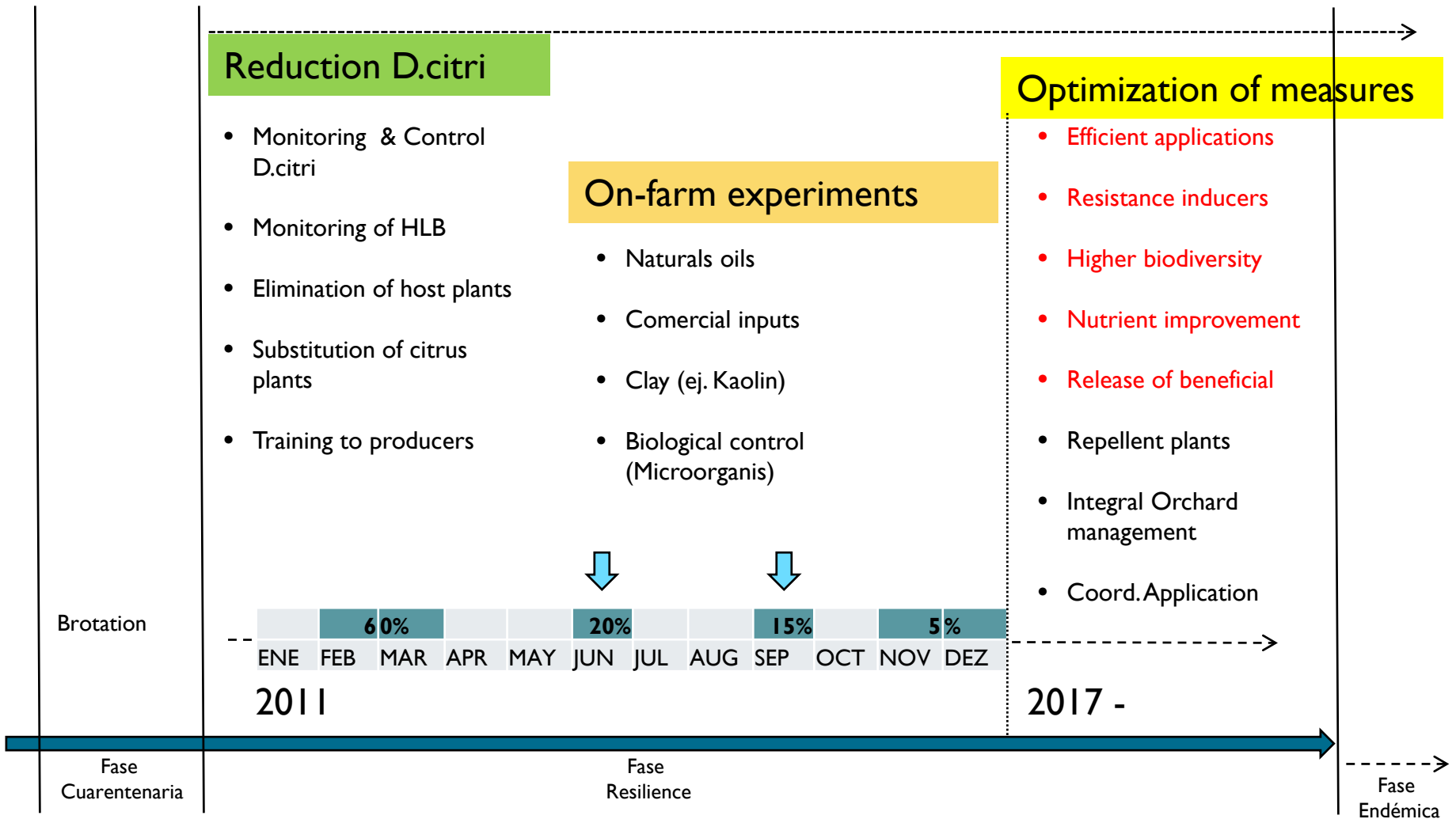


Assuring juice quality

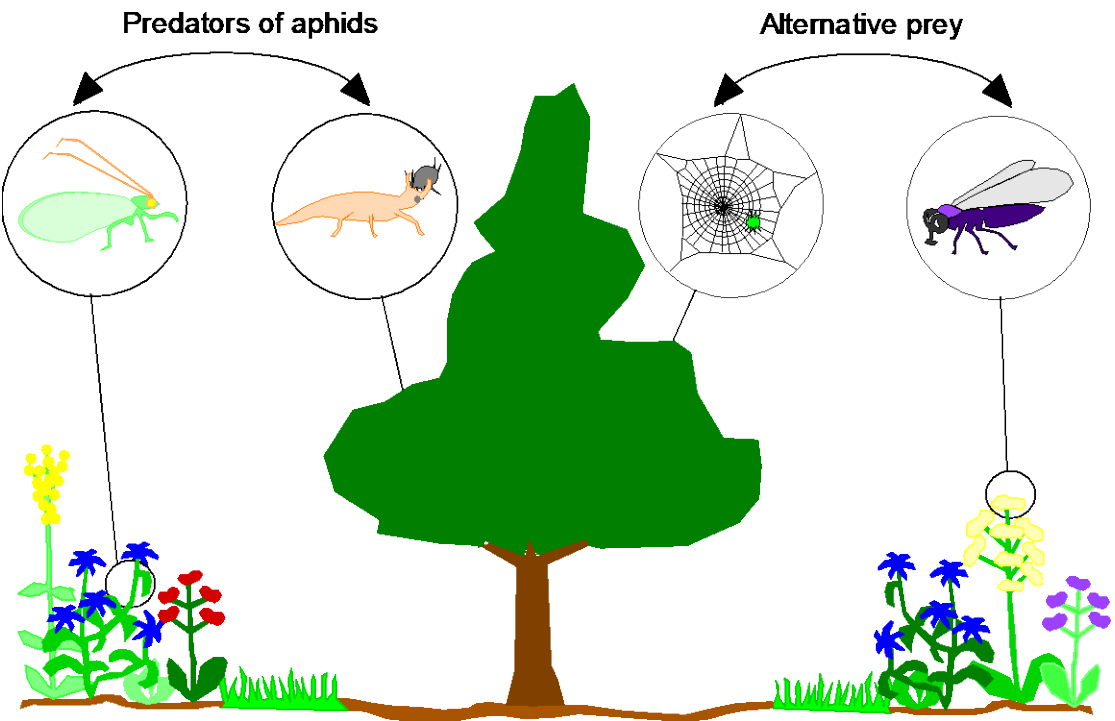


Reducing the risk of supply

An integrated concept for the management of the green disease in organic oranges



Module I: Promoting functional biodiversity for the control of the greening disease”



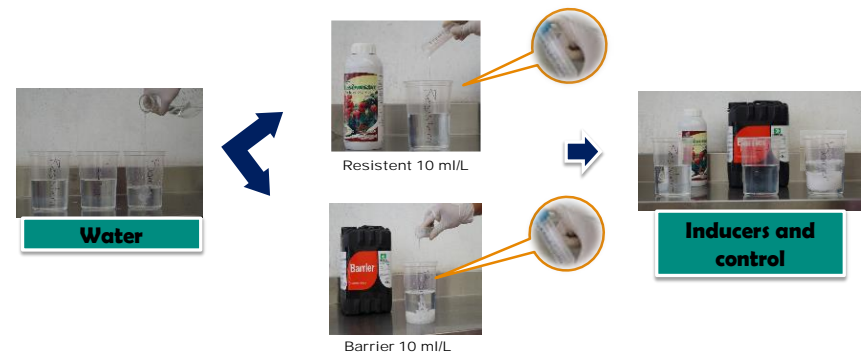
Field studies and On-Farm experiments



Module 2: Increasing plant resistance to infection / reducing greening disease dissemination by efficient control of *Diaphorina citri*

- › Testing different induce resistance inputs
- › Testing the most suitable organic inputs for controlling *Diaphorina citri*
- › Finding practical procedure on monitoring and controlling *Diaphorina citri*

Preparation of resistance inducers



Colonization of plants with the vector



eggs



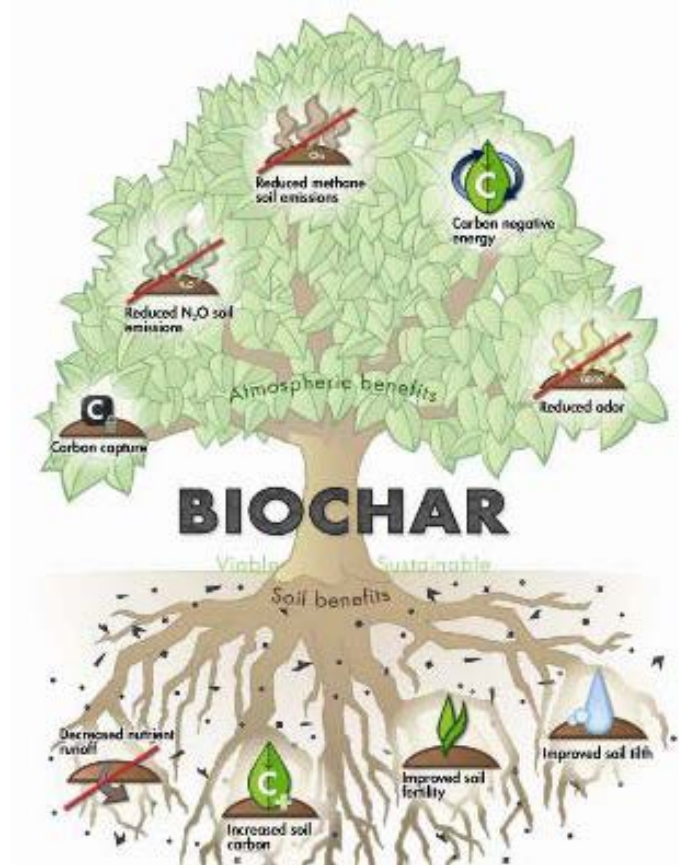
nymphs



adults

Module 3: Increasing plant resistance to infection by means of adequate plant nutrition

- › Assessing and selecting different Bio Char sourcing materials
- › Evaluating potential interaction and effects of Bio Char with different plant nutrient applications and strategies
- › Defining suitable Bio Char and fertilization strategy



Module 4: promote, disseminate, and multiplication of project results

Field visits and training days for farmers and agricultural advisors



Module 4: promote, disseminate, and multiplication of project results

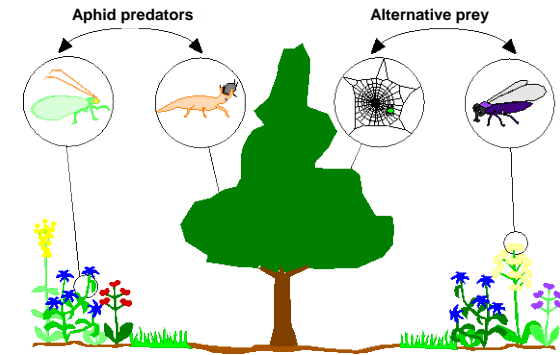
Conference on the Management of HLB and its Vector in Organic Citrus Production



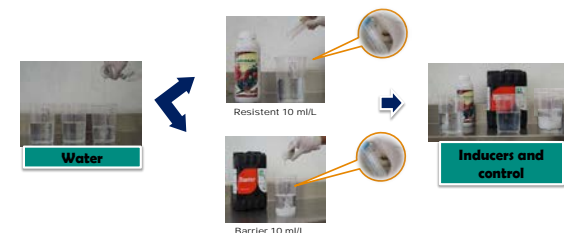
Module 4: promote, disseminate, and multiplication of project results

- › Practical leaflet for farmers on how to fight the HLB disease
- › Scientific publications to local and international journals
- › Media release (Mexico and Switzerland)

Functional biodiversity



Preparation of resistance inducers



Thank you very much for your the attention!



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