

TROPICSAFE TRAINING SESSION

PRACTICES AND TECHNIQUES TO MANAGE CITRUS “HUANGLONGBING”

9th & 10th December

Location:

*Instituto de Investigaciones de
Fruticultura Tropical*
Ave. 7ma no. 3005 entre 30 y 32,
Playa, La Habana, Cuba.

“Huanglongbing” (HLB) disease is transmitted by the psyllids *Diaphorina citri* and *Trioza erytreae*, that severely reduces yield and performance of citrus worldwide. Three species of ‘*Candidatus Liberibacter*’ are associated with HLB in Asia, America and Africa.

The TROPICSAFE training session will allow you to get a better understanding of this disease, recognize the disease in the field and which techniques and practices are being used and/or developed within the project to manage the HLB.

OBJECTIVES

- » Provide information for the identification of “huanglongbing” symptoms, alternative host plants, and insect vectors.
- » Provide information on disease epidemiology.
- » Improve the knowledge on management strategies and biological control to reduce “huanglongbing” economic impact.
- » Get a perspective on how this disease is affecting orchards in Cuba and Guadeloupe and how it is managed.

TARGET

- » Citrus growers
- » Professors and students.
- » Technical advisers, consultants and farmers.
- » Plant protection organizations.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727459

- 1) **HLB symptomatology and methods to contain the disease used in Cuba** - *Maritza Luis Pantoja, Camilo Paredes*
- 2) **Methods for HLB detection: challenges and solutions** - *Ester Marco-Noales*
- 3) **What are the determinants associated to better tolerance of citrus polyploids to HLB?** - *Raphael Morillon*
- 4) **Biological control of *Trioza erytreae* in Europe and of *Diaphorina citri* in other parts of the world** - *Alejandro Tena, César Monzó*
- 5) **“Huanglongbing” and its association with diverse ‘*Candidatus Phytoplasmas*’ in the Caribbean** - *Assunta Bertaccini*
- 6) **Impact and management of “huanglongbing” in Guadeloupe** - *Yuri Uneau*

TRAINERS



Maritza Luis Pantoja is a degree in Biological Sciences with a specialty in Botany from the University of Havana with 38 years of experience and Master in Science in citriculture. She has been working as a bacteriologist for 28 years at the **Research Institute of Tropical Fruit Crops** in Cuba. Her research has been related to the detection and management of bacterial diseases of tropical fruit trees. She has led several research projects on “huanglongbing” disease. She advises the citrus companies across Cuba for detection and management of bacterial diseases. She received a Cuban Academy of Sciences award for her research work on “huanglongbing” disease.



Camilo Paredes is a researcher at the **Research Institute of Tropical Fruit Crops in Cuba**. He graduated in Biology from the University of Havana. His research has been related to the detection and management of bacterial diseases of tropical fruit trees. He has worked on management and epidemiology in several research projects focused on citrus “huanglongbing” disease. He performs citrus health services to the citrus enterprises across Cuba including inspection for identification of symptomatic trees, monitoring psyllid vector populations and molecular detection for verification of the health condition of citrus field plants and propagation materials from citrus nurseries.



Ester Marco-Noales is a biologist, researcher at the **Center for Plant Protection and Biotechnology of the Valencian Institute of Agricultural Research (IVIA) in Valencia (Spain)**, where she leads the research line of phytopathogenic bacteria. For several years she has combined this work with that of associate professor at the University of Valencia, in the area of Microbiology. Throughout her career at IVIA, more than 15 years, she has worked on different bacterial plant diseases of great social and economic relevance. Currently, her main lines of research are focused on the study of both basic aspects of plant bacteria biology and the development of detection methods and control strategies, mainly in three pathosystems: *Erwinia amylovora*, *Xylella fastidiosa* and HLB. She is also responsible for the National Reference Laboratory for phytopathogenic bacteria of the Spanish Ministry of Agriculture.



Raphael Morillon obtained his PhD at the University of Rouen (France) where he investigated the in vivo function of aquaporins, in relation to plant development and salt stress tolerance. He then joined the University of San Diego in California for a postdoctoral stage of 3 years where he investigated the physiological and molecular implication of aquaporins in water deficit tolerance. In 2002, he was hired at **Cirad in Corsica**, as a molecular physiologist to investigate the tolerance of citrus polyploid rootstocks to abiotic stresses. In 2006, he moved to IVIA in Valencia, Spain, with the goal to federate the research activities in citrus at the level of the Mediterranean Basin to develop research projects dedicated to the characterization of the physiological and molecular determinants of salt and water deficit tolerance in citrus polyploid rootstocks. In 2015, he moved to Guadeloupe (French West Indies) to develop research projects on “huanglongbing”. Dr. Morillon has published around 80 articles in journals with impact factor in physiology, molecular biology, genomics and agronomy. He is now back to Montpellier, France and is the head of the Cirad/INRAE citrus team.



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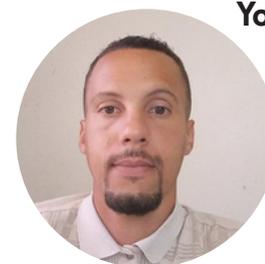
Alejandro Tena is an entomologist at **Instituto Valenciano de Investigaciones Agrarias (IVIA), Spain**. He has a long expertise in Integrated pest management on citrus and has lead several national and international projects on this topic. He has published more than 70 scientific manuscripts, including two manuscripts published in Annual Review of Entomology and one in Proceedings of the National Academy of USA (PNAS). He collaborates as Associate Editor with the scientific journal Pest Management Science, Biological Control, Entomologia Generalis, Bulletin of Entomological Research and Phytoparasitica. During his career, he has also worked as expert on IPM in citrus for the European Food Security Agency (EFSA) and the European and Mediterranean Plant Protection Organization (EPPO). Currently, he is working of several projects to improve the biological control of psyllid that transmit HLB.



César Monzó is a researcher in the Entomology Unit of the **Instituto Valenciano de Investigaciones Agrarias (IVIA), Spain**. He obtained his PhD degree in 2010 investigating conservation biological control (CBC) strategies for the management of Mediterranean fruit fly. In 2010 he moved to the University of Florida (US) and worked for 4 years as a post-doctoral associated in the entomology group led by Prof. Philp A. Stansly. During that time, he developed several research lines aimed at recovering integrated pest management principles in scenarios of high HLB incidence such as that of Florida citrus industry. He evaluated the role that CBC may play on the regulation of *Diaphorina citri* populations, the impact on intensive insecticide programs on CBC services, he developed and evaluated sampling methods and plans for this vector and estimated economic thresholds for *D. citri* management in citrus groves under high HLB incidence. In 2014 he moved back to IVIA where he's been developing further research on CBC strategies in citrus and other perennial crops.



Assunta Bertaccini is a plant pathology professor at the **Alma Mater Studiorum - University of Bologna (UNIBO), Italy**. In more than 40 years of research her major studies have been devoted to plant diseases associated with phytoplasmas and bacteria, focusing on their biology and epidemiology. She has received numerous awards, including the Emmy Klienenberger-Nobel Award for distinguished research in mycoplasma. She is Editor-in-Chief of Phytopathogenic Mollicutes, Senior Editor of Phytopathologia Mediterranea, reviewer of international scientific journals and founder and head of the International Phytoplasma Working Group (IPWG). Chair of COST action FA0807 "Integrated management of phytoplasma epidemics in different crop systems", and she is the coordinator of the TROPICSAFE project.



Youri Uneau is an engineer at the **Association of Producers of Fruit, Agroforestry, Coffee, Cocoa and Vanilla of Guadeloupe (ASSOFWI)**. He obtained a master's degree in Biodiversity of Continental Ecosystems at the University of Bordeaux with a specialization in agro-ecology and resource management at Bordeaux Science Agro High school. His work focuses on the development of organic agriculture and agroforestry through the realization of experiments in experimental stations or at producers' sites. He has worked on several research and development projects on citrus "huanglongbing" disease, concerning disease management and evaluation of new varieties. He provides consultancy and training services to farmers in French overseas departments and territories.