NC STATE UNIVERSITY

Plant Disease Management Workshop: Stevia, in the quest of sweetness… Plant diseases appear!

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INTRODUCTION

Stevia (Stevia rebaudiana [Bertoni] Bertoni) is a specialty crop that constitutes an important alternative for Paraguayan smallholder farmers generating income for more than 30% of rural families. Stevia cultivation has extended through the world increasing its use as a food additive and sweetener. Paraguay is the center of origin of this crop (Fig. 1) with ideal edaphoclimatic conditions positioning itself as the second-largest producer of stevia in the world.

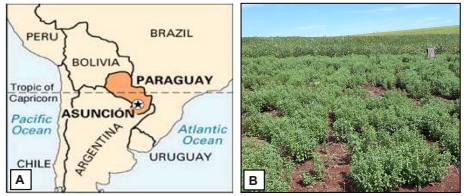

Fig. 1. Stevia production. A) Paraguay, "center of origin" of stevia. B) Smallholder stevia field in Paraguay.

Even though Paraguay has good conditions for stevia production, farmers have difficulties producing crops efficiently and economically. One major constraint is yield losses caused by plant diseases and the inappropriate identification and use of pesticides to control these diseases (Fig. 2).

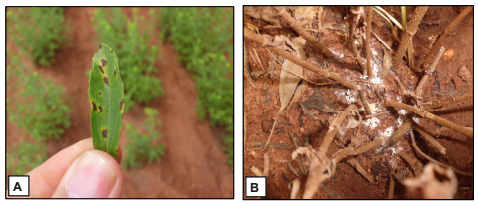

Fig. 2. Stevia Diseases. A) Septoria Leaf Spot Caused by *Septoria steviae*. B) White Root Rot caused by *Sclerotium rolfsii*.

In Paraguay there is not updated information on disease diagnostic and management protocols. Most of the knowledge about disease and crop management is based on empirical knowledge. For this reason, training in the "new" techniques of disease diagnostic and pathogen identification is necessary.

The American Phytopatological Society (APS) provides valuable resources for extension and education such as OIP Global Experience Award which allowed us to carry a workshop aiming to provide hands on experience on diagnostics and management for stevia diseases to Paraguayan farmers, researchers, extension agents and students.

OBJECTIVES

• To update Paraguayan researchers, students about work done by the American Phytopatological Society (APS) and International Society of Plant Pathology (ISPP) and the resources available in the field of Plant Pathology.

• To demonstrate, using as example stevia diseases, diagnostic techniques on plant disease for Paraguayan researchers and students.

• To update Paraguayan researchers, students on new plant diseases management alternatives for stevia diseases.

• To promote Paraguayan researchers, students interest in Plant pathology as science and the interest in stevia research and other crops.

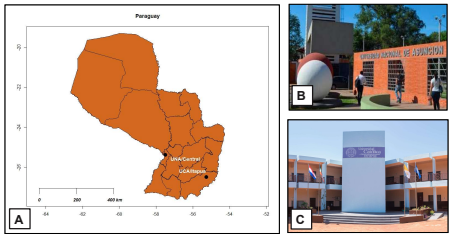

Fig. 3. Workshop's locations. A) Map showing the workshop locations in Paraguay. A) National University of Asuncion, Central, Py. B) Universidad Catolica Nuestra Señora de la Asuncion, Itapua, Py.

OUTLINE OF THE WORKSHOP

The following program was covered in a two-day workshop of 8 hours per day with 2 breaks each.

Day 1

- Introduction to plant pathology and APS and ISPP work
- Stevia research at North Carolina State University
- The need of more information. How to share and ask for data
- General concepts of Plant Pathology

Lunch-break

- Apply case: Plant pathogens of stevia
- Diagnosis and identification of pathogens
- NCSU and APS resources for pathogen identification

Day 2

- "Homemade" microscopes alternatives (smartphone microscopes)
- Molecular tools for plant disease diagnostic
- Plant Disease Management – Current alternatives

Lunch-break

- "Resistant" varieties of stevia
- Qol-fungicides-Current research and regulatory process
- Movement of pathogens
- Solarization Vs. anaerobic soil disinfestation for soilborne pathogens management
- Conclusions and evaluations

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OUTCOMES

Location and number of participants. Two workshops were done, one in the College of Chemistry, National University of Asuncion, Paraguay and the other in the College of Agronomy of "Universidad Catolica Nuestra Señora de la Asuncion", MA, Itapua, Paraguay (Fig. 3). A total of 55 participants attended included extension agents, faculty, public investigators, stevia producers, private consultants and graduate students with a direct interest in diagnostic techniques (Fig. 4). The workshop consisted of presentations and hands on lab practices in which the participants had the chance to learn more about common stevia diseases and techniques for their identification (Fig. 5).

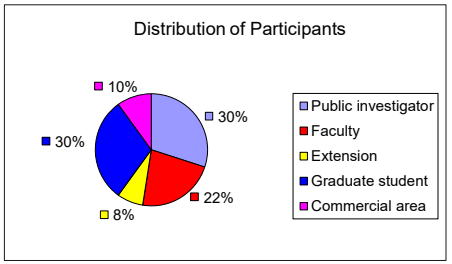

Fig. 4. Distribution of participants. Percentage calculated based on the total number of participants (n=55).

Fig. 5. Plant Disease Management Workshop. A) Laboratory practices on identification of foliar pathogens. B) Participants from National University of Asuncion, Central, Py. C) Demonstration of diagnostics using different microscopes. D) Participants from Universidad Catolica Nuestra Señora de la Asuncion.

ACKNOWLEDGEMENT

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