**Deployment of Rapid Diagnostic Tools for *Phytophthora* on Horticultural Crops in Central America**

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**Abstract**

Plant disease is a limiting factor in agricultural production in Latin America. Plant pathogens cause losses estimated to be as high as $30 billion per year. The risk of introduction of *Phytophthora* species with trade requires continued monitoring and improved diagnostic capabilities. Our objective is to deploy a platform of tools needed to detect, identify, and ultimately prevent spread of species of *Phytophthora* with a major focus on common and high threat species of *Phytophthora* on horticultural crops in Latin America. We will deploy a series of technologies including: a *Phytophthora* diagnostics workshop, a protocols book, a Lucid key, molecular and digital diagnostic identification systems to identify *Phytophthora* species and improve the diagnostic capabilities for important plant disease clinics in the region. The accurate identification of *Phytophthora* has important implications for growers in Latin America and the US and will result in the expansion of the Latin American *Phytophthora* Diagnostic Network (LAPDN).

**Project Summary**

Over the course of this project, a protocols book and a *Phytophthora* Lucid key have been developed to aid in the identification of unknown *Phytophthora* species. These tools were provided to students at the first *Phytophthora* diagnostics workshop held in San Jose, Costa Rica in 2010. The Latin American *Phytophthora* Diagnostic Network was also established at this workshop, providing a way for diagnosticians in Latin America to collaborate and communicate. Since then, the protocols book has been revised and a second workshop was held from September 29 to October 4, 2013 at Zamorano University in Honduras. The first workshop was attend by 25 diagnosticians from 9 countries (Mexico, El Salvador, Honduras, Guatemala, Nicaragua, Costa Rica, Panana, Peru and Chile) and the second was attended by 21 diagnosticians from six countries (Honduras, Mexico, Guatemala, Nicaragua, Costa Rica, and Chile). Over the course of the workshop, students were introduced to morphological characters and were taught how to isolate *Phytophthora* from collected samples. In addition, students were taught a number of "rapid" technologies, including PCR, Lucid Keys, and immunoassay tests for use in the identification of species of *Phytophthora*. Students used these technologies in order to identify an unknown culture provided at the beginning of the workshop. Students were also introduced to online tools, such as the NCSU Plant Disease and Insect Clinic and the *Phytophthora* Database to assist in future identification efforts. In addition, students were introduced to the Latin American *Phytophthora* Diagnostic Network, allowing for an expansion of the community and connecting regional diagnosticians with each other. Each student was provided with a copy of the protocols book for use in their own institutions.

**Future Directions**

With the rapid diagnostic tools for *Phytophthora* identification in place and the LAPDN established, we plan to expand the scope of the project and bring these tools to other regions with a need for increased diagnostic capabilities. In particular, we plan to hold future workshops in Africa and Southeast Asia. At these workshops, students would be introduced to the tools and methods developed from this project, and networks similar to the LAPDN would be established. This workshop would in turn facilitate the development of a sustainable production system through the expansion of local scientific and technical capacity and increased disease awareness in the targeted regions.

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