Asian Soybean Rust Monitoring Program Pays Off in 2007 with First Detections in Canada

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A collaboration between Agriculture and Agri-Food Canada (AAFC), the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), and the Ontario Soybean Growers (OSG).

Introduction

- The establishment of Asian soybean rust (Phakopsora pachyrhizi) in the United States poses a significant risk to Ontario and Canadian soybean production.
- Efforts to monitor movement of soybean rust into Canada continued in 2007.
- Intensive monitoring for the disease in the field was expanded with the incorporation of DNA-based screening techniques and the deployment of airborne-spore detection equipment.

Field Scouting – Methods and Results

- On October 16, 2007, fifty soybean leaves were collected randomly from plots on the University of Guelph Ridgetown Campus in Ridgetown, Ontario, Canada.
- The collected leaves were incubated and examined on October 18, 2007.
- DNA extracted from the small piece of leaf including the pustule tested positive using the real-time PCR assay. DNA sequencing of the qPCR reaction confirmed the positive as Phakopsora pachyrhizi.
- Computer prediction and trajectory models indicated a high probability of soybean rust spore movement into Ontario during late September from the heavily infected fields in the region centered on Arkansas (Fig. 4).
- Allowing for a 2-3 week window for rust development to occur after deposition of the spores, the timing between the predicted spore trajectories and the date the infected leaf was found is reasonable.

Summary

- In 2007, the first Canadian molecular detection of soybean rust spores occurred for rainfall and air samples from collectors deployed at sites in Canada.
- The most noticeable events occurred in mid-July, mid-to late August and late October, when samples from multiple sites per week tested positive.
- In October 2007, the first Canadian infected soybean plant was found at Ridgetown in southwestern Ontario.
- These time periods corresponded to a series of storm front events that suggested long distance transport of the spores was possible.
- Soybean rust DNA concentrations of the positive samples were low, as expected given how far the spores needed to travel on air currents from infected crops on the ground in the mid- to southern US; not all positive results were reproduced in subsequent qPCR verification tests and not all collectors gave positive results in a given week for sites with multiple collectors.

Acknowledgements: We wish to thank Charlie Barnes and Les Szabo (USDA-ARS, University of Minnesota) for their help during the implementation of the Canadian molecular soybean rust screening program: JB collector design information, real-time PCR protocols, and advice.

Funding for the implementation of molecular screening of spore traps was provided primarily by the AAFC Pest Management Centre and supported by the OSG through the Canada-Ontario Research and Development (CORD) Program administered by the Agricultural Adaptation Council (AAC) and the Ontario Soybean Rust Coalition.