NPDN and the Purdue Plant and Pest Diagnostic Lab: Partners in Protecting Indiana Agriculture

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Abstract
Forest trees and soybeans are two major Indiana agricultural commodities, both of which are threatened by pathogens with potentially devastating economic impacts. Diagnosticians at the Purdue Plant and Pest Diagnostic Lab (P&PDL) have used National Plant Diagnostic Network (NPDN) resources to improve diagnostic capabilities and increase first detector preparedness. The P&PDL utilized NPDN resources to educate Indiana residents on *Phytophthora ramorum,* the causal agent of Sudden Oak Death (SOD) and Asian soybean rust, caused by *Phakopsora pachyrhizi*. We developed web pages and training materials and provided first detector training. More than 1000 growers and others were registered as NPDN soybean rust first detectors. Through NPDN, Purdue diagnosticians received training and purchased equipment to increase molecular diagnostic capabilities. Indiana state and regulatory personnel in conjunction with P&PDL diagnosticians and extension specialists participated in a NPDN soybean rust exercise simulating the first find of soybean rust in Indiana. These efforts were successfully put to the test when *Phytophthora ramorum* and *Phakopsora pachyrhizi* were detected for the first time in Indiana in 2006.

Soybean Rust and SOD Training Sessions

Over 1000 agricultural professionals (including operators on at least 3.1 million of the 5 million acres of soybeans in Indiana) received NPDN First Detector and expanded awareness soybean rust training through twelve meetings and hands-on training workshops held in 2005. The programs were designed to assist Indiana producers in developing a response plan for soybean rust as well as to train and register participants as NPDN Soybean Rust First Detectors. Attendees were placed on an e-mail list to receive soybean rust update information.

NPDN First Detector Educator Training focusing on *P. ramorum* and soybean rust was provided through an IP video conference delivered to 17 county sites. Four CCH credits were granted to county extension staff who participated in this innovative training session.

In 2004, PRED (*Phytophthora ramorum* Educate to Detect) training was provided to the Indiana SOD Task Force, which included representatives from regulatory branches (IDNR, APHIS/USDA), and Purdue University scientists. NPDN funds paid for the duplication of training materials, including a customized Indiana PRED CD developed by the P&PDL.

Training Materials

Pictorial Guides for Disease Identification:

P&PDL diagnosticians developed pictorial guides for identification of these two plant diseases, which were distributed to growers, applicators, extension educators, agricultural service professionals, master gardeners and others.

The guides, which included sample submission protocols, were also posted on the P&PDL website.

Sudden Oak Death and Asian Soybean Rust Web Pages:

SOD and ASBR web pages were created on the P&PDL site to provide up-to-date information to stakeholders. Prominent links to NPDN and USDA- APHIS-PPQ information were included. The sites feature topics including host plants, training opportunities, and control options as well as fact sheets, links, and news articles related to the two important diseases. Since their inception, these two P&PDL web pages have received over 27,000 hits.

Molecular Diagnostics

Purdue Plant and Pest Diagnostic Lab diagnosticians participated in several national and regional training sessions in 2004-2006 coordinated by NPDN and USDA-APHIS. Diagnosticians learned PCR techniques for detecting Asian soybean rust and *Phytophthora ramorum*. Funds from NPDN as well as the USDA-APHIS Cooperative Agriculture Pest Survey (CAPS) program were used to purchase equipment and supplies needed for PCR detection, and by 2005 a separate laboratory room was established for PCR procedures in support of P&PDL diagnostic activities.

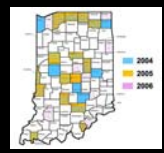
P&PDL Diagnosticians at NCPDN PCR workshop at Michigan State in 2005

Purdue Plant and Pest Diagnostic Lab PCR room

Monitoring for SBR and SOD in Indiana

The P&PDL, with NPDN support, participated in the Indiana soybean rust sentinel plot program in 2005 and 2006. Samples were shipped to the P&PDL, and data was entered in the clinic database (PDIS) as well as in the PIPE database. Monitoring for *P. ramorum* in Indiana was accomplished through participation in the *P. ramorum* National Nursery Survey.

2006 Indiana Sentinel Plots



Nurseries surveyed for *P. ramorum*

NPDN Soybean Rust Detection Scenario Exercise

In March 2005, team members along with Indiana regulatory personnel participated in a soybean rust detection exercise organized by the National Plant Diagnostic Network. A photograph served as a suspect sample. Movement of the sample from grower, to the Plant & Pest Diagnostic Lab, to USDA-APHIS specialists for rust confirmation was tracked through the NPDN Scenario Exercise website. Communications about the potential sample and confirming diagnosis with state regulatory officials were also tracked on the website. The exercise prepared all concerned parties for the proper sample and communication pathways

2006 - Preparations Pay Off

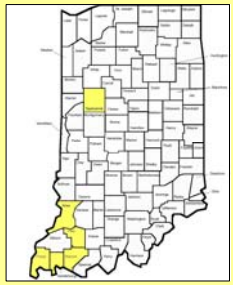
Phytophthora ramorum detected for the first time in Indiana

In 2006, P&PDL diagnosticians were called to put their NPDN training into practice. In July, a viburnum sample taken as part of a trace-forward survey from a retail establishment in Portage, IN was found to be infected with *Phytophthora ramorum*. The sample was diagnosed rapidly using NPDN SOD protocols. Communications of the positive test results occurred in a secure and timely manner. NPDN resources helped produce educational materials that were distributed through the extension educator in the affected county. The public was encouraged through local news releases to send suspect samples to the P&PDL. Testing fees were covered by NPDN funds and all samples submitted tested negative.

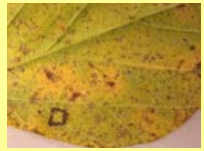
2006 Indiana *P. ramorum* detection

First Detection of Asian Soybean Rust in Indiana

After soybean rust was found in Kentucky in October 2006, Indiana county educators were asked to send any green soybean leaves they could find to the P&PDL for examination. Soybean harvest was well underway at the time, and the sentinel plots had been disbanded. Leaves from 6 IN counties were found to be infected, with very few (1 to 30) pustules per leaf. The samples were diagnosed rapidly using NPDN SBR protocols This is the northernmost report of the disease in the US thus far.



2006 Indiana Asian Soybean rust detections



Single rust pustule on leaf from Knox County, IN