Indiana Prepares for Asian Soybean Rust

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Education and Outreach

Training Sessions
Approximately 1,400 individuals (including operators on at least 3.1 million acres of soybeans in Indiana) received training through various educational resources. The concept that soybean rust is manageable was a key component of these sessions. The Purdue University Extension Service, the Purdue University National Soybean Network, and the Indiana Soybean Board invited soybean growers to participate in 3 workshops in March 2005, and Purdue University, the University of Iowa, and the University of Illinois distributed soybean rust training materials to growers. These workshops included training on disease diagnosis, information about management of rust with tiller fungicides, and soybean response to rust. Purdue University invited Dr. Robert Klein from the University of Nebraska to present information and demonstrations on fungicide application technology. These workshops enabled growers to learn about Asian soybean rust, and to identify and correct rust symptoms.

Sentinel Plots:
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Training was also provided to growers and consultants through a program entitled "Soybean Rust First Detector and Management Program," which offered training at different locations. This inclusive program covered scouting, disease identification and control measures, was sponsored jointly by Purdue University and the Indiana Soybean Board, and was held in May 2005. Sentinel plots were established in cooperation with soybean rust expert Greg Shaner at ACRE. Thelegumes were planted for two purposes, first to determine if they were hosts for the pathogen (all except alfalfa are reported to be), and second to determine if the fungus could survive on the plant leaves that retained leaves over the winter. This year was the establishment year for these sentinel plots, and consequently they were not inspected for rust. The sentinel plots were inspected regularly to obtain data on rust.

In addition to sentinel plots at the Purdue agricultural centers, plots were established elsewhere around the state and shared by county extension educators and other cooperators. Some of these plots included special plantings; others were simply demarcated areas in a grower's field. In all cases, an attempt was made to establish plots with a planting date somewhat ahead of the typical range for Indiana (often difficult because many farmers now plant early). In some cases, the first planting was lost to frost and the test plot was replanted. The farmers associated with these plots identified soybean rust early in the season, which allowed for early action and reduced the spread of rust.

Based on our experience this year, there may be no need to plant soybean sentinel plots earlier than the main crop. Early planting can increase the risk of rust development, and the risk of frost damage. It seems unlikely that rust will reach the Midwest early in the season; so planting in late April or early May should work well. For detection of rust late in the season, a second planting of a susceptible soybean variety should be considered.

The Purdue Plant and Pest Diagnostic Laboratory was chosen as one of three laboratories in the North Central Region to offer real-time PCR analysis to identify the pathogen. Laboratory personnel participated in two training sessions sponsored by NPDN and conducted at the USDA-APHIS facilities in Beltsville and Ft. Detrick, MD. The USDA-APHIS Cooperative Agriculture Pest Survey (CAPS) program provided funds to purchase a Cepheid Smartcycler, and a separate laboratory room was set up for real-time PCR procedures.

The visiting scientists emphasized the importance of providing unified information about soybean rust to growers as quickly as possible, establishing a grower warning network based on soybean rust sentinel plot data, and encouraging team members to visit Brazil and view soybean rust before it became established in the U.S. Throughout their presentations they consistently echoed the idea that "knowledge is power, especially when it comes to controlling a serious new soybean disease.

Publications:
In response to the threat of Asian soybean rust, Purdue University, in collaboration with the Indiana Soybean Board, developed Extension Publication ID-324, "Preparing for Asian Soybean Rust." This all-inclusive publication provides detailed information on diagnosis, sample submission, pathogen biology, management, and economic implications. Over 20,000 copies of the ID-324 were distributed by the Purdue Ag Extension Network, to growers, consultants, educators, and related service professionals.

Asian Soybean Rust Web Page:
An Asian soybean rust Web page was added to the Plant & Pest Diagnostic Lab website in November 2004. This page was developed to provide current information about Asian soybean rust and its potential impact on Indiana and the U.S. Information includes updates on new regulations, diagnostics, and other topics including pest facts for Asian soybean rust, sentinel plots, and other information.

International soybean rust Researchers provide vital insight and visual resources:
Many soybean rust research efforts have been focused on Brazil in order to share their knowledge about soybean rust management. Indiana is included as one of the cooperating states in the "Cultures Guide to Tungroves, " a publication developed by Brazil soybean rust researchers, which is available for download on the website. Since the inception, the P&PDL Asian Soybean rust page has received over 11,000 hits.

Incubation of leaves in laboratory

Soybean Rust Sample Packaging

The Asian Soybean Rust Team:
Purdue Agronomy Dept: Shawn Conley, Ellsworth Christmas, Corey Gerber
Purdue Botany & Plant Pathology Dept: Gregory Shaner, Dan Egel, Andreas Westphal, Scott Abney, Karen Rane, Gail Ruhl, Fred Whittford, Ray Martyn, Amy Deitrich
Purdue Agriculture Economics Dept: Corrine Alexander, Craig Dobbins, Chris Hurt, George Patrick
Purdue Agriculture Communications Dept: Steven Leech, Kevin Smith, Russ Merzdorf
Indiana Soybean Board: Chris Novak, Jonathan Whitelaw

Asian Soybean Rust Sample Submission:
Samples submitted to the P&PDL by Indiana soybean growers, crop consultants or other agricultural service providers. Suggested samples were soybean leaf tissue. A form was developed to distinguish these submitters from other sample submitters admitted to the laboratory. Samples were submitted for symptomatic visual signs of Asian soybean rust on soybean tissue that was incubated under moist conditions for 2-4 weeks. The tissue was placed in a desiccator and then frozen at -20°C for 24 hours. The tissue was discarded if the rust was not observed. The tissue was then subjected to PCR testing, and the pathogen was identified on the tissue.

Sample goals were submitted to the laboratory for Asian soybean rust detection, and all samples were negative for soybean rust. No soybean rust disease detected on these samples were reported to the P&PDL Asian Soybean Rust page.

NPDN Soybean Rust Detection Scenario Exercise:
In March 2005, workshop members along with Indiana regulatory personnel participated in a soybean rust detection exercise organized by the National Plant Diagnostic Network. A scenario was developed on a validated disease model for rust on soybean leaves in the U.S. The scenario was divided into several parts, including a discussion of potential sites and cooperators for the scenario. Each scenario is marked as an opportunity to improve the efficiency of disease monitoring and detection in Indiana.

Background photo by Scott Bauer, ARS/USDA