Journal of Extension
www.joe.org

August 2009
Volume 47 Number 4
Article Number 4IAW7

Return to Current Issue

Developing an Innovative Team Approach to Address a Newly Introduced Disease of Soybeans in the United States

Edward J. Sikora
Professor and Extension Plant Pathologist
sikorej@auburn.edu

Dennis P. Delaney
Extension Agronomist
ddelaney@aces.edu

Mary A. Delaney
Research Epidemiologist
delanma@auburn.edu

Auburn University
Auburn, Alabama

Abstract: Asian soybean rust (ASR) was first detected in the continental United States in 2004. In response to this threat the Alabama Cooperative Extension System Field Crops Team developed an innovative approach to minimize losses from this new disease. The approach combined standard Extension methods with a statewide disease monitoring system combined with a national Web-based information network. The system allowed growers to apply fungicides only when necessary to prevent losses from ASR. In 2006 it was estimated that the program saved soybean farmers in Alabama over $2.5 million in fungicide costs. The program resulted in similar cost savings in 2007.

Responding to an Invasion

Alexander Graham Bell once said, "Before anything else, preparation is the key to success." This idea was put into action by the Alabama Cooperative Extension System (ACES) Field Crops Team in anticipation of the introduction of a new disease of soybean into the continental United States. Team leaders realized that growers and educators would need to be prepared for this invasion and that an innovative, multifaceted team approach would be successful in minimizing losses from this pathogen.

Potential Impact of Asian Soybean Rust (ASR)

Asian soybean rust (ASR) was first detected in the continental United States in 2004 (Schneider, Hollier, & Whitam, 2005). The disease, caused by the fungus *Phakopsora pachyrhizi*, was responsible for significant yield losses to soybeans in Asia and South America (Bromfield, 1980; Dorrance, Draper, & Hershman, 2005;

Kuchler, Duffy, Shrum, & Dowler, 1984). The disease has become established in the southeastern United States by surviving the winter on kudzu then spreading northward on soybeans as the growing season progresses (Sikora & Hershman, 2007). A conservative prediction indicated that once ASR was established in the U.S. it would result in yield losses greater than 10% in U.S. soybean growing areas, with losses up to 50% in the southeast (Yang, 1995).

Implementing a Comprehensive Program to Prepare for ASR

Because ASR was found at the end of the growing season in 2004, there was time for the ACES Field Crops team to develop educational programs for producers as well as install a statewide monitoring system to act as an early warning for farmers in 2005. The approach used involved standard Extension methods such as grower meetings, development of educational materials, farm visits, and direct mailings. However, the team also incorporated a statewide disease monitoring system that combined with a National Web-based information network, as well as grower-friendly telephone disease hotline. This system allows growers to apply fungicides only when necessary to prevent yield loss due to ASR. The educational/monitoring efforts included the following.

1. More than 30 soybean production meetings were held between 2005 and 2007. These were organized by Regional Extension Agents (REA's) and emphasized identification and management of ASR.

2. Programs were conducted for "first detectors" who would be responsible for identifying the disease when it was initially found in the state; a system similar to that described for Iowa (Robertson & Tylka, 2007).

3. Direct mailings to members of the Alabama Soybean Growers Association provided them with educational materials pertaining to ASR.

4. The Auburn University Soybean Rust Hotline (1-800-446-0388) was initiated by the Extension Plant Pathologist. The hotline is updated weekly during the growing season and provides timely information on ASR in Alabama and the southeast allowing growers to make informed management decisions.

5. An Extension publication was developed entitled *Asian Soybean Rust in Alabama*. The publication was distributed to all county offices and is also available on the Web <http://www.aces.edu/pubs/docs/A/ANR-1310/ANR-1310.pdf>.

6. A sentinel plot network for early detection of ASR with support of the USDA National Soybean Rust Sentinel and Monitoring Network and the Alabama Soybean Board was established. Approximately 20 soybean sentinel plots were maintained on Auburn University Research Stations or in fields of cooperating growers each year. These plots were a minimum of 50 x 50 ft in size and planted approximately 2 weeks prior to the standard planting date for that area. Sentinel plots were scouted weekly by REA's, Extension specialists or other trained scouts, and leaf samples collected from each plot were express mailed to the Auburn University Plant Diagnostic Laboratory for examination for

ASR.

7. Fifteen kudzu sentinel patches were sampled weekly. In addition, sampling of random kudzu patches and commercial soybean fields were conducted to expand the monitoring network. Sampling of kudzu continued year-round because identifying the location of ASR-overwintering sites is important to determine the inoculum-potential for the upcoming year. This survey allowed us to determine that ASR can survive in urban areas much farther north then initially expected (Sikora & Hershman, 2007).

8. Updating of all monitoring information on the USDA Pest Information Platform for Extension (PIPE) Web site kept growers across the U.S. informed of ASR's movement.

9. Syngenta Syntinel™ Spore traps were monitored weekly during the growing season. These custom-designed traps can help determine when ASR scouting should intensify in an area.

Economic Impact of the Education and Monitoring Program

Because of our educational efforts and intense monitoring program, we were able to inform growers that fungicide applications in the majority of counties in Alabama were not justified to control ASR in either year due to extreme drought.

Because of this comprehensive approach at education and monitoring, few fungicide applications were made in Alabama in 2006 or 2007. We estimate that less then 10% of the soybean acres were sprayed, resulting in a grower savings of over $2.5 million in fungicide costs. An even greater impact was felt nationally as growers in the Midwest with much larger soybean acreages tracked the national monitoring effort for the disease and also did not spray fungicides unnecessarily. During 2005 and 2006, it is estimated that North American soybean producers may have saved as much as $600 million by not making unnecessary fungicide applications for ASR (Sikora & Hershman, 2007). The key is that growers had the information to make the decision not to spray. Lack of this information, or dissemination of inaccurate information, could have led to millions of soybeans acres to be sprayed unnecessarily in North America (Sikora & Hershman, 2007).

References

Bromfield, K. R. (1980). Soybean rust: some considerations relevant to threat analysis. *Prot. Ecology.* 2:251-257.

Dorrance, A. E., Draper, M. A., & Hershman, D. E., eds. (2005*). Using foliar fungicides to manage soybean rust.* NC-504 Land Grant Universities Cooperating. Bulletin SR-2005.

Kuchler, F., Duffy, M., Shrum, R. D., & Dowler, W. M. (1984). Potential economic consequences of the entry of an exotic fungal pest: the case of soybean rust. *Phytopathology* 74:916-920.

Robertson, A., & Tylka, G. L. (2007). Building the "rust fast track system" for identifying Asian soybean rust in Iowa. *Journal of Extension* [On-line], 45(3) Article 3IAW7. Available at: http://www.joe.org/joe/2007june/iw7.php

Schneider, R. W., Hollier, C. A., & Whitam, H. K. 2005. First report of soybean rust caused by Phakopsora pachyrhizi in the continental United States. *Plant Disease* 89:774.

Sikora, E., & D. Hershman. (2007). Soybean rust in review: 2004-2007. In Dorrance, A., D. Hershman, & M. Draper (Eds), *Using foliar fungicides to manage soybean rust*. Retrieved August 13, 2009 from: http://oardc.osu.edu/soyrust/

Yang, X. B. (1995). Assessment and management of the risk of soybean rust. In J. B. Sinclair & G. L. Hartman (Eds., *Proceeding of the soybean rust workshop, 9-11 August 1995.* National Soybean Research Laboratory, Urbana, IL
