2009 Soybean Rust Monitoring in Mississippi
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ABSTRACT
Since the initial detection of soybean rust (SBR) in the continental United States in November 2004, SBR has been identified in 20 states. Shortly after the detection of the disease in the U.S., SBR was detected in Mississippi in December 2004. Since that time SBR has been detected in an ever increasing number of counties each year, and in 2009 was detected in all 82 counties in MS. As opposed to previous years when SBR was typically detected first in a southern county, in 2009 SBR was first detected in the Delta, where historically was the earliest detection of SBR in the Delta. Weather conditions throughout the last half of the growing season were conducive for SBR development and paired with a later soybean crop meant that SBR was widespread and in some cases infection resulted in a yield loss. This is the first year for a yield loss to be reported from MS that could be specifically attributed to SBR. In addition to weekly monitoring of the 22 planted soybean sentinel plots, 26 unique kudzu patches and 443 production soybean fields were scouted throughout the growing season in an effort to detect the disease and make the best management suggestions. Timely fungicide suggestions to producers were broadly disseminated with the aid of the soybean rust hotline, newsprint, radio, and television interviews.

PHYSICAL SCOUTING
On a weekly basis, 22 planted soybean sentinel plots located throughout the state were scouted to determine if SBR was present in MS (Figure 1). In addition to sentinel plots, production soybean fields, coral bean sites, and kudzu sites throughout the state were also scouted during the soybean growing season (n=1,136 total, unique locations). SBR was first detected on August 6 in Holmes County, MS on the southeastern edge of the Delta where greater than 70% of the soybeans are planted. This marked the first time that SBR had been detected in the Delta prior to any other region in the state. Following the initial detection of SBR intense scouting continued in the Delta and the remainder of the state until the first week of October. As a whole, the soybean crop was later planted in 2009 and there were numerous regions of the state with a larger variation in soybean growth stages during August and September. Scouting continued in those regions to provide important information on the presence and severity of SBR for local producers. 2009 marked the first year that every county in MS recorded a positive SBR find. Historically speaking, 79 counties were positive in 2008 and 26 counties had a positive SBR detection in 2007. Field scouting was conducted with a 20-30 hand lens. Additionally, a stereoscope accompanied scouts on scouting trips to validate immediate morphological diagnoses. In some rare cases, suspect leaf samples were placed in plastic bags and incubated for 24-36 hours to determine if SBR was in fact present on the underside of leaves. ELISA test kits were used for the initial positive sample in August and not relied on for the remainder of the season.

In the past, intense scouting has normally ceased at the end of the soybean growing season. However, since MS is home to some 250,000 acres of kudzu in 80 out of 82 counties, kudzu became the main focus of scouting in October and November. Over 200 unique kudzu sites were observed for the presence of SBR. Ideally this information will help us more carefully scout those kudzu sites with a known history of SBR but will also allow us to determine the different reactions that kudzu has to infection from the fungus throughout the state.

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PRODUCER SUGGESTIONS/TRAINING
In 2006 a soybean rust phone hotline (1-866-641-1847) was created to serve soybean producers in Arkansas, Louisiana, and Mississippi with the support of the Mississippi Soybean Promotion Board and BASF. The hotline was created to provide producers with first hand, timely information updates on the distribution of SBR in AR, LA, and MS as well as surrounding states. In 2009 the hotline was again used to disseminate specific fungicide suggestions to producers throughout the region. In addition to the hotline, information was disseminated using a weekly recorded radio program (by the Mississippi Network), newspapers, television interviews, the Mississippi Crop Situation Update (a weekly newsletter created and disseminated by extension personnel), and a weekly or as needed email distribution list. In 2009, the total number of calls was significantly reduced from previous years but this is believed to be due to the other media outlets and overall widespread nature of the disease at an earlier time period than what has been observed over the past 4 years (data not presented). As the soybean crop moved towards maturity throughout the majority of MS, in August and September, a greater number of calls were placed to the hotline (Figure 2). The number of specific calls from each state/region have not yet been determined for 2009. In addition to making weekly updates for statewide producers there were numerous one-on-one trainings that were conducted at the field level with consultants, distributors as well as producers to make them aware of the presence of the disease. In addition, one large scale training was conducted in Noxubee County in mid-September. Over 40 individuals attended the training to learn the symptoms involved with soybean rust in a heavily infected soybean field. The particular location in this county had several fields in the vicinity that suffered what could be considered severe yield loss (between 15 and 25% reduction in yield calculated on a bushel/Acre basis) due to early SBR infection. In one case where a field did not receive a preventative R3/R4 fungicide application the producer suffered 25% yield loss compared to his neighbor that applied a fungicide at R4 (see Figure 3B & 3F).

Figure 1. Map of the 2009 Mississippi soybean rust scouting effort. Map presents the unique locations, either kudzu (n = 675), production soybean fields (n = 454), coral bean (n = 7), as well as planted soybean sentinel plots (n = 22) that were scouted throughout the growing season. Additionally the map presents those counties that tested positive for rust, whether on soybean or kudzu. Note, unique locations were likely scouted on more than one occasion. Some of the kudzu locations will continue to be scouted throughout the winter months.

Figure 2. Composite number of calls placed to the soybean rust hotline during a four month period of the 2009 growing season. The hotline provides information for Arkansas, Louisiana, and Mississippi soybean producers throughout the growing season. Updates to the hotline content occurred almost weekly or as needed when additional information was deemed necessary for producers to make sound, informed management decisions.

Figure 3. Highlights of the 2009 MS soybean rust scouting team’s efforts: (A) Wilkinson county kudzu patch extending skyward above a deep ravine; (B) discussing potential treatment options in a heavily infected soybean field in Noxubee County; (C) SBR scouting continues on kudzu, especially in those locations where green leaves can be protected from the elements as seen on this windy farm in the Appling county kudzu region; (D) heavily infected kudzu leaves as seen in a large kudzu site in DeSoto County, MS in late October 2009; (E) protecting a sentinel plot from deer can sometimes mean extremes need to be taken; (F) aerial image of a heavily SBR-infected soybean field in Noxubee County, MS in September; and (G) volunteer soybeans infected with SBR in November 2009.