Summary
of
Technical Science Working Group
on
Soybean Rust (SBR) – Teleconference #4
Held on May 1, 2003

A. Purpose of Working Group
B. SBR Recognized as Homeland Security Issue by USDA
C. Status of SBR in Africa and South America
D. Detection and Surveillance
E. Epidemiology and U.S. Impact
F. Experiences with SBR in Brazil and Paraguay
G. SBR Section 18 Development and Progress

Web resources on soybean rust:
APHIS SBR site and strategic plan - http://www.aphis.usda.gov/ppq/ep/soybean_rust/
ARS SBR news - http://www.ars.usda.gov/is/pr/2002/020627.htm
Florida SBR Pest Alert - http://www.doacs.state.fl.us/%7Epi/enpp/pathology/soybeanrust.html
Illinois facts about SBR - http://www.ag.uiuc.edu/cespubs/pest/articles/200213k.html
IPM Centers SBR website (past Working Group meeting summaries, membership, action plan, SBR fungicide efficacy trials, and useful links) - http://www.ipmcenters.org/NewsAlerts/soybeanrust/
NC504 SBR Committee - http://www.lgu.umd.edu/project/home.cfm?trackID=3154
Ohio SBR facts - http://ohioline.osu.edu/ac-fact/0048.html
United Soybean Board SBR guide – http://www.unitedsoybean.org/
Working Group on SBR website - http://www.ipmcenters.org/NewsAlerts/soybeanrust/

A. Purpose of Working Group – presented by Kent Smith, OPMP, Washington, DC

The basic purpose of this working group is to enhance communication between state and federal scientists concerning soybean rust. Specifically, we hope to better prepare state departments of agriculture and extension specialists to deal with soybean rust given that they will make the recommendations to growers concerning this disease when it arrives in the continental U.S.

B. SBR Recognized as Homeland Security Issue by USDA – presented by Jeremy Stump, Acting Director for Office of Homeland Security at USDA, Washington, DC

USDA considers soybean rust a serious threat to American Agriculture that may affect homeland security. Following 9/11, it is especially important that we consider the threat to our security that exotic plant diseases, such as soybean rust, may pose. While entry of this disease may be natural via air-blown spores, the intentional or unintentional artificial entry of this pathogen into the continental U.S. must be considered and prevented whenever possible. The Office of Homeland Security at USDA stands ready to assist this Working Group in preparing for the arrival of SBR.

C. Status of SBR in Africa and South America – presented by Morris Bonde, ARS, Ft. Detrick, Maryland

SBR is now in all soybean areas of Africa, but it is controlled by the use of fungicides. Unusually hot, dry weather has further reduced the impact of SBR this past season.

In South America SBR is known to exist in Argentina, Paraguay, and Brazil. Recent reports from Argentina indicate that this disease is not currently in the main soybean growing areas. It is reported to be only in test plots in the extreme north.

In Brazil, SBR is now in 95 to 99 % of the soybean acreage. The season was generally dry and hot, but did end up with some warm, wet weather, which promoted SBR. Losses this season are estimated to be as high as $400 million dollars. This was after the application of fungicides that have cost an estimated $540 million dollars.

D. Detection and Surveillance

a) In Florida – presented by Shabbir Rizvi & Tim Schubert, Florida Department of Agriculture, Gainesville

The Florida Department of Agriculture has collaborated with XB Yang of Iowa State University on the detection and surveillance for SBR in Florida in order to minimize the potential impact of this disease on soybean growers. They have divided the state of Florida into four ecological zones involving 25 plots of soybeans and kudzu.

Zone 1 is located on the southern tip of Florida. It includes five sites, two in commercial soybean fields and three in kudzu plantings. Soybeans are present here but not in significant acreage, while kudzu is common and capable of staying green year-round, therefore it is an excellent overwintering host for SBR. Zone 2, containing 11 sites, is located in Central Florida. No soybeans are grown here, so all the sites are sentinel sites of kudzu. Zone 3, with 3 sentinel sites of kudzu, is located in Northern Florida. In order to precede soybean production, only kudzu was used here, although additional soybean sites may be added as the season progresses. Finally, zone 4 contains 5 sentinel kudzu sites in the Panhandle of Florida.

The survey was started in February of 2003. Sentinel plots have been visited every 2-3 weeks, inspected visually, and samples of suspected disease have been returned to the lab. Thus far, no signs or symptoms of SBR have been discovered. Other diseases have been noted, including Pseudocercospora leaf spot and bacterial leaf spot of kudzu, and bacterial pustule and Septoria leaf spot of soybeans. Herbicide injury of kudzu is sometimes observed.

b) In United States – presented by XB Yang, Iowa State University, Ames

XB is leading a project to enhance detection and surveillance for SBR in the United States. He is cooperating with scientists in Florida, Louisiana, Alabama, Tennessee and others. Before the soybean season starts, he follows the progression of kudzu and roadside clovers in the Southeast U.S. for possible detections of SBR. Kudzu may stay green is the southern tip of Florida, starts growing in late

February or March in Central Florida, and early April in Louisiana and other Gulf states. In early May, kudzu is actively growing in Tennessee.

c) Function of National Plant Diagnostic Network (NPDN) – presented by Kitty Cardwell, USDA/CSREES, Washington, DC

The National Plant Diagnostic Network is being developed with Homeland Security money to enhance our ability to rapidly and accurately respond to plant disease occurrences. When presumptive identifications are made of SBR or any plant pathogen in the field it is important to send that sample as quickly as possible to the nearest NPDN laboratory and not to unnecessarily alarm the public by talking about the sample before a diagnosis is rendered and confirmed.

On April 30, 2003, Reid Frederick and Mary Palm conducted an APHIS-funded training session of "Train the Trainers." The identification and biology of SBR were the focus of this training opportunity held at Ft. Detrick, Maryland. Ten participants from the NPDN hubs and related diagnostic clinics were able to observe SBR in the containment facility on site, observe spores of *Phakopsora pachyrhizi* and *P. meibomiae* microscopically, and see a demonstration of the real-time PCR test for rapid species identification of the SBR pathogens. The PCR tests for SBR are currently being validated by APHIS.

E. Epidemiology and U.S. Impact – presented by XB Yang, Iowa State University, Ames

Other activities of XB's group at Iowa State involve developing a better understanding of the air dispersal of SBR pathogen spores and the infrared detection or remote sensing of SBR. He does not expect direct movement of spores of *Phakopsora pachyrhizi*, the causative agent of SBR, from South America to the U.S. due to the movement of equatorial winds from east to west rather than south to north. A much more likely scenario, is progressive movement of *P. pachyrhizi*, over the Central American land bridge with eventual arrival in Texas or some other southern state. Movement via hurricane activity from Africa or South America to the U.S. seems unlikely considering the presence of *P. meibomiae* in the Caribbean, from where it has not moved to the U.S. mainland in the past 30 years.

F. Experiences with SBR in Brazil and Paraguay – presented by Michael McNeill & Bob Streit, Agricultural Consultants, Algona & Ames, Iowa

In March of 2003, Michael and Bob visited sites all over Brazil and Paraguay. They saw rust nearly everywhere they visited. At some sites, especially in Paraguay, kudzu was an important source of the SBR pathogen. Unfortunately, SBR seems to be a political problem in that most of the Brazilians refused to admit that the disease was present. Often diagnosis of the problem was hampered not only by politics but also by apparent confusion with other soybean diseases.

The disease symptoms developed very quickly. Several individuals noted that the plants defoliated sometimes only one week after the first symptoms were observed. The most susceptible soybean growth stages were R3 and R4. Limitations to disease development were temperatures over 85°F and dry conditions. Early and full coverage of fungicides are believed to be instrumental to successful control.

G. SBR Section 18 Development and Progress – presented by John Sierk, Minnesota Department of Agriculture, St. Paul

A group of 15 interested working group members have been discussing and working on the development of Emergency Exemptions (Section 18s) for SBR on soybeans and other leguminous crops. Marty Draper of South Dakota has developed a draft document for soybeans. Alan Henn of Mississippi and Bob McMillan of Florida are developing another document that will address the needs of minor leguminous crops. These Section 18 requests will be submitted initially by South Dakota and Minnesota for soybeans and Mississippi and Florida for minor leguminous crops but are being designed so that other states can easily piggyback onto them.

Primarily because of limited supplies of any one or two compounds, four compounds are being considered for the emergency exemption request on soybeans. They are propiconazole (Tilt, Propimax EC), tebuconazole (Folicur), myclobutanil (Laredo ED), and propiconazole + trifloxystrobin (Stratego). Readers are cautioned that these choices are only in a draft document, they have not been approved by EPA, and they only indicate the preferences of one or two states.

The Economic Research Service of USDA has contributed to the economic analysis that has been included with the Emergency Exemptions. They have also indicated they will conduct a more detailed research report that will look at all the potential ramifications of SBR to the agricultural community and to the U.S. economy.