Soybean Rust Scenario Workshop Report
May 3, 2005, Doubletree Hotel Airport, St Louis, MO

Sponsored by:
American Soybean Association, USDA, United Soybean Board & the North Central Soybean Research Program

Organized by:
Dr. Kitty Cardwell, USDA, Cooperative States Research Education and Extension Service

EXECUTIVE SUMMARY OF WORKSHOP

Forty soybean rust extension specialists, certified crop advisors, insurance industry representatives, soybean rust researchers, USDA administrators, and USB/ASA sponsors met to evaluate the functionality of the USDA Soybean Rust Information Website as an e-Extension platform for providing growers with information and recommendations for managing soybean rust. Participants were divided into small groups and charged with the task of constructing recommendations for growers in specific states using a set of website tools developed for extension specialists and hypothetical scenarios of soybean rust spread throughout the U.S. There were three important outcomes of this training activity. The first resulted from the realization that a more flexible set of communication tools were needed for the USDA website because the spatial units (e.g., counties, cropping districts…) that extension specialists traditionally use to provide guidelines to growers vary greatly among states. The second outcome was a reaffirmation that the learning curve for synthesizing new information into guidelines for growers is steep, and thus extension specialists need access to scenario training experiences whenever new useful information technologies become available. Finally, Risk Management Agency (RMA) advisors and crop insurance industry representatives were very appreciative of the training experience and committed to collaborating with Extension to assist farmers with providing documentation of their good farming practices to manage soybean rust.

CONTENTS OF WORKSHOP REPORT

OBJECTIVES OF WORKSHOP

The four objectives for the Soybean Rust Scenario Workshop were communicated to participants by Dr. Kitty Cardwell at the open session.

1. To develop strategies for interpreting information on the spread of soybean rust to improve the value of that information for grower decision making, by:
    a. Interpreting information on soybean rust spore deposition, soybean and kudzu growth stage, and soybean rust disease progression displayed on maps depicting hypothetical scenarios of pathogen spread in the U.S.
    b. Constructing maps and messages to growers in specific counties and states for display on the public USDA Soybean Rust Information Website.
    c. Describing how these guidelines translate into Good Farming Practices (GFPs),
2. To provide modelers and website managers with feedback for improving the USDA Soybean Rust Information Website.
3. To provide insight from grower representatives on how the extension recommendations on the USDA website might be implemented and whether the guidelines and maps would likely be useful and timely for decision-making and action.
4. To provide insurance industry representatives with an appreciation for the complexity of decision-making process for GFP development for soybean rust management and develop further avenues of interaction between extension, insurance industry and growers.

SECTION 18 FUNGICIDE REPORT

Dr. Martin Draper, University of South Dakota

Summary of Presentation

Dr. Draper described the fungicide options available to U.S. growers and how the efficacy of the various chemicals depends strongly on the state of the disease and soybean crop at the time of application. He suggested that growers, specialists, crop insurance agents and administers should refer to the guidelines called "Using Foliar Fungicides to Manage Soybean Rust" produced by A.E. Dorrance, M.A. Draper, and D.E. Hershman with support from USDA CSREES. Dr. Draper noted that conditions in soybean fields vary greatly within counties due to many factors including: cultivar, cultural practices, local weather, and topography. Producers, he emphasized, need to scout regularly and interpret the management guidelines given the situation in their own fields and surrounding area.

Dr. Draper used Figure 1 to describe the relationship between soybean rust disease progression and management options. He discussed preventative, curative, and eradicant/antisporulant based approaches, modes of action of cholonitriles, strobilurins, triozols, and combination products, and when during the progress of the soybean rust disease each of these strategies is most appropriate.

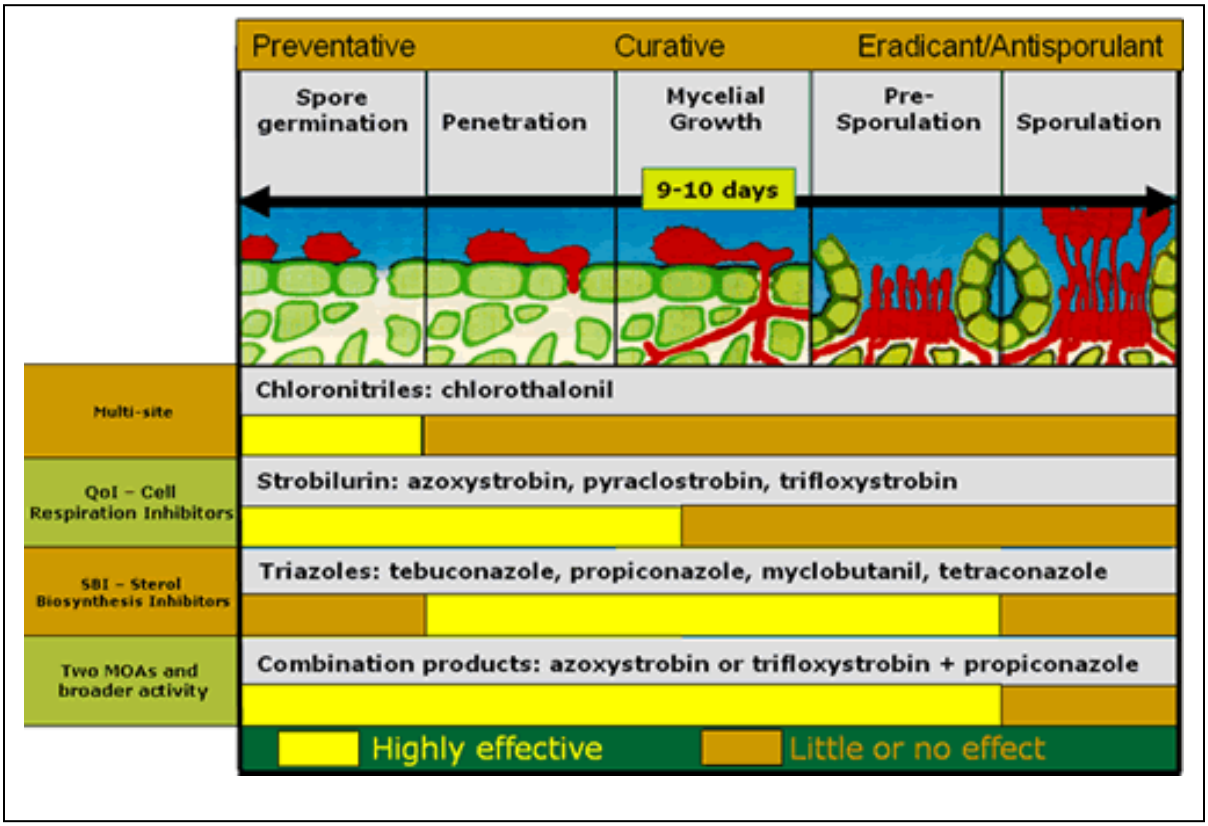


Figure 1. Variation in fungicide efficacy with progression of infection (from M. Draper).

Dr. Draper also reviewed the fungicide products available to growers. Figure 2 below summaries his appraisal.

	Product	Uptake	Family	MOA	Reappl. Interval	Pre-Infection Activity?	Post Infection Activity?	Pre Harvest Interval
Preventative Protectant (Pre-Infection)	Bravo/Echo	Protectant	Chloronitrile	Multiple	7-14 (10)	Yes	No	42 days
	Quadris	Systemic	Strobilurin	QoI	21	Yes	No	14 days
	Headline	Systemic	Strobilurin	QoI	14-21	Yes	No	21 days
Curative (Post-Infection)	Folicur	Systemic	Triazole	DMI	14-21	Yes	Yes	21 days
	Tilt/ PropiMax/ Bumper	Systemic	Triazole	DMI	14-21	Yes	Yes	28 days
	Laredo	Systemic	Triazole	DMI	14-21	Yes	Yes	28 days
	Domark	Systemic	Triazole	DMI	n/a	Yes	Yes	21 days
	Stratego	Systemic	Strobilurin + Triazole	QoI + DMI	14-21	Yes	Weak	21 days
Mixed Mode of Action (Post-Infection)	Quilt	Systemic	Strobilurin + Triazole	QoI + DMI	14-21	Yes	Yes	21 days
	Headline SBR	Systemic	Strobilurin + Triazole	QoI + DMI	14-21	Yes	Yes	30 days

Figure 2. Fungicide option for managing soybean rust (from M. Draper).

EVALUATION OF SCENARIOS BY WORKING GROUPS

Two scenarios were developed for the workshop based on the ZedX-Isard aerobiology model of soybean rust spread, hypothetical source area delineation in the Caribbean basin, and historical weather data for the 2002 and 2004 growing seasons. Weather conditions in North America during these seasons were generally dry and wet respectively, resulting in very different disease scenarios. Because the disease was not present in North America prior to autumn 2004, the aerobiology model simulations of disease spread were substituted for observations. Consequently, the set of model output maps available to workshop participants was the same as that used by specialists to update guidelines for growers on the USDA Soybean Rust Information Website.

Dr. Kitty Cardwell opened the Workshop by welcoming participants and explaining the objectives of the meeting. Dr. Scott Isard provided an explanation of the maps on the USDA Soybean Rust Information Website, the aerobiology model, and the assumptions that were used to create the soybean rust spread scenarios for 2002 and 2004.

Workshop participants were divided into three teams with 2 to 3 soybean rust extension specialists, certified crop advisors, insurance industry representatives, soybean rust researchers, USDA administrators, and USB/ASA sponsors in each group. Each team was asked to construct grower guidelines for specific states and dates corresponding to the hypothetical scenarios for 2002 and 2004. The tasks included providing visual information to growers on a set of Observation, Scouting, and Management Guidelines maps and supporting written text messages. Blank paper maps were provided so that

each participant could construct his or her own interpretation. Extension Specialists Drs. Don Hershman, Marty Draper, and Greg Shaner served as group facilitators, each assisted by a computer technician and secretary. As the groups developed guidelines for the scenarios, the facilitators led discussions about how to interpret the information provided on the web site. Each participant had ample opportunity to contribute to these discussions and because of their diverse backgrounds and perspectives, the interpretations of the information and the resulting grower guideline maps varied greatly among individuals. The computer technicians worked to capture (and archive) the consensus that emerged from each of these discussions on maps and in the text boxes provided on demonstration websites that mimicked the USDA Soybean Rust Information Website. Secretaries were charged with providing feedback to the modelers by noting the many suggestions from workshop participants for improving the content of the soybean rust website.

Each team worked on the same two scenarios, the first in a 3-hr morning session and the second in a similar length afternoon session. There were provocative discussions among members from different groups over lunch. When the afternoon session terminated, the certified crop advisors and insurance industry representatives met for 15 minutes to discuss their impressions of the activity. A general session was convened with Dr. Glen Hartman summarizing the scenario interpretations by comparing the maps on the demonstration websites that were generated by the three working groups. Dr. Hayward Baker led a lively discussion of RMA and insurance industry concerns and recommendations. Finally, Dr. Kitty Cardwell thanked all individuals for their participation and acknowledged those who helped sponsor and organize the workshop.

OUTCOMES OF WORKSHOP

A. Recommendations for USDA Soybean Rust Information Website.

During the working group discussions, a consensus of opinion emerged that the format for presenting guidelines to growers on the website was inadequate for two primary reasons. The first issue revolved around the designation of counties as the spatial unit for providing grower guidelines on the USDA soybean rust site. In many states, there are important traditions and expectations for providing extension guidelines to growers at larger spatial resolution. Consequently, differentiating guidelines on the basis of counties was deemed inappropriate. The second reservation was directed toward the use of color on maps to convey management guidelines. Growers require information from their fields regarding crop growth stage and the presence/absence of disease to interpret the county-wide disease management guidelines correctly. The format of the site was such that each county would be filled with a color for a specific guideline with associated text information describing how the grower's own field level observations should be used to modify the county-level guidelines. Workshop participants agreed that many growers would simply use the color on management guidelines without reading the qualifying text leading to inappropriate use of fungicides. Some participants, not confident about where to draw boundaries, were unwilling to color contiguous counties in the same state different colors on the management guidelines map. In contrast, the colored maps with

county-level resolution were deemed excellent for communicating observations of soybean rust to growers.

During the convening sessions, workshop participants agreed that the design for delivering information to growers regarding scouting and disease management guidelines should be changed from map to text format. The group suggested that the new format should allow extension specialist to provide guidelines to growers across flexible spatial units within states.

In addition, to the above major recommendation, participants provide many suggestions for improving information and tools on the USDA Soybean Rust Information Website. This feedback is summarized in Appendix III.

B. RMA and Insurance Industry Concerns and Recommendations.

RMA and insurance industry personnel indicated that they were very pleased with the training workshop. The experience of developing guidelines for growers using the scenarios had exposed them to the complexities of the decision making process and the value and uncertainty associated with guidelines for managing soybean rust. They committed to collaborating with Extension to assist farmers with providing documentation of their good farming practices to manage soybean rust. Their concerns and recommendations are summarized below.

1) Create a map tutorial or document that explains the process of lighting up counties states when soybean rust is identified.

2) Identify other legume hosts that might be affected by *P. pachyrhizi (e.g.*, dry beans and snap beans). Indicate on website the crops and alternative hosts used in model for each state.

3) Provide national scouting guidance to provide farmers with instructions for scouting and evaluating suspect tissue samples.

4) Provide information on the percentage of the crop at certain stages where guidance is being provided. It is important to know how much of the crop is infected (an estimate at least) and at what stage of growth the infection is occurring.

5) For crop insurance purposes, it would help if management guidance could drill down to the county level. RMA is concerned that guidance is too cursory. Why can't State Extension get a better handle on the amount of soybeans and when they are planted, the stage of the soybean crop and the severity and amount of infection. Is this a problem with scouting? Is this a problem with resources? Is this a problem with the current organization make-up?

6) Make a strong effort to have commentary guidance as consistent as possible among states. One state may be more specific than others. Is there a need for

more guidance? Is it possible to continue commentary guidance on a county basis rather than on a state basis?

7) We must know that a large percentage (80%-90%) of a county/state has gone "black" (total infestation/no use treating) before that determination is made and designated on the website map. If not, crop insurance could be in a very vulnerable position since growers who could still treat soybean rust will not do so in such designated states. This will make individual determinations difficult, if not impossible, to justify.

8) The RMA and crop insurance industry will collaborate with Extension on the development of a documentation aid to assist farmers with providing their documentation of their good farming practice to manage ASR. This aid should benefit growers, Extension, RMA and the crop insurance industry by tracking the actions taken to manage ASR outbreaks.

9) The RMA will accept and manage any calls received from crop insurance industry regarding processing soybean rust mapping questions and commentaries. RMA will contact State Extension on the behalf of crop insurance industry and resolve with extension and will then relay response back to crop insurance industry.

RESPONSE TO WORKSHOP RECOMMENDATIONS FOR USDA SOYBEAN RUST INFORMATION WEBSITE

The workshop recommendation for a more flexible, text driven format to convey scouting and management guidelines was received by the ZedX programming team with enthusiasm. In less than 3 weeks: 1) a new design was proposed for displaying scouting and management guidelines on the public USDA Soybean Rust Information website, 2) storyboards depicting the design were created, 3) a series of national conference calls among specialists was conducted to evaluate the storyboards and to provide suggestions for improvements, and 4) the programming to incorporate the changes into the website was completed.

The following changes to the USDA Soybean Rust Information Website were implemented on 24 May 2005 at 1630 EDT.

1. The management and scout maps are combined into a more comprehensive map called the "State Update" map.
2. The color of the State Update map reflects the date when state commentary was last updated.
3. Users access management and scouting commentary by clicking within the state boundaries on the State Update map.
4. The "State Commentary" that replaced the management and scouting maps is in text form that "pops up" with the following six categories:
    a) Observations
    b) Soybean growth stages
    c) Management guidelines

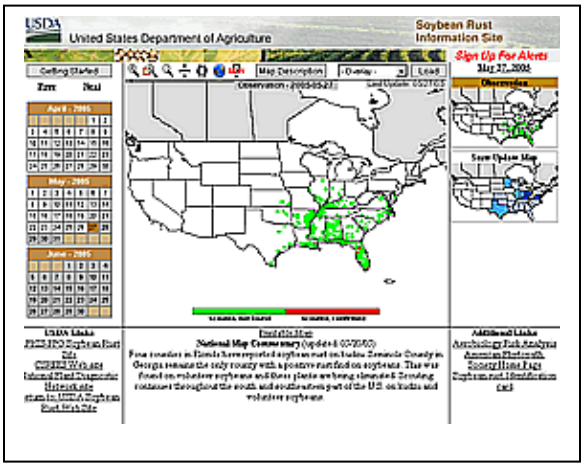
d) Forecast outlook
e) Scouting recommendations
f) Scouting techniques.

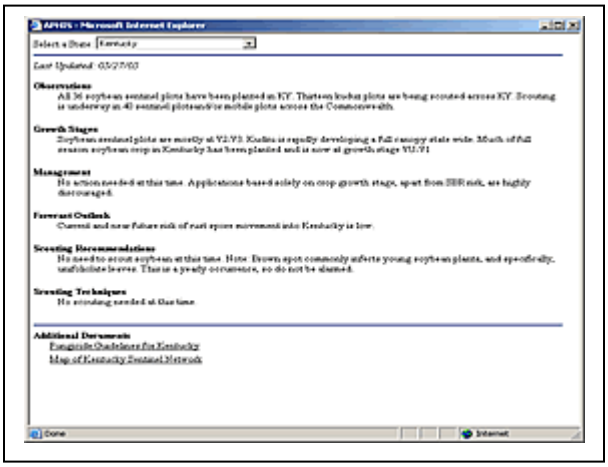
5. Links at the bottom of the State Commentary window allow growers to access additional information provided by extension specialists.
6. Users can access the text information for different states using a pull down menu on the State Commentary page.
7. No default state commentary is provided.

The changes to the public USDA Soybean Rust Information Website necessitated development and deployment of a new set of communication tools on the specialist website. These tools (not shown above) were designed, reviewed, and incorporated into the website concomitant with the changes to the public site.

1. The "State Commentary Tool", represented by the question mark, has been added to the navigation tools.
2. The State Commentary Tool can be used to display the State Commentary by clicking on a state on either the Observation or State Update maps.
3. Once the State Commentary Tool is selected, a window will open displaying the commentary for that state. Specialists may edit the information in this window and save their changes. They may also upload attachments providing additional information for users.
4. Additional state commentary can be viewed by clicking on the map again, or by selecting another state in the pull down menu in the commentary window.

The major modifications to the public website are captured in the Figures 3 and 4 below.

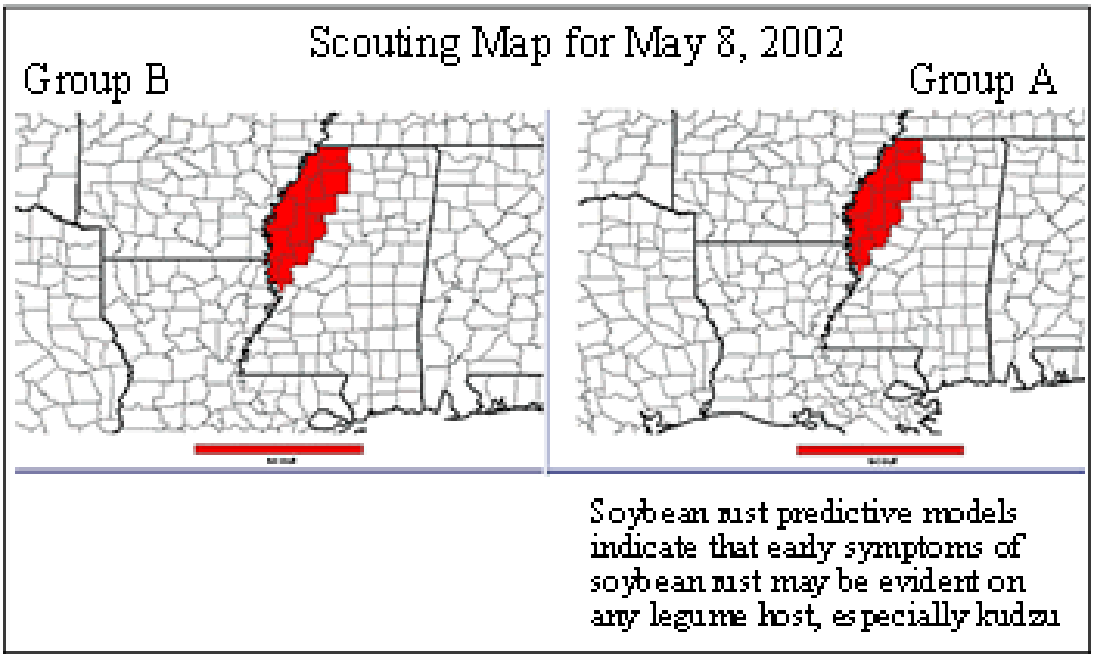


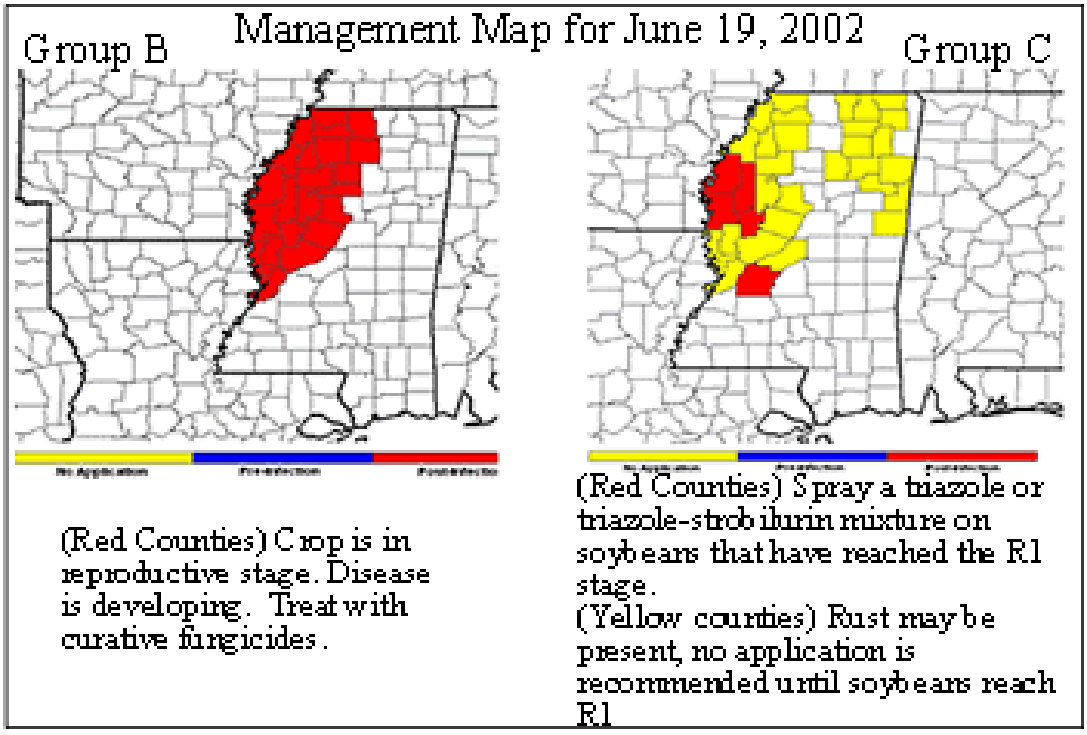


Notice that thumbnails for viewing Scouting and Management Maps have been replaced by a thumbnail for viewing Commentary on the right hand side of Figure 3. When the commentary screen is invoked, a US state map appears in the main screen (not shown). As indicated in the list of changes above, users may click on individual states to view commentary (Figure 4) provided by Extension Specialists. This commentary is divided into the 6 categories in response to feedback from workshop participants, RMA, and insurance industry personnel. Links at the bottom of the window allow growers to access additional information provided by extension specialists.

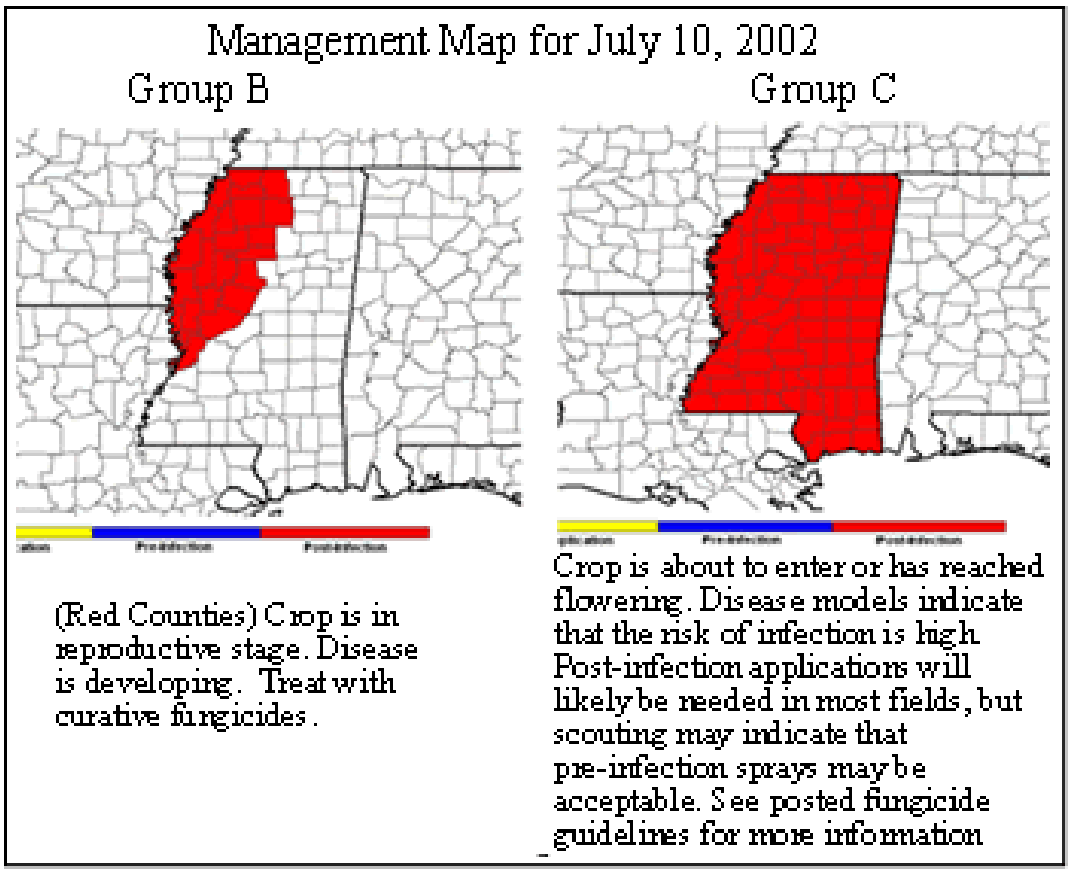
APPENDIXES I: Examples of Guidelines Created in Working Sessions

The following three figures provide examples of the Scouting and Management Maps and commentary that was developed in the different sessions. The working groups provided similar guidelines for the scenario dates at the beginning of the growing season.





Note that Working Group C considered information on the variation in soybean growth stage across Mississippi more important to the development of guidelines than did group B.



Members of Group C elected to not differentiate among MS counties on the Management Map for the July 10, 2002 scenario.

APPENDIX II: Summary of Feedback to Modelers from Working Sessions

Many of the suggestions for improving the website pertained to the presentation of Scouting and Management information to growers or were also captured in the nine items suggested by the RMA and insurance industry representatives. These items are not listed individually to avoid duplication. Workshop participant suggestions are organized into four categories below. ZedX programmers have already accommodated some of the suggestions below into the website.

Suggestions for programming changes to the website.

1. **Scouting and Management Maps**. Reformat how scouting and management information is presented to producer (discussed in detail above).
2. **Hot spots**. It would be very useful for the public to be able to click on a state to zoom to that state. Since information from neighboring states is of paramount importance for decision making. The user should be able to be on a state map and click on neighboring states (that show up on the zoomed map) and go directly to that state.

3. **Accumulated wet deposition maps.** Accumulating spore deposition on soybean over the past week or 2 weeks might be more valuable than total accumulation wet deposition for the season.
4. **Specialist Tools.** Tools always wake up at current date. Specialists might be less prone to making careless mistakes if the tools woke up on the date of the displayed map.

Suggestions for changes to the text on the website.

1. **Simulation scouting map description**. Indicates when scouting should be initiated. Scouting should continue until R6.
2. **Descriptions of "simulated soybean maps"**. These are really bean maps because they include dry and snap beans as well as soybean. Update label and map description.
3. **Terms.** Add a glossary of terms.

Suggestions for additional links.

1. **Potential hosts**. Link to list of potential hosts on the public website. If producers read in a commentary to scout non-soybean hosts they need a list of those hosts?

2. **Scouting techniques**. Link public site to pdf or another web site with information on scouting techniques.

Suggestions regarding an instructional component for the website.

1. **Demonstration tools.** Make an exercise or "demo" on using the public website for farmers?

2. **Demonstration website.** Maintain the demonstration website as an instructional tool for extension specialists and others.

APPENDIX III: Names and Affiliations of Workshop Participants

USB/ASA Organizers, Sponsors, and Participants

Bob Callanan	ASA
Steve Censky	ASA
Julie Hawkins	ASA
Steve Muench	USB
Karen Pfantsch	USB
Ed Ready	USB
David Wright	NCSRP

Insurance Industry

Dave Bell	USDA RMA
Rob Black	Rain and Hail
Don Hutsell	National Crop Insurance
Scott Laaveg	RCIS
Mark Splettstaszer	Great American Insurance Company
Mark Zarnstorff	NCIS
Jeff Virchow	RCIS

Certified Crop Advisors

Lyndon Brush	Certified Crop Advisor
Steve Dlugosz	Certified Crop Advisor
John G. Niemeyer	Royster Clark Inc
Harold Reetz	Foundation for Agronomic Research

Scenario Team Facilitators (Soybean Rust Extension Specialists)

Martin Draper	South Dakota State University
Don Hershman	University of Kentucky
Greg Shaner	Purdue University

Soybean Rust Extension Specialists, Associates, and Assistants

Rick Cartwright	University of Arkansas
Nicholas Dufault	Penn State University
Geir Friisoe	Minnesota Department of Agriculture
Clayton Hollier	Louisiana State University
Char Hollingsworth	University of Minnesota
Doug Jardine	Kansas State University
Steve Koenig	North Carolina State University
Linda Kull	University of Illinois
Jim Kurle	University of Minnesota
Dean Malvick	University of Illinois
Robin Pruisner	Iowa Department of Agriculture
Brad Ruden	South Dakota State University
Pleas Spradley	University of Arkansas
Laura Sweets	University of Missouri

USDA Organizers, Sponsors, and Participants

Heyward Baker	USDA RMA
Kitty Cardwell	USDA CSREES
Thomas Dorr	USDA
Glen Hartman	USDA ARS
Roger Magarey	USDA APHIS CPHST
Burleson Smith	USDA

Soybean Rust Information Website Representatives

Annalisa Ariatti	University of Illinois
Scott Isard	Penn State University

Industry Representative

Marshall Beatty	Syngenta