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United States Government Accountability Office
Washington, DC 20548

May 17, 2005

The Honorable Tom Harkin
Ranking Democratic Member
Committee on Agriculture, Nutrition, and Forestry
United States Senate

Subject: *Agriculture Production: USDA's Preparation for Asian Soybean Rust*

Dear Senator Harkin:

In November 2004, Asian Soybean Rust (ASR*)* was discovered in the United States in Louisiana. In the following weeks, it was found in eight additional southern states. ASR is a harmful fungal disease that has spread throughout many other parts of the world, including Asia, Australia, Africa, and South America. ASR can infect over 90 host plant species, including legumes, such as dry beans, peas, and kudzu, a plant that grows wild primarily in the southern United States. Although the disease has caused significant soybean crop loss and increased production costs in many other countries, ASR arrived in the United States too late in the crop year to have any effect on soybean production in 2004, and scientists were uncertain about how it would survive the winter climates in the United States. However, in February 2005, researchers found that ASR had successfully over-wintered on kudzu in Florida, and it was subsequently detected in Georgia on soybean plants in April 2005. Since environmental factors, such as rainfall, humidity, and temperature, affect both the severity and incidence of ASR, scientists do not know how widespread or damaging the disease will be in the United States during the 2005 crop year. The U.S. Department of Agriculture (USDA) is responsible for monitoring and addressing the problems posed by ASR. The Environmental Protection Agency (EPA) is responsible for licensing fungicides to treat the disease.

You asked us to determine (1) USDA's efforts to develop and implement an ASR surveillance strategy to identify and protect against ASR's entry into the United States and to test and verify suspect cases; (2) USDA's strategy for minimizing the effects of ASR now that the fungus has arrived in the United States; and (3) the progress that USDA, EPA, and others have made in developing, testing, and licensing fungicides to treat ASR and in identifying and breeding ASR-resistant or -tolerant soybeans. We provided your staff with a formal briefing on our findings on April 28, 2005. In that briefing, we cited USDA's lack of funding for ASR oversight as an area of concern. On May 12, 2005, the Secretary of

Agriculture announced that USDA will use about $1.2 million in contingency funding to help monitor, report, and manage soybean rust during the 2005 growing season. This report summarizes the results of our April 28th briefing, and enclosure I presents our briefing slides.

To respond to your questions, we met with USDA and EPA officials and visited state, industry, and soybean association officials and university extension faculty in Georgia, Indiana, Iowa, Louisiana, and Minnesota. We selected these states to provide geographic representation of states where soybeans are grown. We also conducted a survey of 31 soybean-producing states in April 2005. Enclosure II describes our scope and methodology, and enclosure III presents our survey results. We performed our work from December 2004 through April 2005 in accordance with generally accepted government auditing standards.

In summary, we found the following:

In May 2002, after ASR was identified in Brazil, USDA began planning for the introduction of ASR into the continental United States. Three USDA agencies—the Animal and Plant Health Inspection Service (APHIS), the Cooperative State Research, Education, and Extension Service (CSREES), and the Agricultural Research Service (ARS)—the National Plant Board, industry, and several land-grant universities formed an ad hoc Soybean Rust Committee. At about the same time, USDA established the National Plant Diagnostic Network to enable diagnosticians, state regulatory personnel, and first detectors to communicate information, images, and methods of detection for ASR and other diseases in a timely manner. In the fall of 2002, USDA began disseminating information and conducting training courses in an effort to educate growers about how to identify and manage the disease. In January 2004, APHIS issued a strategic plan that provided information on the protection, detection, response, and recovery from ASR. While generally comprehensive in its coverage of issues, the plan was not fully developed when ASR was first identified in the United States.

Since the initial discovery of ASR in the continental United States, USDA and others have increased efforts to inform growers about how to identify and minimize the effects of the disease. In April 2005, USDA issued *A Coordinated Framework for Soybean Rust Surveillance, Reporting, Prediction, Management and Outreach.* The framework includes a surveillance and monitoring network, a Web-based information management system, decision criteria for fungicide application, predictive modeling, and outreach efforts. We surveyed 31 soybean-producing states to obtain information about their efforts, in coordination with USDA, to prepare for and manage ASR. The states generally responded positively when discussing efforts to educate growers and others on ASR and in setting up sentinel plot monitoring programs. (Sentinel plots will be planted earlier than commercial plants to alert growers if ASR is present in their region.) However, some of the states reported that their diagnostic laboratories may have insufficient funding and/or staff to test suspected samples for ASR. In addition, most states indicated that they were either uncertain or did not believe they

would have enough equipment available to apply fungicides to treat the disease. The American Soybean Association, representing many of the nation's largest soybean growers, has also expressed concerns about whether growers will have access to equipment as well as fungicides in a timely manner. Finally, USDA's Risk Management Agency has recently developed additional guidance on the actions growers must take to ensure that any losses due to ASR are covered under their insurance policies. However, growers have expressed concerns about what they need to do to demonstrate good farming practices in treating ASR and the documentation they must provide to demonstrate that they followed such practices. Further guidance may be needed because of the uncertainties associated in dealing with the disease.

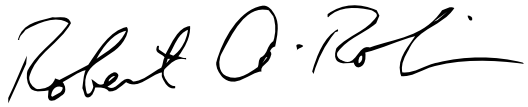
USDA, EPA, and others have made significant progress in developing, testing, and licensing fungicides to treat ASR. As of April 2005, eight fungicides were registered with EPA for treating ASR. In addition, EPA had approved emergency exemptions for an additional 11 fungicides to treat ASR under section 18 of the Federal Insecticide, Fungicide, and Rodenticide Act. Section 18 exemptions provide designated states with an emergency exemption to temporarily use a fungicide. As of April 2005, 32 states had applied for and been granted section 18 exemptions that are effective through November 10, 2007. USDA estimates that researchers are 5 to 9 years away from identifying or breeding ASR-resistant or -tolerant soybeans. In addition, on March 10, 2005, USDA removed ASR from the list of select agents and toxins, which removed certain restrictions and will aid ongoing research on the disease in the United States.

We met with USDA's Special Assistant for Pest Management Policy and APHIS, ARS, CSREES, the Economic Research Service (ERS), and RMA officials to discuss the facts in this report. We also discussed the report with officials in EPA's Office of Pesticide Programs. USDA and EPA generally agreed with the information in our report and provided some clarifying comments that we incorporated as appropriate.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution of it until 30 days from the date of this letter. We will then send copies of this report to the Secretary of Agriculture and the Administrator of EPA. In addition, this report will be available at no charge on the GAO Web site at http://www.gao.gov.

If you have any questions about this report or need additional information, please contact me at (202) 512-3841. Key contributors to this report were James L. Dishmon, Jr., Chad M. Gorman, Ronald E. Maxon, Jr., Lynn M. Musser, and Deborah S. Ortega.

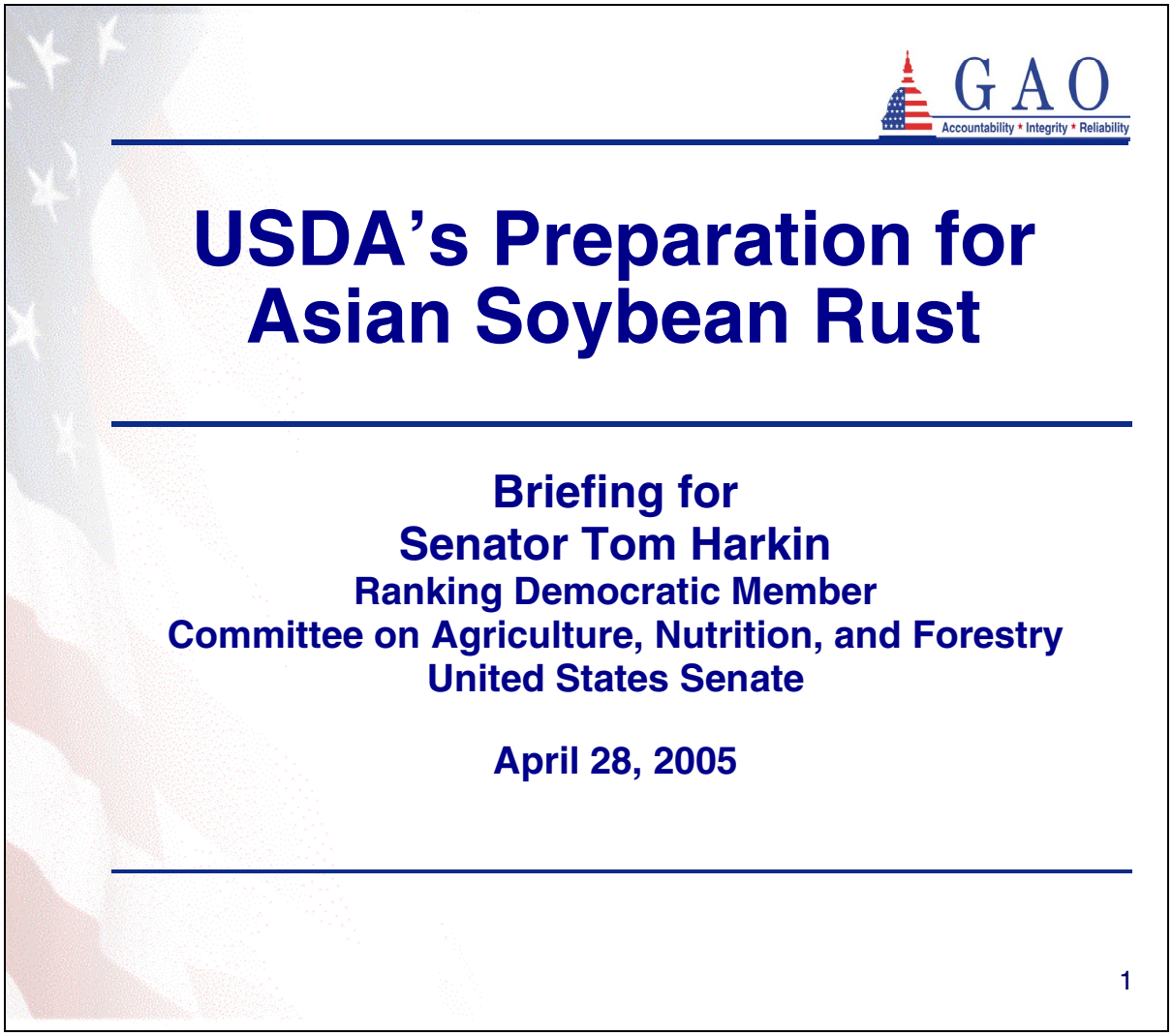
Sincerely yours,



Robert A. Robinson
Managing Director, Natural Resources
and Environment

Enclosures - 3

USDA's Preparation for Asian Soybean Rust



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Background

- In November 2004, Asian Soybean Rust (ASR) -- *Phakopsora pachyrhizi*--was first discovered in the continental U.S. in Louisiana.
- ASR is a harmful fungal disease that has caused economic losses in Asia, Australia, Africa, and South America because it decreases crop yield and increases fungicide costs.
- Environmental factors, such as rainfall, humidity, and temperature, affect both the severity and incidence of ASR. Long periods of leaf wetness, high humidity, and temperatures between 60 and 85 degrees Fahrenheit are ideal for spore germination.

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Background

- ASR can infect over 90 host plant species of legumes, such as dry beans and peas, and kudzu, which grows wild in the southern U.S.
- There are no commercial U.S. soybean cultivars with resistance or tolerance to ASR.
- Fungicides are currently the primary tools for managing ASR. However, growers must be knowledgeable about the various types of preventative and curative fungicides as well as when and how to apply them.
- An April 2004 USDA study projected U.S. losses between $640m and $1.3b in the first year of ASR's arrival.

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Objectives

Provide Information on:

- USDA's surveillance strategy to identify and protect against ASR entry into the U.S.
- USDA's strategy and actions to minimize the effects of ASR now that it is in the U.S.
- USDA, EPA, and others' progress in developing, testing, and licensing fungicides to treat ASR and in developing rust-resistant or rust-tolerant soybeans.

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Scope and Methodology

- Met with USDA and EPA officials and visited state, industry, and soybean association officials and university extension faculty in Georgia, Indiana, Iowa, Louisiana, and Minnesota.

- Surveyed 31 soybean-producing states:
  - Training and Education
  - Sentinel Plots
  - First Detectors
  - Laboratory Facilities and Staff
  - Fungicides and Application Equipment

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Objective 1: USDA's Preparation for ASR

- In May 2002, after ASR was identified in Brazil, three USDA agencies—the Animal and Plant Health Inspection Service (APHIS), the Cooperative State Research, Education, and Extension Service (CSREES), and the Agricultural Research Service (ARS)—joined with the National Plant Board, industry, and several land grant universities to form an ad hoc Soybean Rust Committee.

- In June 2002, USDA established the National Plant Diagnostic Network (NPDN) to allow diagnosticians, state regulatory personnel, and first detectors to communicate information, images, and methods of disease detection in a timely manner.

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Objective 1: USDA's Preparation for ASR

- In November 2002, USDA began conducting training to educate growers and others about how to identify and manage ASR.
- In January 2004, APHIS issued a strategic plan providing information on how to detect, respond to, and recover from ASR. The strategic plan appeared to be comprehensive in its coverage of issues, but ASR was identified in Louisiana before many aspects of the plan were fully developed.

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Objective 1: USDA's Preparation for ASR

- In September 2004, USDA participated in a mock field exercise held in Minnesota to prepare for ASR.
- In October 2004, USDA issued standard operating procedures for plant diagnostic laboratories to deal with ASR. The procedures included information about the symptoms of the disease; protocols for screening, examining, shipping, storing, and destroying ASR samples; and guidelines for who should be notified of the results.
- USDA supported states' efforts to obtain EPA emergency fungicide approvals.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

- In January 2005, USDA issued a draft copy of *A Coordinated Framework for Soybean Rust Surveillance, Reporting, Prediction, and Management*. The final framework was issued in April 2005.

- The framework includes:
  1. A surveillance and monitoring network
  2. A Web-based information system
  3. Decision criteria for fungicide application
  4. Predictive modeling
  5. Outreach for training, education, and disseminating information

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

Training & Education

- Before the November 2004 discovery of ASR, land-grant universities had given over 300 presentations, programs, and workshops to educate growers about ASR detection and fungicides.
- Since the discovery of ASR, they have given about 1,500 additional presentations, programs, and workshops.
- In 30 of the 31 states we surveyed, training covered identification of ASR and "look-alike" diseases and available fungicides; 25 states covered ASR tracking and forecasting information; and 25 states covered application methods.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

Sentinel Plots

The sentinel plot program has three functions:

1. Serve as an early warning system.
2. Quantify the timing of spore production.
3. Provide means to collect data for research.

- Sentinel plot data, along with data collected by mobile field monitoring teams and industry, will be entered into USDA's Soybean Rust Monitoring and Prediction System.
- USDA has established a Web site that will use sentinel plot data to allow viewers to monitor the progress of the disease on a daily basis.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

Sentinel Plots

- States reported that they plan to have 347 USDA plots, 516 university-sponsored plots, and 186 other plots.
- Most states reported various factors for determining the number and distribution of sentinel plots. The most common factors were location of plot within the state and distribution of soybeans within the state. Only 15 states reported that scientific data, such as wind patterns, crop yield, or rainfall, were factors.
- In most states, a combination of people will monitor the plots. The number of monitors that the states plan to train varied, ranging from 1 to 300.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

Sentinel Plots

- USDA has recommended that the states plant 320 plots at a projected cost of $800,000, but USDA has not yet provided funding.
- The North Central Soybean Research Program (NCSRP) and the United Soybean Board (USB) have provided $389,000 for a sentinel plot program consisting of 20 plots to be established in each of 20 states.
- The total amount of funding that the states anticipate receiving also varied. The states anticipate receiving over $500,000 from USDA and approximately $390,000 from the North Central Soybean Research Program and the United Soybean Board.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

First Detectors

- The states reported that they have already trained over 5,000 first detectors to assist growers in their efforts to detect ASR and that they plan to train over 1,000 more this year.
- First detectors include: extension personnel, crop consultants, agribusiness employees or consultants, state department of agriculture personnel, growers, USDA/APHIS personnel, and master gardeners.
- 30 states indicated that first detectors were being given instructions on how to prepare, and where to send, samples for confirmation of ASR.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

Laboratory Facilities and Staff

- State labs have allocated $0 to $91,000 for testing samples for ASR in 2005.
- The amount of funding that the labs believe is needed to run the 2005 ASR testing program varied, ranging from $0 to $150,000.
- USDA estimates that each state will require $45,000 for diagnostic staff and equipment dedicated to diagnosing ASR.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

States' Assessments of Laboratory Facilities and Staff for ASR Testing

ASR Testing	Probably or definitely yes	Probably or definitely no	Uncertain
Sufficient staff?	18	7	6
Sufficient funding?	10	7	14

Source: GAO's analysis of state survey data.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

Fungicides and Application Equipment

- Surveyed states reported that their growers and commercial applicators probably or definitely had a good understanding of:
  - available fungicides (27 states),
  - when to apply fungicides (23 states),
  - the appropriate methods for applying fungicides for ASR (23 states).

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

Estimated Percent of Soybean Growers Who Own Equipment to Apply Fungicide

Estimated percent	Number of states
1-25%	6
26-50%	7
51-75%	3
76-99%	4
100%	2
Uncertain	9

Source: GAO's analysis of state survey data.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

Fungicides and Application Equipment

- 8 states believe there are enough commercial applicators to provide service to growers in their states who do not own equipment to apply ASR fungicide. 5 states do not believe there is sufficient equipment, and the remaining 17 states indicated that they were uncertain. 1 state did not respond.

- Estimates for the percentage of soybean acreage that could be sprayed within 5 days following the confirmation of ASR in the states we surveyed ranged from a low of 20 to a high of 100 percent.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

Fungicides and Application Equipment

- Chemical companies that manufacture fungicides approved by EPA for use on ASR declined to go on record with the quantities they had on hand or planned to manufacture.
- A trade association representing crop protection chemical companies has stated that it believes the industry will be responsive to growers in managing the disease during the 2005 crop year.
- The American Soybean Association has expressed concerns regarding the availability of fungicides.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

ASR Disease Forecast/Predictive Models:

- The Soybean Rust Aerobiology Prediction System is a collaborative project between Pennsylvania State and North Carolina State Universities and ZedX, Inc.
- Iowa State University is developing forecast models using predicted daily weather data from an atmospheric model to make short-term predictions of ASR risk in different geographic areas.
- The North American Disease Forecast Center at North Carolina State University will also provide ASR disease forecasts.

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Objective 2: USDA's Efforts to Minimize the Effects of ASR

Crop Insurance Coverage

- USDA's Risk Management Agency (RMA) has stated that losses of insured growers will be covered if they follow "good farming practices."
- 12 of the 31 soybean-producing states indicated the information provided by RMA is sufficient for use in extension presentations to growers on ASR; 18 were uncertain, while 1 said it is not.
- RMA stated that it has recently provided insurers with guidance regarding what steps growers must take to insure that their losses will be covered.

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Objective 3: Licensing Fungicides and Developing Rust-Resistant Soybeans

- As of April 25, 2005, 8 fungicide products (4 active ingredients) were registered with EPA for treating ASR in the U.S.
- In addition, EPA has approved 11 fungicide products for treating ASR under section 18 of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Section 18 quarantine exemptions grant three years of temporary use rights in specified states.
- 32 states have received section 18 emergency exemptions for 6 or more fungicide products.

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Objective 3: Licensing Fungicides and Developing Rust-Resistant Soybeans

- Most of the states we surveyed reported that they did not have difficulties obtaining EPA section 18 emergency exemption approvals for ASR fungicides.
- 26 states have obtained information or consulted with officials from Brazil or other countries regarding lessons learned about applying fungicides to treat ASR.
- 27 states believe that growers and commercial applicators in their states have a good understanding of the types and product names of fungicides to treat ASR.

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Objective 3: Licensing Fungicides and Developing Rust-Resistant Soybeans

- USDA estimates that its researchers will identify soybean germplasm with some level of rust resistance within 5 years and that industry will require an additional 2-4 years to develop commercial soybean lines with resistance.
- On March 10, 2005, USDA removed ASR from the list of select agents and toxins, which will allow for additional research to be conducted in the U.S.
- In April 2005, USDA issued its National Strategic Plan for the Coordination and Integration of Soybean Rust Research.

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Areas of Concern

- USDA has not provided funding to the states for the sentinel plots. However, if the states do not monitor the plots as recommended, the quality of the data used in the forecasting systems and for future research could be jeopardized.
- Fungicides and application equipment may be insufficient to meet the needs of growers if and when ASR occurs.
- The predictive models have not yet been validated, and there are questions about the timely reporting of data.
- RMA may need to issue additional guidance regarding what steps growers must take to insure that their losses will be covered.
- Although USDA's framework is generally comprehensive, more information is needed regarding how it will be implemented.

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Scope and Methodology

To determine the U.S. Department of Agriculture's (USDA) efforts to develop and implement an Asian Soybean Rust (ASR) surveillance strategy to identify and protect against ASR's entry into the United States and to test and verify suspect cases, we interviewed officials from USDA's Animal and Plant Health Inspection Service (APHIS), Cooperative State Research, Education, and Extension Service (CSREES), and Agricultural Research Service (ARS) to identify actions that the department took before November 2004, when the first case of ASR was confirmed in the continental United States. In addition, we discussed these actions with USDA's Special Assistant for Pest Management Policy. We also reviewed pertinent documents regarding USDA's efforts to educate growers and others to identify, report, and test suspected cases of ASR.

To determine USDA's strategy for minimizing the effects of ASR now that the fungus has arrived in the United States, we interviewed officials from USDA's APHIS, CSREES, ARS, Farm Service Agency (FSA), and Risk Management Agency (RMA) to identify efforts that have been implemented since November 2004. We also surveyed the 31 soybean-producing states that were included in USDA's sentinel plot program to obtain information on their efforts to minimize the effects of ASR through education, training, surveillance, and testing. We pretested the content and format of the survey questionnaire with officials in four states. During these pretests, we asked the officials to assess whether the questions were clear and unbiased and whether the terms were accurate and precise. We made changes to the questionnaire based on pretest results. We also conducted site visits to Georgia, Indiana, Iowa, Louisiana, and Minnesota, where we met with officials from land-grant universities, field-based extension offices, state departments of agriculture, and state soybean associations and check-off boards to gain more in-depth information about their efforts to mitigate the effects of ASR.[1] We also interviewed industry and trade representatives to discuss the adequacy of available fungicides and application equipment.

To determine the progress that USDA, the Environmental Protection Agency (EPA), and others have made in developing, testing, and licensing fungicides to treat ASR and in identifying and breeding ASR-resistant or -tolerant soybeans, we interviewed officials from USDA, EPA, and state departments of agriculture to obtain information about their efforts to license fungicides to treat ASR. We also interviewed ARS personnel as well as researchers from academia and industry and reviewed related reports and studies regarding efforts to identify and breed ASR-resistant or -tolerant soybeans.

We performed our work from December 2004 through April 2005 in accordance with generally accepted government auditing standards.

[1]A check-off board is an industry-funded marketing and research program that promotes an agricultural product.

Survey of Soybean-Producing States: Preparations for Asian Soybean Rust

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Washington, DC

Survey of Soybean-Producing States: Preparations for Asian Soybean Rust

Please coordinate with others at your state's land grant university or in your state's Department of Agriculture to complete this questionnaire.

Questions? Contact:
Deborah Ortega (404) 679-1848 ortegad@gao.gov
or
Jim Dishmon (202) 512-9814 dishmonj@gao.gov

Return by April 13th:
Please return in the provided Fed Ex envelope.

Part 1: Extension Programs

Someone knowledgeable about your state's university extension program should answer Questions 1 - 5.

1. **How many presentations, programs, or workshops on Asian Soybean Rust (ASR) were presented or sponsored by your state's university extension program between January 1 and November 10, 2004, when ASR was first discovered in the U.S.?** *(Enter 0 if none. If you do not know the exact number, please provide an estimate.)* . . . . . Number: Total = 347; Range = 0 - 36; (N = 31) — Check if an estimate: 15

2. **Between November 11, 2004 and March 31, 2005, how many presentations, programs, or workshops on ASR were presented or sponsored by extension?** *(If you do not know the exact number, please provide an estimate.)* . . . . . Number: Total = 1496; Range = 0 – 300; (N = 31) — Check if an estimate: 17

3. Which of the following topics are included in extension presentations, programs, or workshops on ASR? (*Please check included or not included for each topic.*)

Topic	Included	Not Included
a. Types, purposes, and when to apply fungicides	30	1
b. Tank-mixing fungicides with other pesticides	21	9
c. Ground and aerial application methods	25	5
d. Identification of Asian soybean rust (ASR)	30	1
e. Identification of "look-alike" diseases	30	1
f. Current ASR tracking and forecasting information	25	5
g. Insurance coverage or disaster funding for losses due to ASR.	21	9

4. Are any of the following activities with a focus on ASR being done by the field-based extension personnel in your state? (*Please check included or not included for each activity.*)

ASR Activity	Yes	No
a. Giving presentations, programs, or workshops	28	2
b. Distributing publications, newsletters, or other printed material	30	1
c. Maintaining a Web site or listserv	17	13
d. Preparing and distributing news releases	24	5
e. Visiting growers' fields at request of grower	23	5
f. Responding to phone or email questions	31	0

5. Is the information provided by USDA's Risk Management Agency (RMA) on insurance coverage and requirements sufficient for use in presentations, programs or workshops on ASR? (*Please check one.*)

Yes	No	Uncertain	Not applicable
12	1	18	0

Information About Individual Completing Part 1 (Extension Programs)		
Name:		
Title:		
Department:		
Organization:		
Mailing Address:		
City, State, and Zip Code:		
Phone:	**Email:**	

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Part 2: Sentinel Plots

Please have someone knowledgeable about your state's sentinel plot program answer Questions 6 - 22.

USDA Sentinel Plots

6. How many USDA Sentinel Plots will be in your state in 2005? (*Enter 0 if none. If you do not know the exact number, please provide an estimate.*). . . . . .

Number
Total = 347
Range = 4 – 48
(N = 31)

Check if an estimate: 8

If 0 Go to Q 11

6a. How many of these plots will use soybeans as the host? (*Enter 0 if none. If you do not know the exact number, please provide an estimate.*) . . . . . .

Number
Total = 313
Range = 4 - 24
(N = 31)

Check if an estimate: 8

6b. How many of these plots will use non-soybean hosts? (*Enter 0 if none. If you do not know the exact number, please provide an estimate.*) . . . . . .

Number
Total = 37
Range = 0 - 25
(N = 30)

Check if an estimate: 5

7a. Where will these USDA Sentinel Plots be located? (*Please check 'Located Here' or 'Not Located Here' for each listed location.*)

Location	Located Here	Not Located Here
a. State owned or controlled land	6	21
b. University owned or controlled land.	25	5
c. Land belonging to an agricultural company (e.g., marketing, processing, or pesticide).	9	20
d. Private grower's land.	27	4

7b. If there are other locations for USDA Sentinel Plots, please list them below.

_____

_____

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Note: The total for question 6 does not equal the subtotals in 6a and 6b because some sentinel plots will use both soybeans and non-soybean hosts.

8a. Which of the following factors did you use in determining the number and distribution of USDA Sentinel Plots for 2005? (*Please check 'Used' or 'Not Used' for each factor.*)

Factors in Determining Locations of USDA Sentinel Plots	Used	Not Used
a. Location of plot within state	29	0
b. Scientific data (e.g., wind patterns, crop yield, rain fall)	15	13
c. Funding	19	10
d. USDA guidance	11	17
e. Soybean management practices	15	13
f. Convenience	19	9
g. Travel costs	13	15
h. Distribution of soybeans within your state	30	0
i. Distribution of other hosts within your state	8	21
j. USDA's *Coordinated Framework for Soybean Rust Surveillance, Reporting, Prediction and Management*	17	11

8b. If you used factors, other than those above, in determining the number and distribution of USDA Sentinel Plots in your state, please list below.

One state used input from consultants, a second state combined the program with scouting for another pest, and a third state selected plots based on available growers who agreed to plant an early maturing crop.

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9a. Who will monitor the USDA Sentinel Plots? (*Please check 'Will Monitor' or 'Will Not Monitor' for each possibility.*)

Possible Monitors for USDA Sentinel Plots	Will Monitor	Will Not Monitor
a. Field-based extension or research personnel	26	3
b. Campus-based extension or research personnel	27	3
c. Private, independent crop consultants	9	22
d. State Department of Agriculture personnel	11	18
e. Agribusiness employees or consultants	9	21
f. USDA/APHIS personnel	6	23

9b. If there are individuals, other than those above, who will serve as monitors for the USDA Sentinel Plots, please list below.

One state listed personnel from the state's department of agriculture.

10. Will the USDA Sentinel Plots be monitored according to USDA's *Coordinated Framework for Soybean Rust Surveillance, Reporting, Prediction and Management*? (*Please check one.*)

Yes 27 No 1 Uncertain 3

↓

(*If no, please describe the monitoring system you will use.*)

One state will monitor one-third of its plots according to USDA's framework, while another state will monitor one-fourth of its plots according to the framework.

University-sponsored Sentinel Plots

University-sponsored sentinel plots include plots funded or sponsored by the North Central Soybean Research Program or the United Soybean Board and plots funded by other grants, but not the USDA Sentinel Plots.

11. How many University-sponsored Sentinel Plots will be in your state in 2005? (*Enter 0 if none. If you do not know the exact number, please provide an estimate.*). . . . .

Number	Check if an estimate
Total = 516 Range = 0-52 (N = 31)	12

If 0 Go to Q 16

11a. How many of these plots will use soybeans as the host? (*Enter 0 if none. If you do not know the exact number, please provide an estimate.*) . . . . . .

Number	Check if an estimate
Total = 445 Range = 0-40 (N = 30)	11

11b. How many of these plots will use non-soybean hosts? (*Enter 0 if none. If you do not know the exact number, please provide an estimate.*) . . . . . .

Number	Check if an estimate
Total = 76 Range = 0-25 (N = 30)	11

12a. Where will these University-sponsored Sentinel Plots be located? (*Please check 'Located Here' or 'Not Located Here' for each listed location.*)

Location	Located Here	Not Located Here
a. State owned or controlled land	5	21
b. University owned or controlled land	24	5
c. Land belonging to an agricultural company (e.g., marketing, processing, or pesticide)	10	18
d. Private grower's land	25	4

12b. If there are other locations for University-sponsored Sentinel Plots, please list them below.

_____

_____

_____

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Note: The total for question 11 does not equal the subtotals in 11a and 11b because some sentinel plots will use both soybeans and non-soybean hosts.

13a. Which of the following factors did you use in determining the number and distribution of University-sponsored Sentinel Plots for 2005? (*Please check 'Used' or 'Not Used' for each factor.*)

Factors in Determining Locations of University-sponsored Sentinel Plots	Used	Not Used
a. Location of plot within state	25	2
b. Scientific data (e.g., wind patterns, crop yield, rain fall)	15	12
c. Funding	17	12
d. USDA guidance	10	17
e. Soybean management practices	14	13
f. Convenience	17	10
g. Travel costs	13	14
h. Distribution of soybeans within your state	27	2
i. Distribution of other hosts within your state	10	18
j. USDA's Coordinated Framework for Soybean Rust Surveillance, Reporting, Prediction and Management	16	10

13b. If you used factors, other than those above, in determining the number and distribution of University-sponsored Sentinel Plots in your state, please list below.

One state used input from consultants, and a second state selected plots based on available growers who agreed to plant an early maturing crop.

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14a. Who will monitor the University-sponsored Sentinel Plots? (*Please check 'Will Monitor' or 'Will Not Monitor' for each possibility.*)

Possible Monitors for University-sponsored Sentinel Plots	Will Monitor	Will Not Monitor
a. Field-based extension or research personnel	24	4
b. Campus-based extension or research personnel	23	6
c. Private, independent crop consultants	9	20
d. State Department of Agriculture personnel	10	18
e. Agribusiness employees or consultants	8	20
f. USDA/APHIS personnel	3	25

14b. If there are individuals, other than those above, who will serve as monitors for the University-sponsored Sentinel Plots, please list below.

One state listed that growers will also serve as monitors for these plots.

15. Will the University-sponsored Sentinel Plots be monitored according to USDA's *Coordinated Framework for Soybean Rust Surveillance, Reporting, Prediction and Management*? (*Please check one.*)

Yes 20 No 3 Uncertain 5

↓

(*If no, please describe the monitoring system you will use.*)

Other Sentinel Plots

16. How many other (e.g., grower, agribusiness, state Department of Agriculture) sentinel plots will your state have? (*Enter 0 if none. If you do not know the exact number, please provide an estimate.*).....

Number	Check if an estimate
Total=186 (N=27) Range =0-50	18

Funding for Sentinel Plots

17. What funding do you anticipate for the Sentinel Plot program in your state? (*Enter 0 if none. If you do not know the exact amount, please provide an estimate.*)

Source	Amount	Check if an estimate
USDA.....	Total = $518,000 Range: = $0 – 37,500 (N = 29)	12
North Central Soybean Research Program.....	Total = $357,000 Range = $0 - $27,000 (N = 28)	5
United Soybean Board.....	Total = $33,000 Range: $0 – 18,000 (N = 21)	5
Other grants.....	Total=$149,800 Range: $0 – 80,000 (N = 21)	4
Other (*Please give amount, then specify source below.*) Three states listed state check-off boards, another three listed state government, one state listed extension funds, and a final listed company gifts.	Total=$116,323 Range: $0 – 33,000 (N = 15)	4

18. Will your state's 2005 funding for sentinel plots be sufficient? (*Please check one.*)

Yes 11 No 3 Uncertain 17

Training for Sentinel Plot Monitors

19. How many sentinel plot monitors will be trained for your state? (*Enter 0 if none. If you do not know the exact number, please provide an estimate.*). . . . . .

Number	Check if an estimate
Total=1052 Range: 1 – 300 (N = 31) **If 0 Go to Q 21**	22

20. Please describe the training for monitors.

We received twenty-seven diverse comments. Some states included training that covered scouting procedures, reporting protocols, look-alike diseases, sample handling, and planting and managing sentinel plots. Others offered one-on-one and small group field training. One state conducted weekly teleconferences, and another state instructed monitors to contact the head of its sentinel plot program when they observed unusual foliage.

21. Do you have written procedures for monitoring sentinel plots? (*Please check one.*)

Yes 24 No 4 Uncertain 2

22. Do you have written procedures to follow when reporting sentinel plot findings? (*Please check one.*)

Yes 24 No 3 Uncertain 3

Information About Individual Completing Part 2 (Sentinel Plots)		
Name:		
Title:		
Department:		
Organization:		
Mailing Address:		
City, State, and Zip Code:		
Phone:	**Email:**	

Part 3: First Detectors for Asian Soybean Rust

Please have the person most knowledgeable about your state's first detector program answer Questions 23 - 25.

23a. Will any of the following be first detectors for ASR in your state? (*Please check 'Yes' or 'No' for each category.*)

Possible First Detectors	Yes	No
a. Field-based extension or research personnel	31	0
b. Campus-based extension or research personnel	29	2
c. Private, independent crop consultants	28	3
d. State Department of Agriculture personnel	28	3
e. Agribusiness employees or consultants	28	3
f. USDA/APHIS personnel	16	15
g. Growers	21	9
h. Master Gardeners	6	23

23b. If others will serve as ASR first detectors in your state, please specify below.

_____

_____

_____

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24a. Have any first detectors already been trained to identify ASR? (*Please check one.*)

Yes 26 → How many? Number Total = 5222 (N = 25) No 1 Uncertain 4

24b. Will any (additional) first detectors be trained this year? (*Please check one.*)

Yes 18 → How many? Number Total = 1170 (N = 12) No 2 Uncertain 11

25. Are first detectors being given instructions on how to prepare and where to send samples for confirmation of ASR? (*Please check one.*)

Yes 30 No 0 Uncertain 1

Information About Individual Completing Part 3 (First Detectors)		
Name:		
Title:		
Department:		
Organization:		
Mailing Address:		
City, State, and Zip Code:		
Phone:	**Email:**	

Part 4: Diagnostic Laboratory Facilities and Staff

The person responsible for your state's diagnostic laboratory(ies) should answer Questions 26 - 35.

26. Does your state have sufficient staff to perform diagnostic testing for Asian Soybean Rust (ASR) in 2005? (*Please check one.*)

Definitely yes	4
Probably yes	14
Uncertain	6
Probably not	5
Definitely not	2

27. Does your state have sufficient funding to perform diagnostic testing for ASR in 2005? (*Please check one.*)

Definitely yes	4
Probably yes	6
Uncertain	14
Probably not	4
Definitely not	3

28. How much funding has your diagnostic lab allocated for testing samples for ASR in 2005? (*Enter 0 if none. If you do not know the exact amount, please provide an estimate.)*

Dollars	Check if an estimate
Total = $237,300 (N=29) Range =$0-91,000	20

29. Which test(s) will your diagnostic lab use to confirm ASR? (*Check all that apply.*)

Morphological 30 Molecular 19 Other 10 →*Please specify test below.*

Nine states listed Elisa.
One state listed serological.

30. Will your lab charge to test a sample for ASR? (*Please check one.*)

Yes 8 → How much? Dollars Range = $13 – 50 (N=7) No 17 Uncertain 5

31. How much money do you believe is needed to run the 2005 ASR diagnostic testing program in your state? . . . . . Dollars Range = $0-150,000 (N=28)

32. Will your diagnostic laboratory implement the National Plant Diagnostic Network (NPDN) guidelines for testing for ASR? (*Please check one.*)

Yes 27 No 0 Uncertain 4

33. Has your laboratory developed written ASR protocols for any of the following? (*Please check yes or no for each category.*)

	Yes	No
a. Where to submit samples	29	2
b. How to submit samples	29	2
c. Procedures when samples are received	24	7
d. How samples are to be tested	24	7
e. Reporting results of testing to NPDN	25	6

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34. To whom will your laboratory report the <u>first case</u> of ASR if it is confirmed in your state in 2005? (*Please check all that apply.*)

USDA Beltsville Lab	28	
NPDN Hub Lab	25	
State Department of Agriculture	28	
All other laboratories in the NPDN	9	
Grower whose farm sample came from	30	
State plant regulatory official	28	
State plant health director	24	
Other	18	→ *If other, please specify below* Eleven states listed university officials, and nine listed extension personnel. Others included industry, general public, farm bureaus, first detectors, media, and certified crop advisors.

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35. If ASR is confirmed in your state in 2005, to whom will your laboratory report any subsequent confirmed cases of ASR? (*Please check all that apply.*)

USDA Beltsville Lab	6	
NPDN Hub Lab	18	
State Department of Agriculture	24	
All other laboratories in the NPDN	4	
Grower whose farm sample came from	28	
State plant regulatory official	21	
State plant health director	21	
Other	15	→ *If other, please specify below* Eight states listed extension personnel, and three listed university officials. Others included first detectors, general public, and certified crop advisors. One listed a state rust alert network.

Information About Individual Completing Part 4 (Diagnostic Testing)		
Name:		
Title:		
Department:		
Organization:		
Mailing Address:		
City, State, and Zip Code:		
Phone:	**Email:**	

Part 5: Fungicides and Application Equipment

Please have the individual most knowledgeable about fungicide application, including extension programs on fungicides, answer Questions 36 - 44.

36. Has your state had any difficulties obtaining Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 18 Emergency Exemptions approval(s)? (*Please check one.*)

Yes 4 → *If yes, please specify below* No 26 Uncertain 1

Two of these states noted that difficulties were due to issues with their respective departments of agriculture. One state listed difficulty registering a specific product, and a final state noted uncertainty over details of the exemptions.

37. Has your extension program prepared guidance for applying fungicides? (*Please check one.*)

Yes 29 No 1 Uncertain 1

38. Have you obtained information or consulted with officials from Brazil or other countries regarding lessons learned about fungicide application for ASR? (*Please check all that apply.*)

Yes, with Brazil 25 Yes, with another country(ies) 10 No 5

↓

(*Please specify the country(ies)*)

Nine states listed Zimbabwe, 4 listed South Africa, 2 listed Argentina, and one listed Paraguay.

39. Do most growers and commercial applicators in your state have a good understanding of the types and product names of fungicides available to treat ASR? (*Please check one.*)

Definitely yes	9
Probably yes	18
Uncertain	4
Probably not	0
Definitely not	0

40. Do most growers and commercial applicators in your state have a good understanding of when to apply fungicides for ASR? (*Please check one.*)

Definitely yes	5
Probably yes	18
Uncertain	5
Probably not	3
Definitely not	0

41. Do most growers and commercial applicators in your state have a good understanding of the appropriate ways to apply fungicide? (*Please check one.*)

Definitely yes	8
Probably yes	15
Uncertain	7
Probably not	1
Definitely not	0

42. Approximately how many soybean growers in your state own equipment for applying fungicides? (*Please check one.*)

1-25%	6
26-50%	7
51-75%	3
76-99%	4
100%	2
Uncertain	9

43. Are there enough commercial applicators to provide service to growers in your state who do not own equipment to apply APR fungicide? (*Please check one.*)

Yes 8 No 5 Uncertain 17

44a. Given the number of growers who have their own equipment, the number of commercial applicators and the potential demand on them, and the availability of fungicide, about what percentage of your state's soybean acreage could be sprayed within five days following the confirmation of ASR in your state? . . . . . Percentage Range: 20 - 100% (N=25)

44b. Please use the space below to comment on your answer to Question 44a, if desired.

Respondents' comments were primarily concerned with the obstacles their states would face in the above scenario. Seven states noted that having enough equipment to spray might be a problem, while 5 noted that weather conditions would affect how fast spraying could occur. Others noted that equipment might be in use for other things and that the availability of fungicide might be a problem in their states.

Information About Individual Completing Part 5 (Fungicides)		
Name:		
Title:		
Department:		
Organization:		
Mailing Address:		
City, State, and Zip Code:		
Phone:	**Email:**	

45. No questionnaire of this type can cover every relevant topic. If you wish to expand on your answer(s) or comment on any other topic related to ASR, please use the space below. Or, if you wish, you may email your comments to Deborah Ortega at ortegad@gao.gov.

Four states noted their concerns about funding for research, sentinel plots, or diagnostic facilities. Others noted that they wanted more guidance for sentinel plot procedures and crop insurance. Three states said they were concerned about the availability of fungicide. One state noted that access to USDA research findings was slow; one state thought that their diagnostic lab would be understaffed, and one state noted confusion over spraying procedures.

(360578)

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