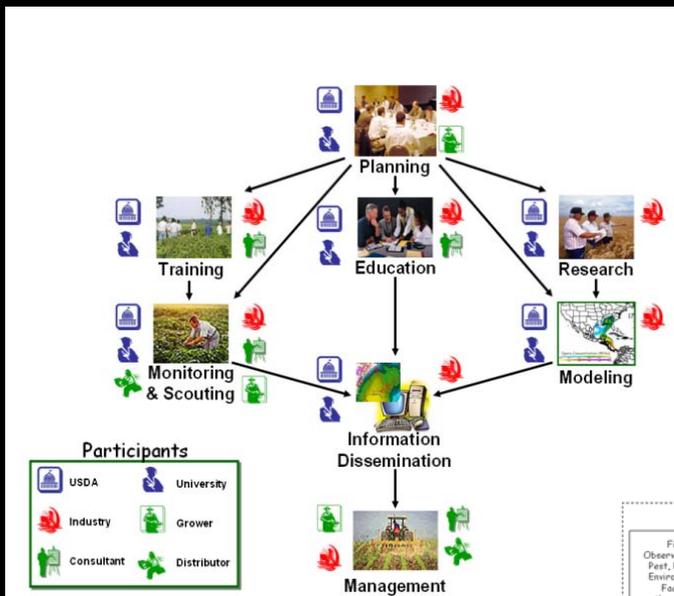
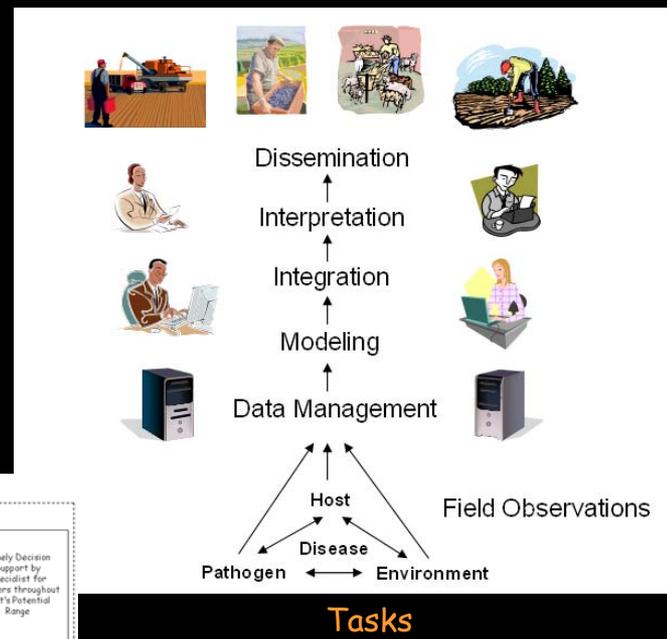
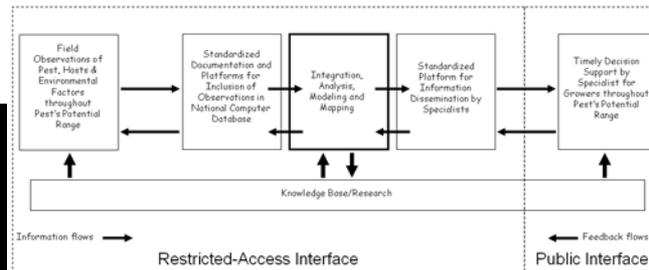


Early Warning Systems for Rust Diseases

Scott A. Isard
 Professor of Aerobiology
 Departments of Plant Pathology
 & Meteorology
 Penn State University



Components & Participants



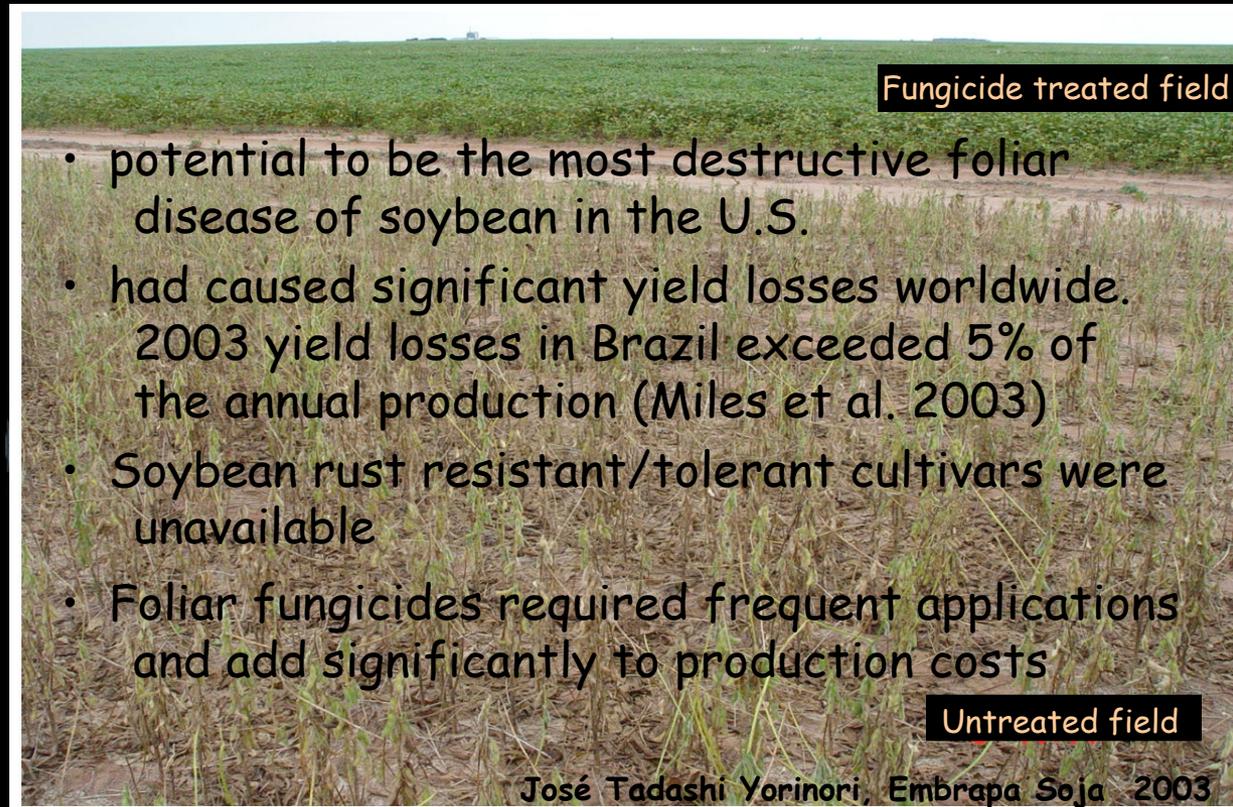
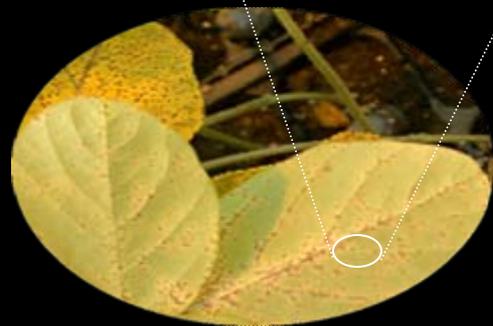
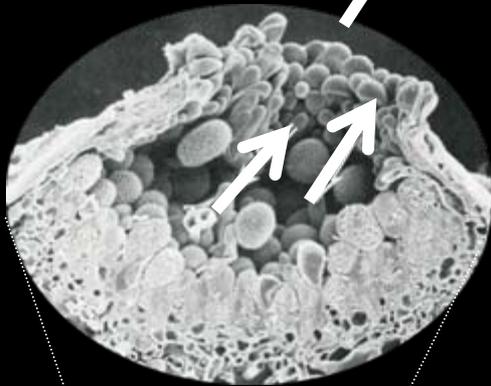
Tasks

Early Warning Systems for Rust Diseases

Lessons learned from the Soybean Rust experience

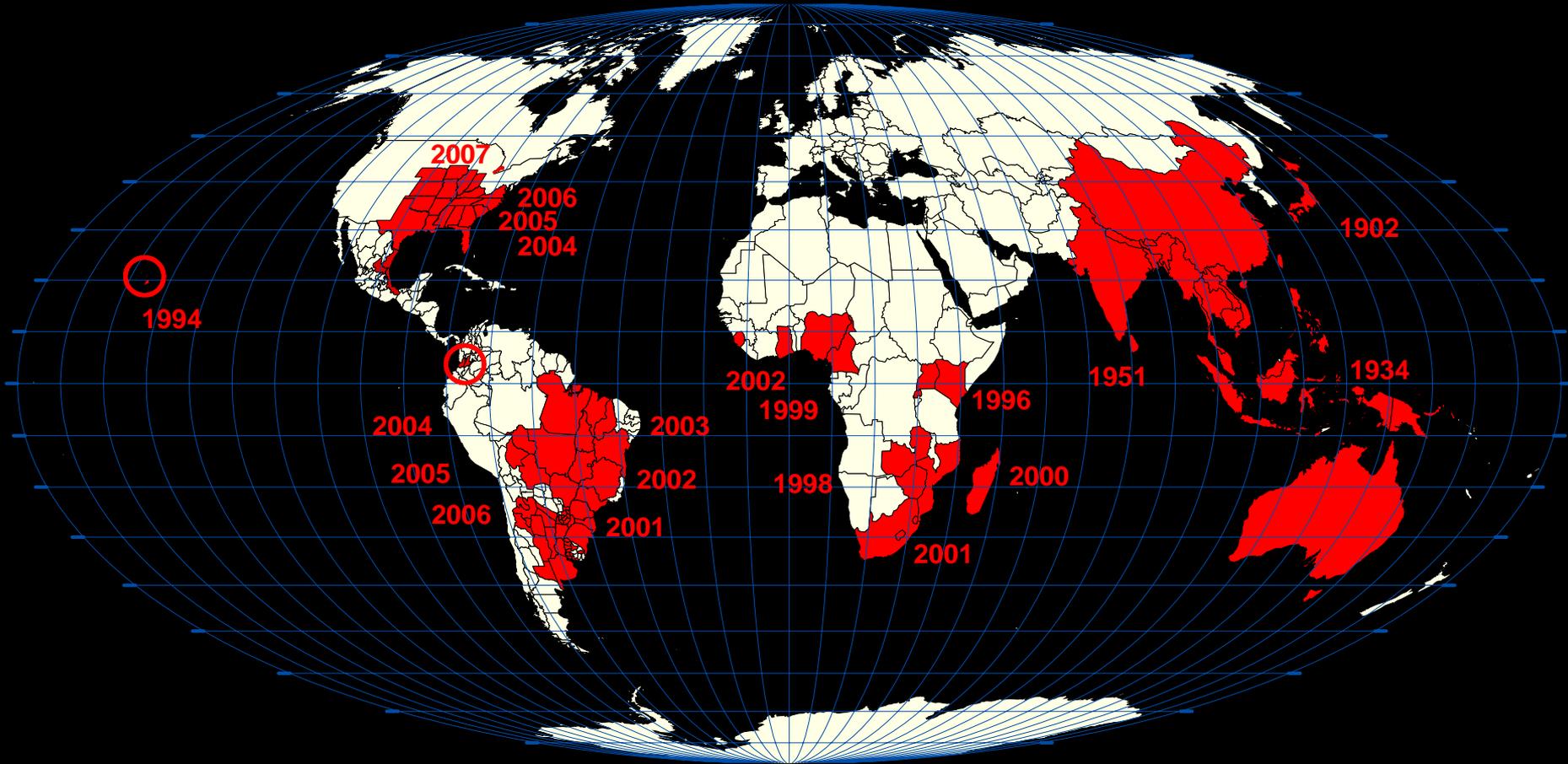
Preparing for "in-season" management of new wheat stem rust races

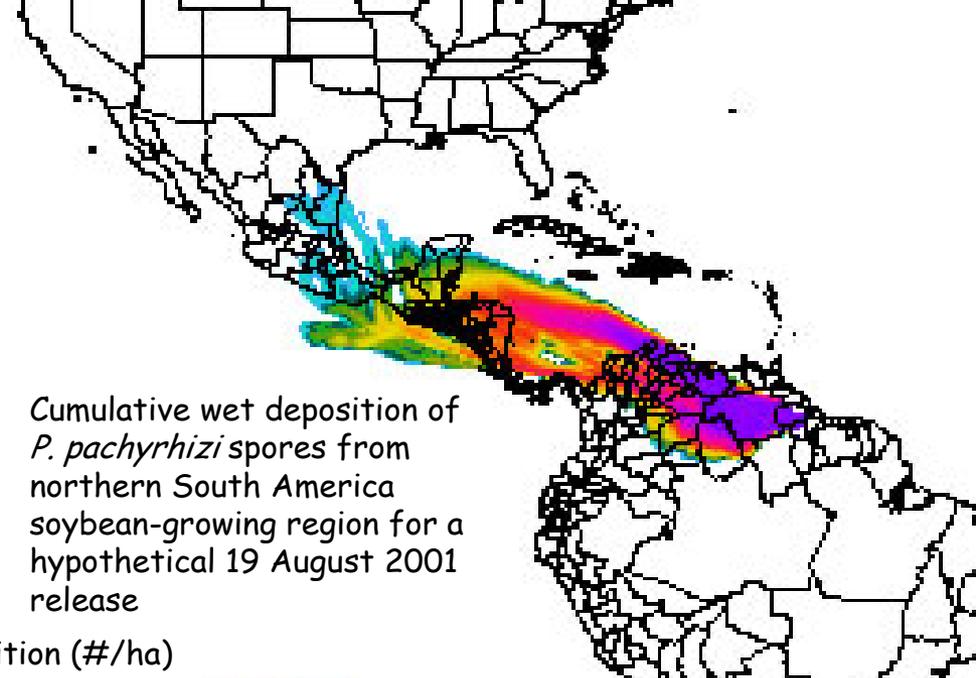
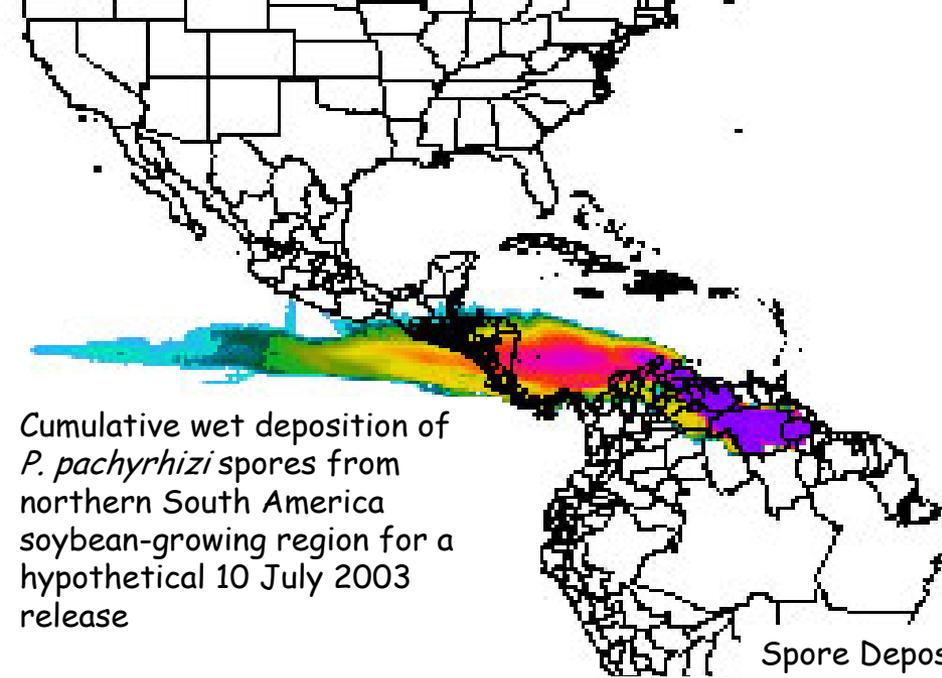
Situation regarding SBR in 2004 prior to entry into US



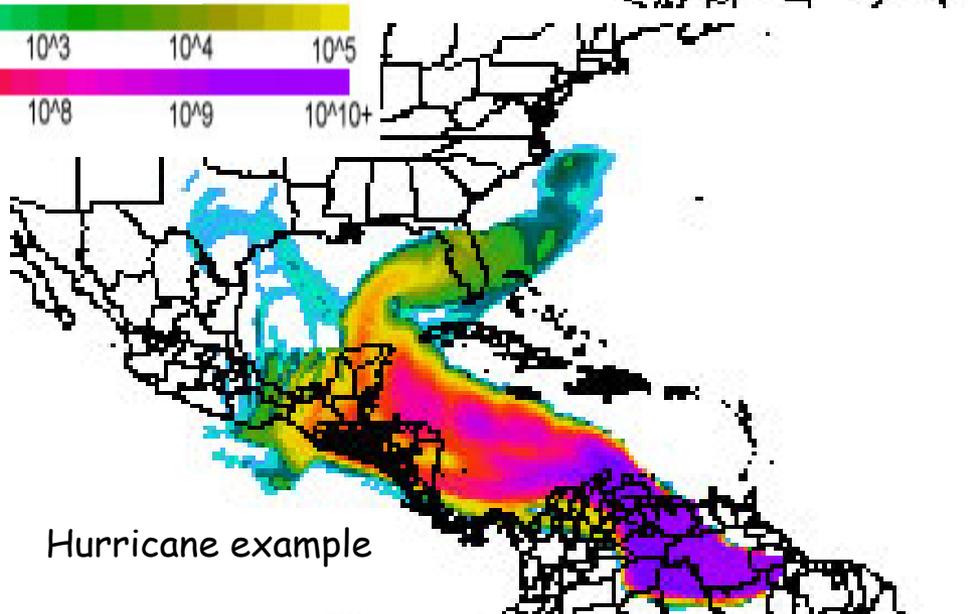
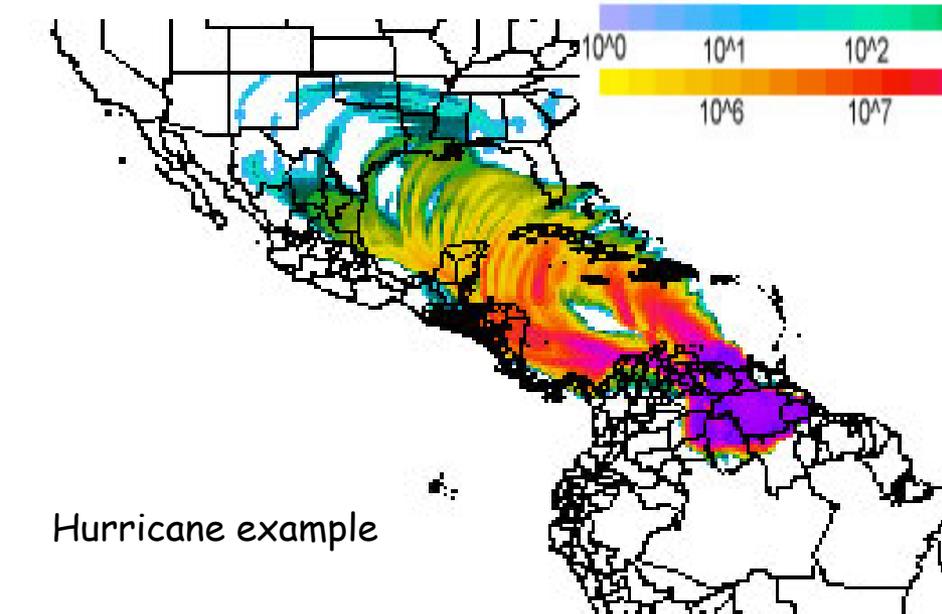
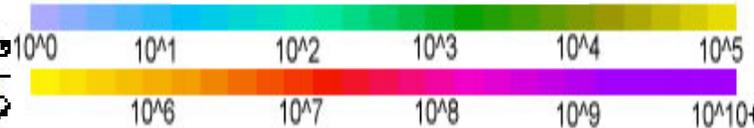
- potential to be the most destructive foliar disease of soybean in the U.S.
- had caused significant yield losses worldwide. 2003 yield losses in Brazil exceeded 5% of the annual production (Miles et al. 2003)
- Soybean rust resistant/tolerant cultivars were unavailable
- Foliar fungicides required frequent applications and add significantly to production costs

Soybean Rust Spread





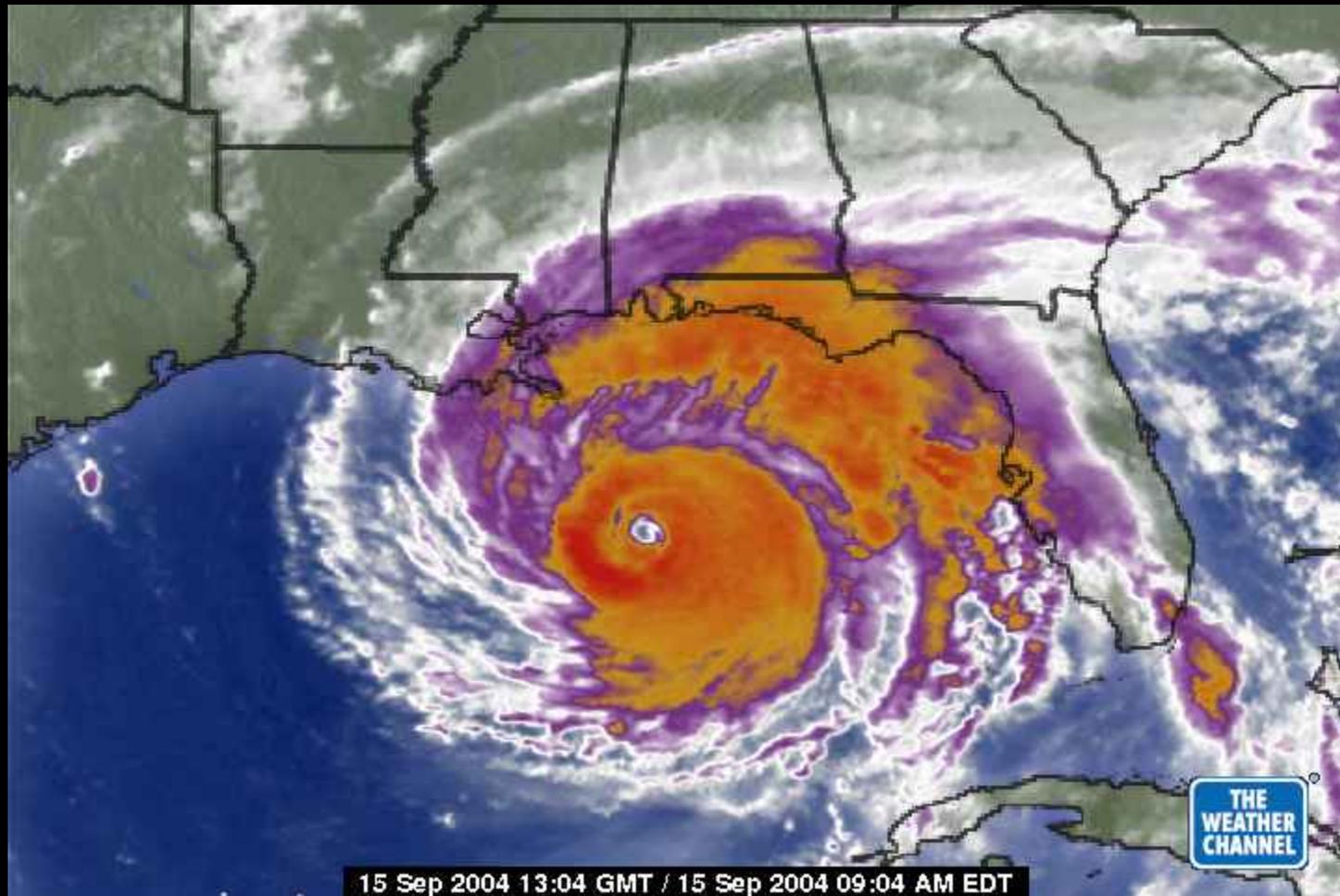
Spore Deposition (#/ha)



Cumulative wet deposition of *P. pachyrhizi* spores from northern South America soybean-growing region for a hypothetical 21-27 August 1999 release.

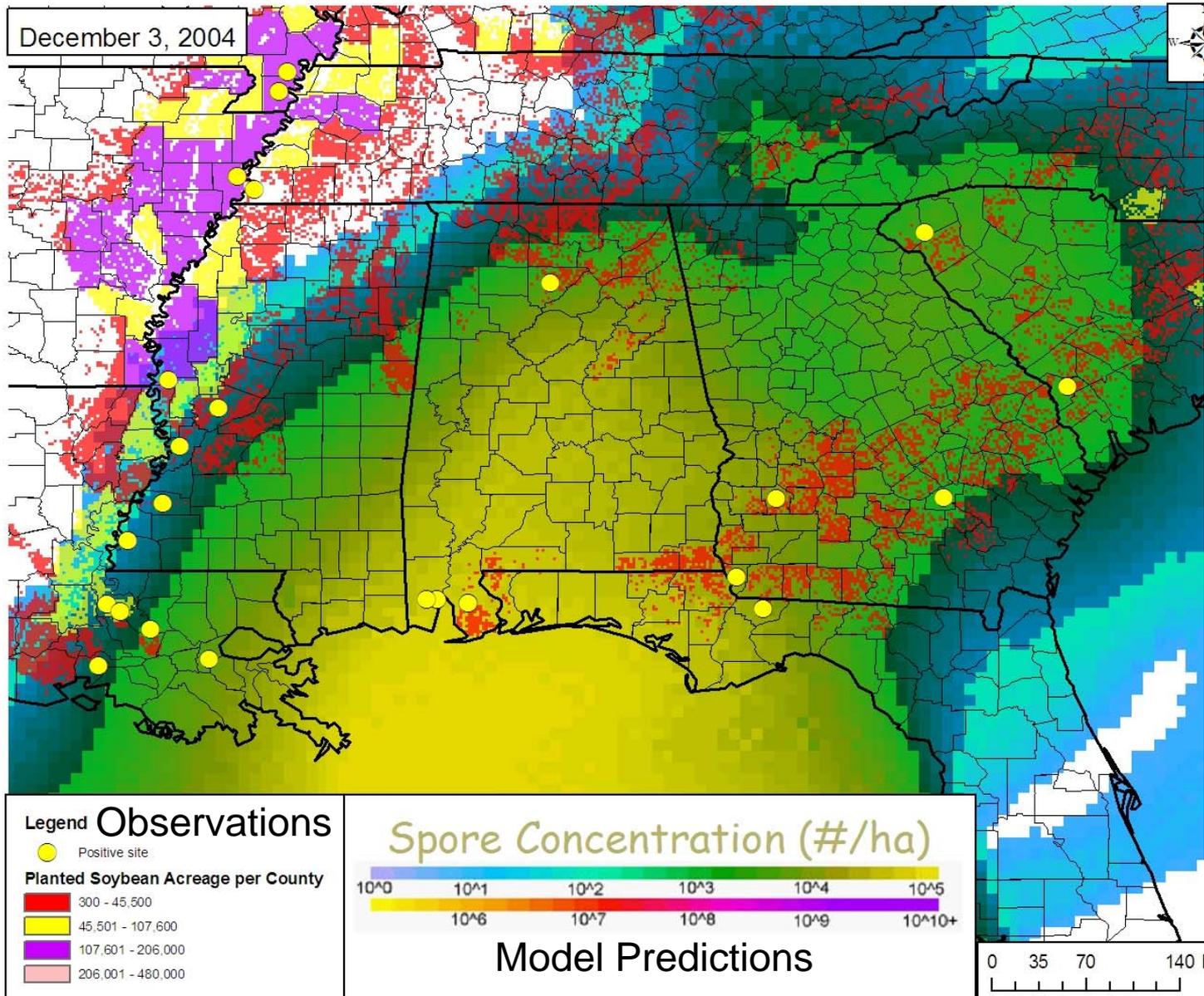
Cumulative wet deposition of *P. pachyrhizi* spores from northern South America soybean-growing region for a hypothetical 22-29 August 2003 release.

Hurricane Ivan 2004



September 15, 2004

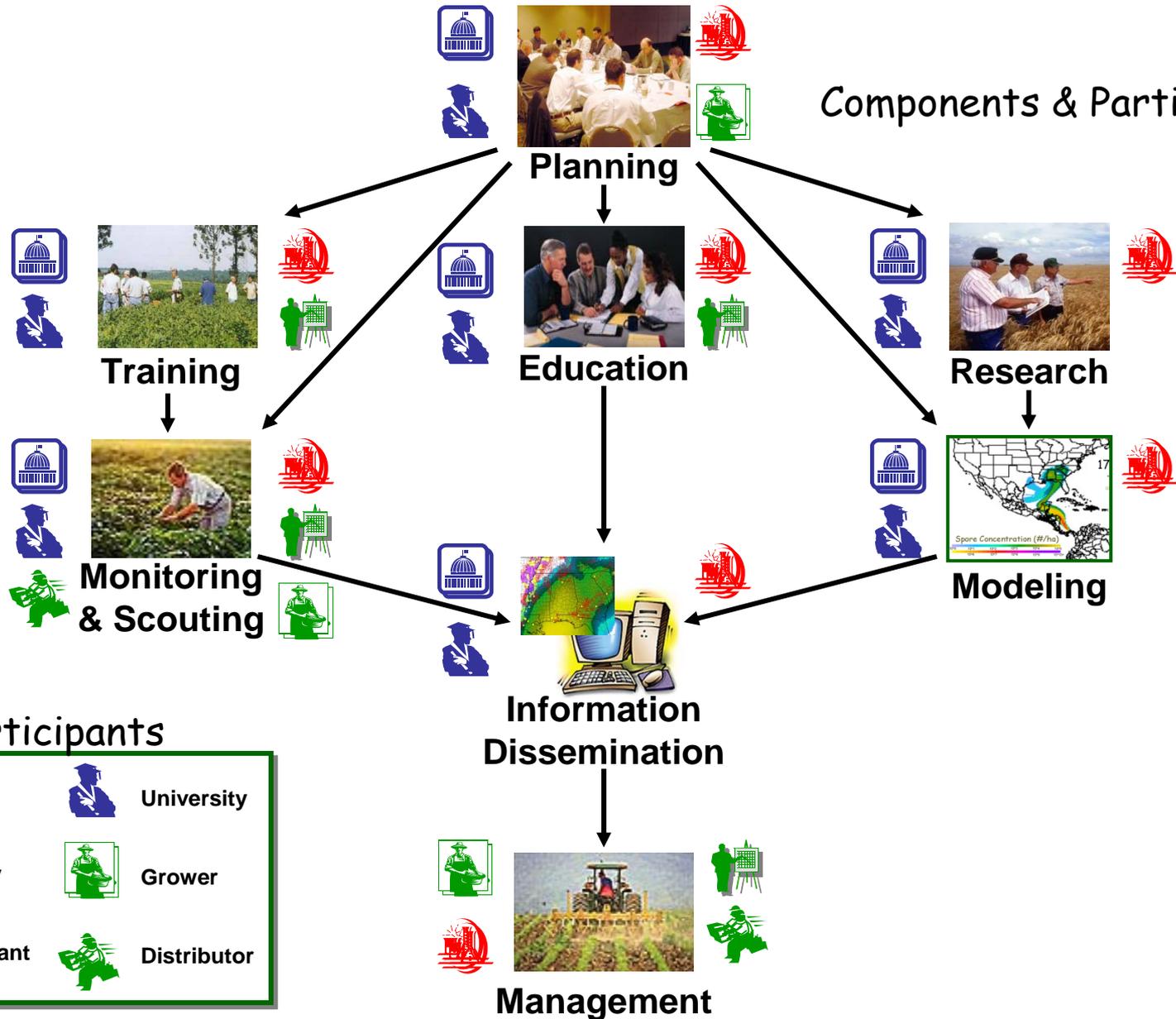
2004 Soybean Rust Incursion into Southeastern U.S.



USDA Soybean Rust Coordinated Framework

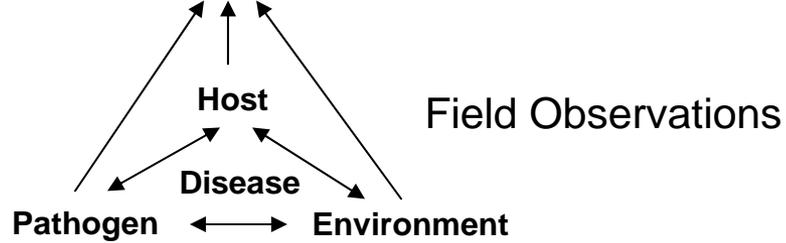
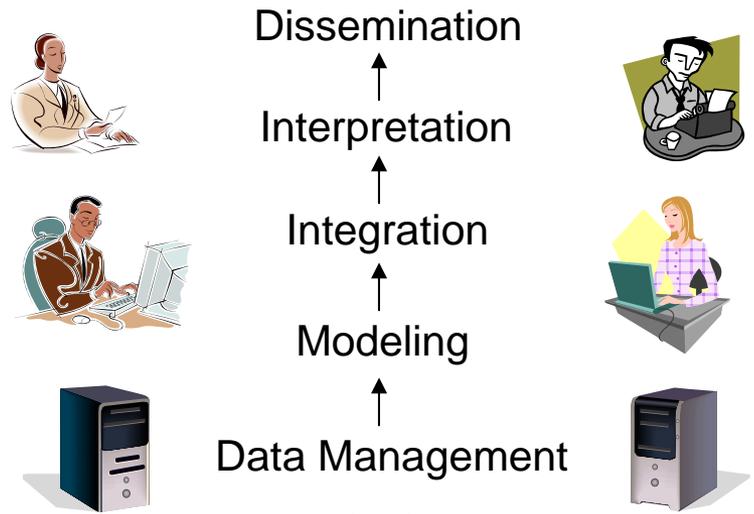
From planning to management in 2004/2005

Components & Participants

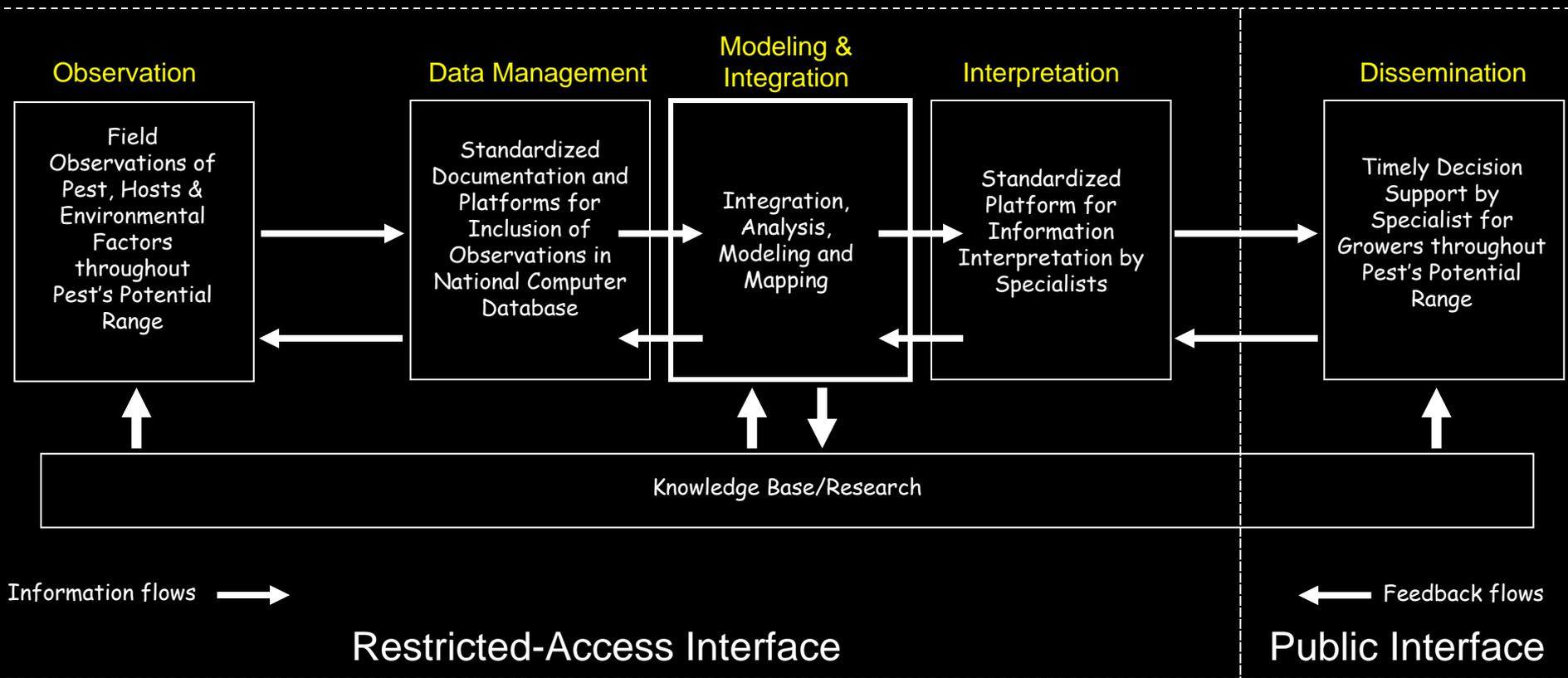


Combining Information Technology and IPM Paradigms

Tasks



Pest Information Platform for Extension & Education (PIPE)



People and computers linked by "state-of-the-art" Information Technology

Plot Setup Form

Observer: Scott Isard

Obs Date: 2005 Sep 29

Country: USA

State: ..

County: ..

Location Type: ..

Location Name: - Select one or enter below -

Longitude (DD):

Latitude (DD):

Diagnostic Laboratory Form

Lab ID:

Obs Date:

Country:

State:

County:

Location Type:

Location Name:

Longitude (DD):

Latitude (DD):

Field Sample ID:



e Usage

Save Obs

Data Entry Form

Obs Date: 2005 Sep 29

Country: USA

State: ..

County: ..

Location Type: ..

Location Name: - Select one or enter below -

Longitude (DD):

Latitude (DD):

Plot 1

Plot ID:

Host: ..

Cultivar:

Plant Date: 2005 Sep 29

Height: ..

Veg Stage: ..

Rep Stage: ..

Canopy Closure: ..

Continue

Save Obs

Observation Forms Help

- Location Type -

Location Name Setup

Online Download Upload

Entry Excel Excel

PDA Edit

Soybean rust, kudzu and other weeds are appropriate eight different counties in 28 counties in Louisiana are active and plant samples have prevailed.

Data Management and Integration

APHIS researcher

Sentinel Protocol Map Description Download Geotiff SBR Images Help

Up

August - 2005

	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September - 2005

			1	2	3	
4	5	6	7	8	9	10

Observation Researcher - 2005-09-29

State Point
County Commentary

Sentinel Plots Load

Chronology of Positive Detections

Observation Researcher

Sim Daily Spore Transport

Sim Daily Wet Dep Land

Sim Acc Wet Dep Land

ID	County	Date	Loc Type	Loc Name	Host	Cultivar	Reproductive Growth Stage	Vegetative Growth Stage	Pest	Status
11725	Jefferson	2006-07-27	Sentinel in-season	JEFFERSONnursery-7	SOYBEAN	DP7220	R5	--	Soybean Rust	Positive
11053	Marion	2006-07-27	Kudzu/wild legumes	MARION4	KUDZU	--	--	--	Soybean Rust	Negative
11054	Marion	2006-07-27	Kudzu/wild legumes	MARION5	KUDZU	--	--	--	Soybean Rust	Negative
11057	Marion	2006-07-27	Kudzu/wild legumes	MARION6	KUDZU	--	--	--	Soybean Rust	Positive
11055	Hernando	2006-07-26	Kudzu/wild legumes	hernando1	KUDZU	--	--	--	Soybean Rust	Negative
11056	Hernando	2006-07-26	Kudzu/wild legumes	hernando2	KUDZU	--	--	--	Soybean Rust	Negative
10999	Gadsden	2006-07-24	Kudzu/wild legumes	NFRECO-6	KUDZU	--	--	--	Soybean Rust	Positive
11086	Gadsden	2006-07-21	Sentinel in-season	GADSDEN1Arotplots-3	SOYBEAN	DP7220	R6	--	Soybean Rust	Positive
11087	Gadsden	2006-07-21	Sentinel in-season	GADSDEN1Arotplots-5	SOYBEAN	DP7220	R5	--	Soybean Rust	Negative
11088	Gadsden	2006-07-21	Sentinel in-season	GADSDEN1Arotplots-7	SOYBEAN	DP7220	R4	--	Soybean Rust	Negative

ed. suspected scouted, confirmed
ot + Lab ▲ Industry

ational Commentary

mentary (updated: 09/21/05)

y to report soybean rust. Oconee County in Georgia is the
has been found in 2005. Calhoun County in SC is the furthest
arl River County in Mississippi is the furthest west that rust
unties reported positive with rust; Florida has 22; Georgia has

Additional Links

[Aerobiology Risk Analysis](#)

[American Phytopath. Society Home](#)

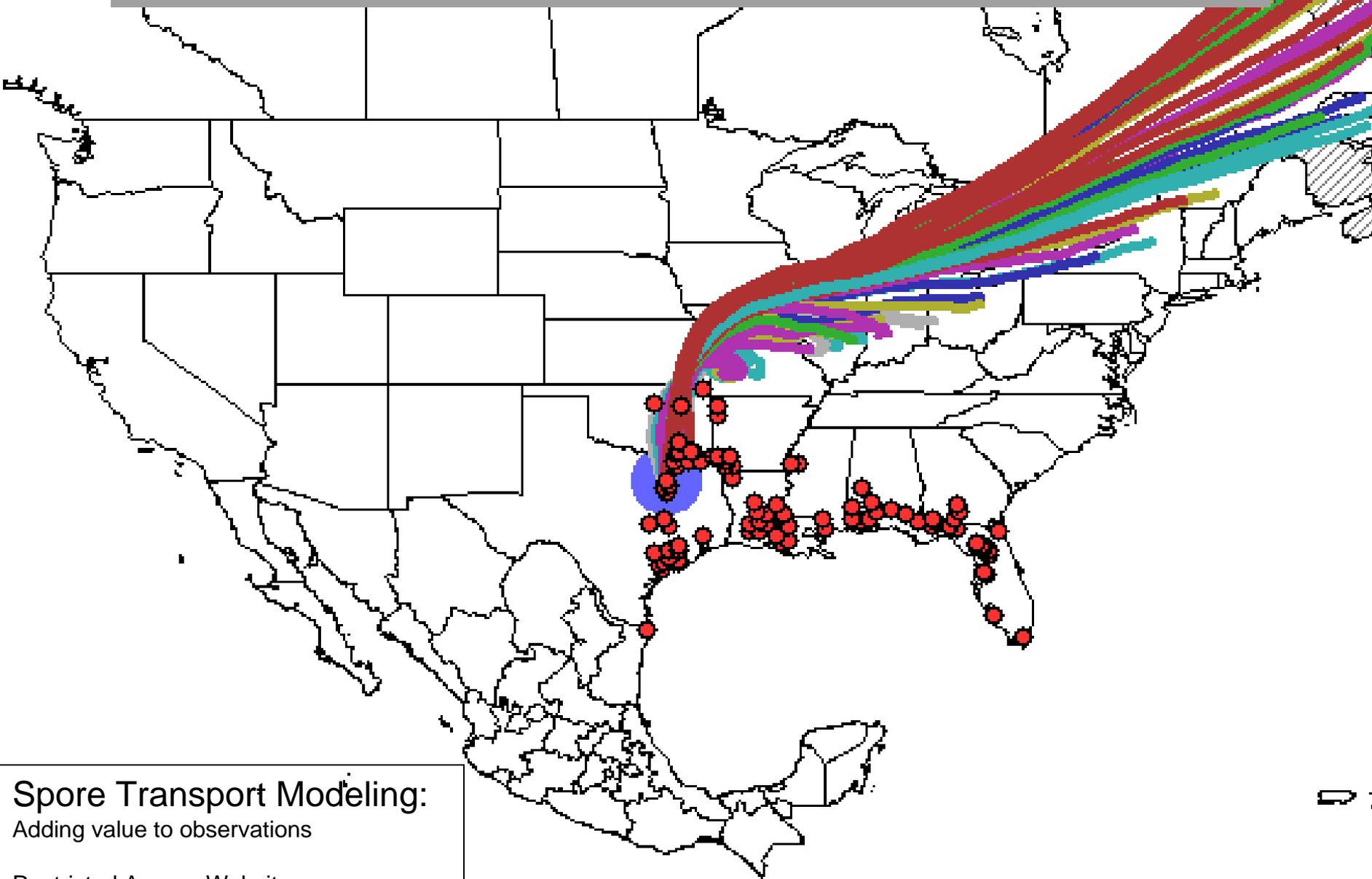
[Page](#)

[Animated Hurricane Maps](#)

[Soybean rust Identification card](#)

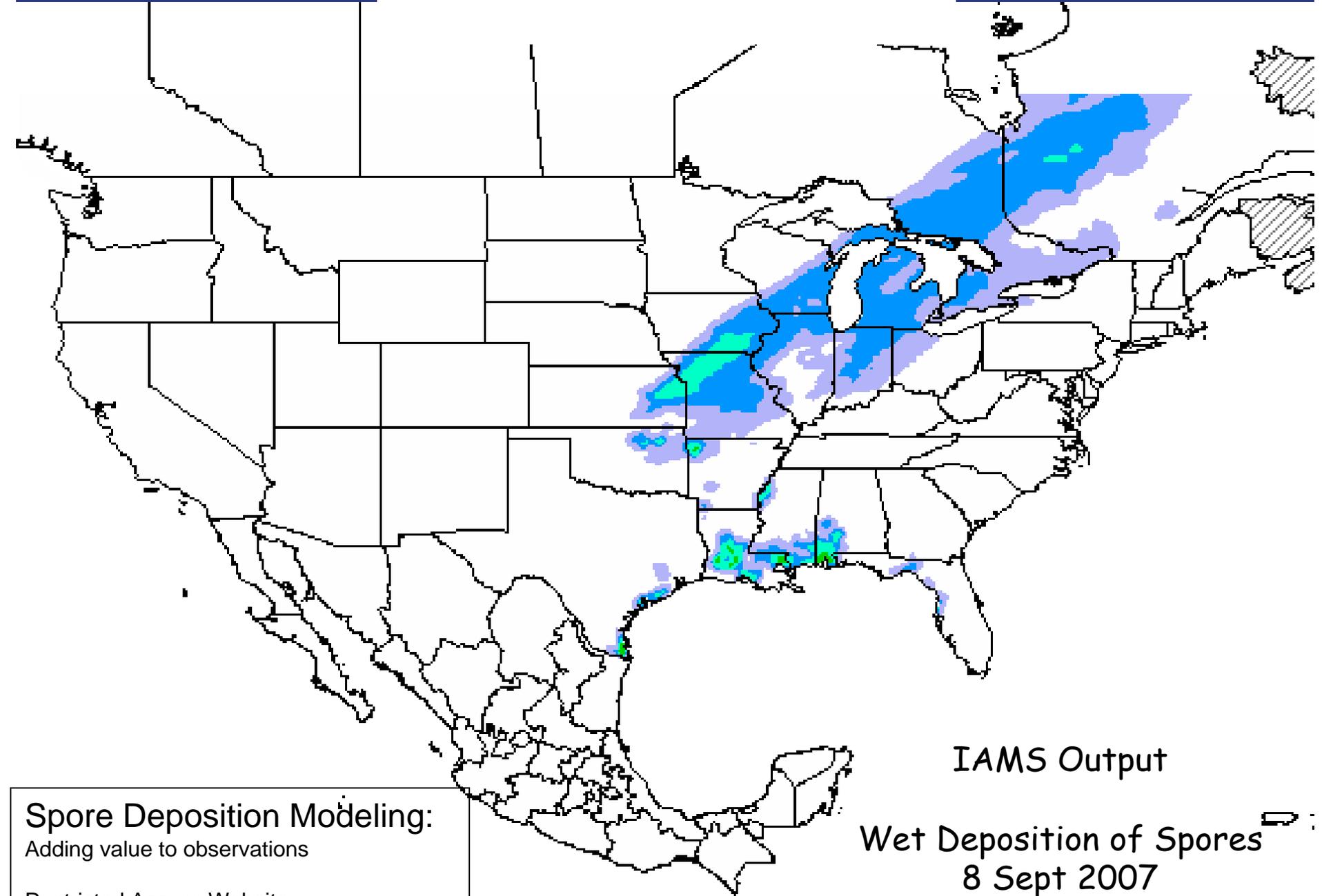
Done Inters

The HYSPLIT simulations displayed use NOAA's models and data, but are not created by NOAA



Spore Transport Modeling:
Adding value to observations
Restricted Access Website





Spores/Land Area (#/ha)



Disease Severity Modeling

Adding value to observations

APHIS researcher ▼
Sentinel Protocol
Map Description
Download Geotiff
SBR Images
Help

Up

August - 2005						
	1	2	3	4	5	6
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14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September - 2005

			1	2	3	
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

October - 2005

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2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Down

? State Point
 County Commentary

- Overlay - ▼ Load

crop

no crop

spores

no spores

% infection (lesion formation)

latent

0-20

21-40

41-60

61-80

81-100

Sim Lead Soy LAI

Sim Acc Dep Soy Leaf

Sim Lead Dis Sev Soy

Sim Soy Scouting Areas

Observation Public

USDA Links

[APHIS-PPO Soybean Rust Site](#)
[CSREES Web site](#)
[National Plant Diagnostic Network site](#)
[Return to: USDA SBR website](#)
[USDA Position on Spore trapping](#)

[Edit National Commentary](#)

National Map Commentary (updated: 08/16/05)

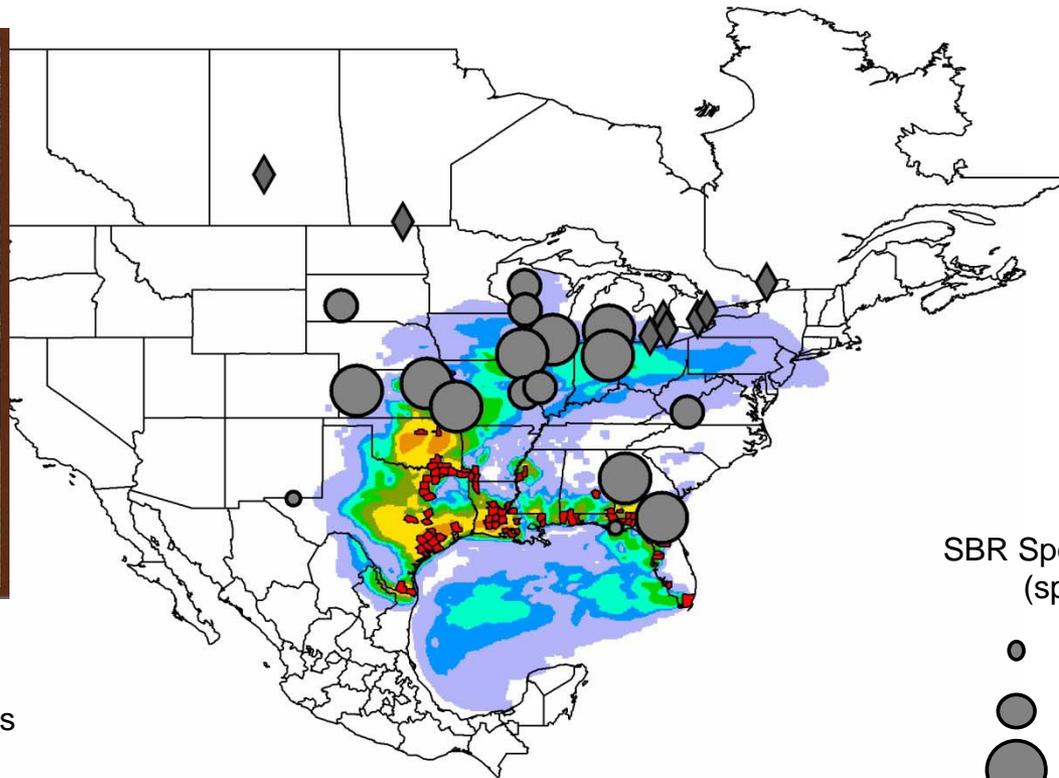
By August 24th, rust is expected to be light to moderate to heavy in Georgia, part of Alabama and Florida. New light infestation is expected in Louisiana. All other states are expected to have either latent or no infection.

Additional Links

[Aerobiology Risk Analysis](#)
[American Phytopath. Society Home Page](#)
[Animated Hurricane Maps](#)
[Soybean rust Identification card](#)

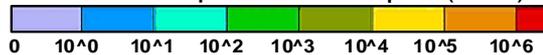
Comparison of IAMS Spore Deposition Predictions and SBR Spore Collections (16-22 August 2007)

NADP Rainwater Collector



■ County with SBR infected sites
 (21 August 2007)

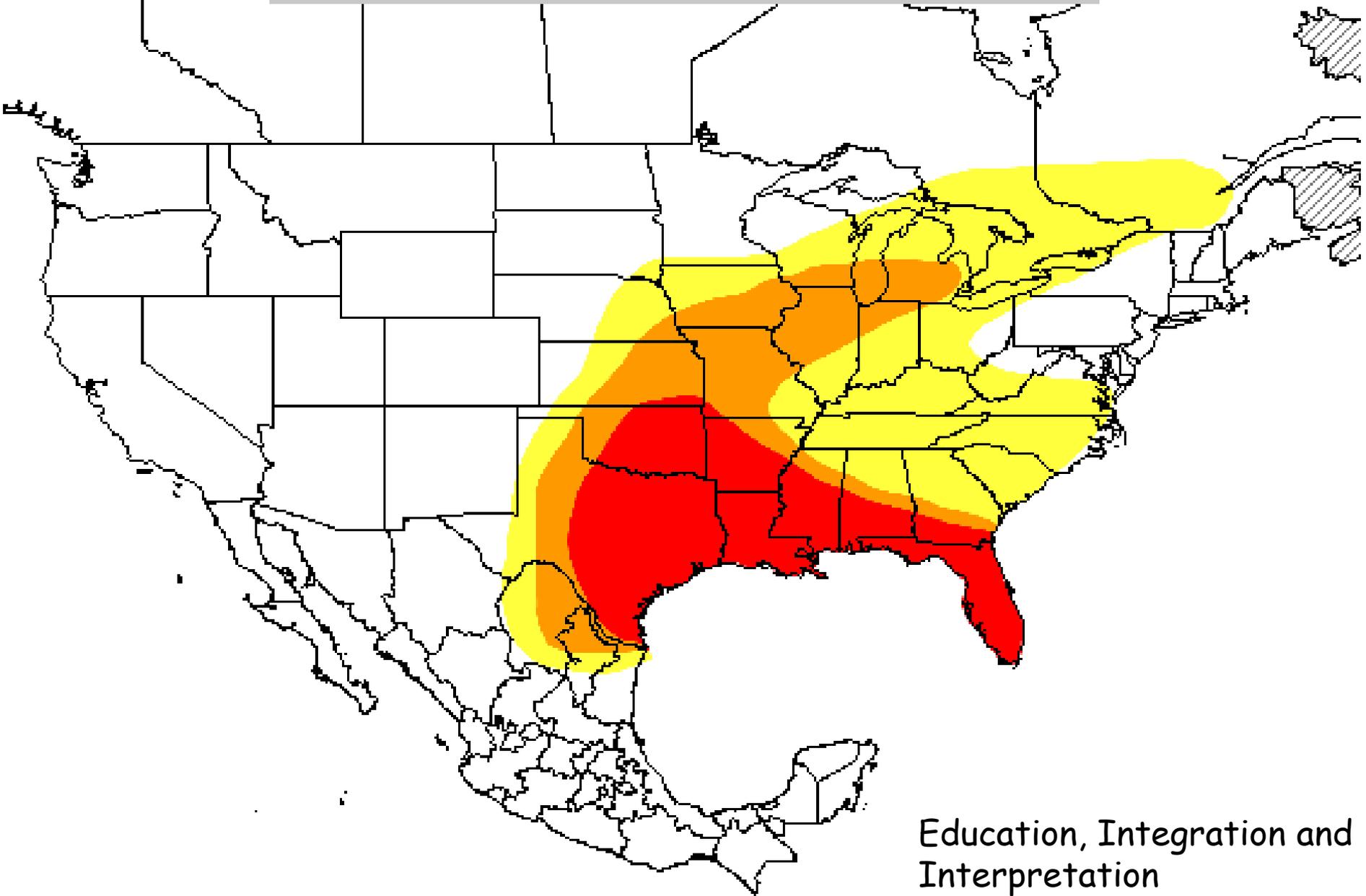
IAMS Wet Deposition Output
 Viable SBR Spores/Land Area (#/ha)



SBR Spore Collections (spores/m²)

- 0 - 20
- 21 - 80
- 81 - 320
- >321
- ◆ Positive, # of spores unknown

SBR Activity Ensemble: 1 - 2 Day Forecast (2007-09-07)



Education, Integration and Interpretation



Interpretation & Communication by Specialists

(maps, textboxes, uploads)

APHIS

Florida
Observation
2005
Sep
29
Help

No Entry
 Not Found
 Suspect
 Confirmed

County: Dixie

Florida
Public Commentary
2006
Aug
2

Florida Commentary

Crop Growth Stage Last Modified: 07/25/06 10:56 AM [Expand](#)

Most commercial soybeans are planted and at late vegetative stages or early reproductive stages.

Observation and Outlook - Disease Last Modified: 07/28/06 01:45 PM [Expand](#)

A soybean sentinel plot in Jefferson County in North Florida was PCR positive for soybean rust on MGVII leaves collected 7/27/06. Two MGVII leaves were found to have 2% disease severity; another MGVI leaf from the same plot was also identified to have a small amount of rust.

Scouting and Management - Disease Last Modified: 07/25/06 10:56 AM [Expand](#)

Start scouting when you reach R1 or when nearby infections are identified. You should be ready to act in case disease does develop in your region.

Florida Hyperlinks

Active	Category	Display Name	Address	
<input checked="" type="checkbox"/>	State Link	FDACS Information	http://www.doacs.state.fl.us/pi/enpp/pa	<input type="button" value="Delete"/>
<input checked="" type="checkbox"/>	State Link	SPDN Information	http://spdn.ifas.ufl.edu/soybean_rust.htm	<input type="button" value="Delete"/>
<input checked="" type="checkbox"/>	State Link	FL Soybean Rust page	http://spdn.ifas.ufl.edu/Florida_Soybean	<input type="button" value="Delete"/>

[Return to: USDA Positive](#)

[Management Page](#)

Public Website: Observation Map



United States Department of Agriculture

**Soybean Rust
Information Site**

Getting Started

Prev **Next**

August - 2005

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7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September - 2005

			1	2	3	
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

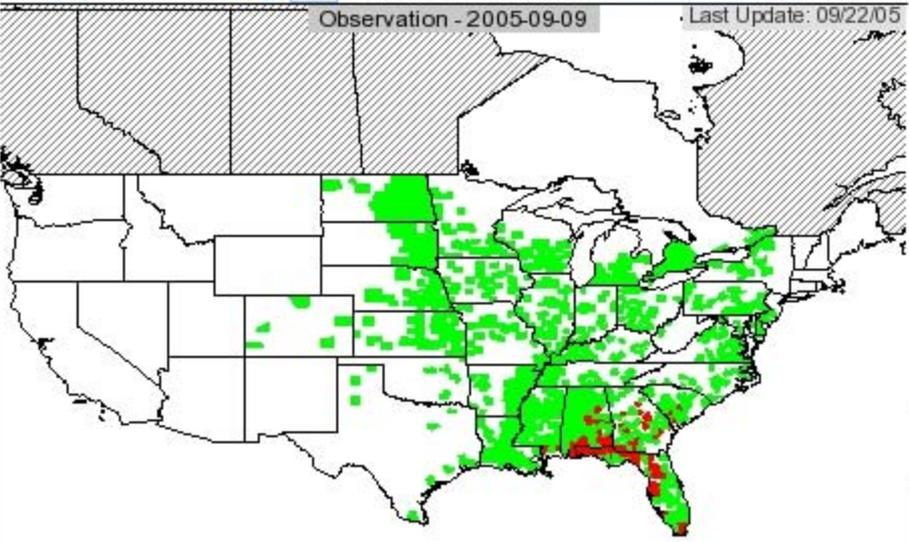
October - 2005

					1	
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					



Map Description - Overlay - Load

Observation - 2005-09-09 Last Update: 09/22/05





Sign Up For Alerts

Sep 09, 2005

Observation



State Update Map



Chronology of Positive
Detections

SBR Forecast (09/09/05)

Tropical storm Ophelia brings new spore depositions to the southeastern U.S. coast.

Click For Details...

USDA Links

[APHIS-PPQ Soybean Rust Site](#)

[CSREES Web site](#)

[National Plant Diagnostic Network site](#)

[Return to: USDA SBR website](#)

[USDA Position on Spore trapping](#)

Printable Map

National Map Commentary (updated: 09/09/05)

Marion county in Georgia is the newest county to report soybean rust. Oconee County in Georgia is the furthest northern location where soybean rust has been found in 2005. Calhoun County in SC is the furthest east that soybean rust has been found while Pearl River County in Mississippi is the furthest west that rust has been found in 2005. Alabama now has 13 counties reported positive with rust; Florida has 22; Georgia has 16; Mississippi has two; and South Carolina has three. There were 35 counties reporting soybean rust in the month of August with five reports so far in September. New reports of soybean rust are expected to continue within states

Additional Links

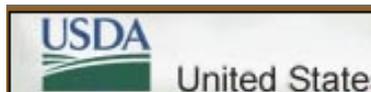
[Aerobiology Risk Analysis](#)

[American Phytopath. Society Home Page](#)

[Animated Hurricane Maps](#)

[Soybean rust Identification card](#)

Public Website: Specialist Commentary



Getting Started

[Prev](#) [Next](#)

July - 2006

						1	
2	3	4	5	6	7	8	
9	10	11	12	13	14	15	
16	17	18	19	20	21	22	
23	24	25	26	27	28	29	
30	31						

August - 2006

		1	2	3	4	5	
6	7	8	9	10	11	12	
13	14	15	16	17	18	19	
20	21	22	23	24	25	26	
27	28	29	30	31			

September - 2006

					1	2	
3	4	5	6	7	8	9	
10	11	12	13	14	15	16	
17	18	19	20	21	22	23	
24	25	26	27	28	29	30	

LA Commentary

- [ID/Scouting Tools](#)
- [Not sure if it is Rust?](#)
- [Other SBR Sites](#)
- [Hurricane Animations](#)
- [Observation Animations](#)
- [Partners](#)
- [Professional Societies](#)

Select a State/Province: ▼

Crop Growth Stage Last Modified: 08/14/06 05:04 PM

Harvesting has begun in many of the soybean growing areas especially with early maturing varieties or those planted early. Some late planted beans are in the early reproductive stage.

GFP Tool

Click to document management practices

Observation and Outlook - Disease Last Modified: 08/23/06 12:16 PM

ASR was found in Concordia Parish in a commercial field (which also contains the soybean sentinel plot) of Group V soybeans at the R6 stage. Incidence and severity levels were low. This brings to eight (8) the number of parishes in which ASR has been found on either soybeans or kudzu. Please check the federal public website <http://www.sbrusa.net/> to see where ASR has been confirmed in the US.

Observation and Outlook - Insect Last Modified: N/A

Commentary Not Available

Scouting and Management - Disease Last Modified: 08/23/06 12:16 PM

ASR was found in Concordia Parish in a commercial field (which also contains the soybean sentinel plot) of Group V soybeans at the R6 stage. Incidence and severity levels were low. This brings to eight (8) the number of parishes in which ASR has been found on either soybeans or kudzu.

The recommendation is for soybeans in the R1 through R5 growth stages and have a good yield potential be treated with a rust fungicide. The fungicides for rust control have a triazole alone or in combination with a strobilurin. These products are listed in the 2006 Plant Disease Management Guide and are on the LSU AgCenter Rust website, <http://www.lsuagcenter.com/soybeanrust>.

Again, it is especially important at this time to monitor your crop very carefully and be alert for reports of disease outbreaks in the area. You can monitor the AgCenter's website (<http://www.lsuagcenter.com/soybeanrust/>), contact your county agent, or call the Asian Soybean Rust Hotline at 1-800-516-0865.

Scouting and Management - Insect Last Modified: N/A

Commentary Not Available

Management Guidelines for Growers

Website - M  <http://www2.sbrusa.net> - Guidelines - Microsoft Internet Explorer

National Soybean Rust Management Guidelines
Last Updated May 01, 2006

Vegetative Growth Stages
Current data indicate that fungicide applications are not needed in the early vegetative growth stages. Spraying just prior to crop flowering (R1) may be prudent if disease is increasing. This is especially true for late-planted crops and/or very late-maturing varieties that may develop a large canopy before flowering.

R1-R5 Reproductive Stages
Soybean rust symptoms are most prevalent, and increase most rapidly, during crop reproductive growth stages. The first fungicide application should be made before rust has appeared on more than 2% of the leaves in the crop canopy. One, two, or three applications may be needed, depending upon what growth stage the disease is first detected and subsequent environmental conditions. Consecutive applications of either strobilurins or triazoles alone should never be made due to resistance concerns. Refer to fungicide labels for specific directions and restrictions.

R6 and later
Spraying at late growth stages is not recommended due to lack of yield response. In addition, many fungicides have days to harvest (preharvest intervals) or growth stage restrictions. Refer to fungicide labels for specific directions and restrictions.

USDA

Getting E

[Prev](#)

September

3	4	5	6	
10	11	12	13	
17	18	19	20	
24	25	26	27	

October

1	2	3	4	
8	9	10	11	
15	16	17	18	
22	23	24	25	
29	30	31		

November

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5	6	7	8	
12	13	14	15	
19	20	21	22	
26	27	28	29	

FL Comments

- [FL Links](#)
- [ID/Scouting To](#)
- [Not sure if it is](#)
- [Other SBR Site](#)
- [Hurricane Anir](#)

Done  Internet

Automatic Notification Functions



United States Department of Agriculture

Pest Information Platform
for Extension and Education

http://www2.sbrusa.net - Alert Signup - Micros...

Sign Up For Alerts

Oct 01, 2006

Legumes/Kudzu
Soybean Rust

- Overlay - Load

006-10-01 Last Update: 09/30/06

E-Mail Alert Signup

[Signup Help](#)

The USDA Soybean Rust email notification system will send an email alert each time new information about soybean rust is made available for the region and/or state you specified.

*Email:

*Region: --- Please Select One ---

[Region Map](#)

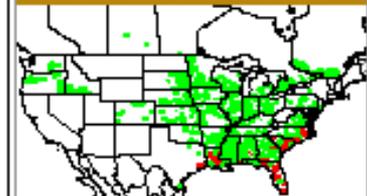
State: --- All States in Region ---

Affiliation: --- Please Select One ---

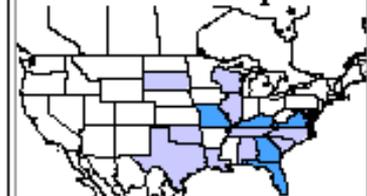
* Required

September			
3	4	5	6
10	11	12	13
17	18	19	20
24	25	26	27
October			
1	2	3	4
8	9	10	11
15	16	17	18
22	23	24	25
29	30	31	
November			
			1
5	6	7	8
12	13	14	15
19	20	21	22
26	27	28	29

SB Rust Observation



SB Rust State Update



Chronology of Positive Detections

SBR Forecast
[Click For Details...](#)

FL Comment

- [FL Links](#)
- [ID/Scouting T](#)
- [Not sure if it i](#)
- [Other SBR Sites](#)
- [Hurricane Animations](#)
- [Observation Animations](#)
- [Partners](#)

(updated: 09/29/06)
... sentinel plot 9/28. This is the first
... time rust was found in this county in 2006; it was positive in 2005. The soybeans
... were MG5 at R7-8. Confirmation was done with PCR.

Rust was found in the Suwannee County soybean sentinel plot 9/27. This is the first
... time we found rust in this county. we had 2 sentinel plots in 2005 that never became

Management Toolbox

- [Tactics - USA](#)
- [Guidelines - USA](#)
- [GFP Tool](#)
- [Insurance Docs](#)
- [Commentary Chron](#)

Detection Chronology



United States Department of Agriculture

Pest Information Platform
for Extension and Education

Sign Up For Alerts

Oct 01, 2006

Legumes/Kudzu
Soybean Rust

overlay - Load

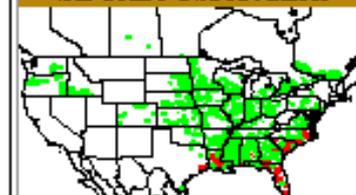
Last Update: 09/30/06

Chronology of Positive Detections

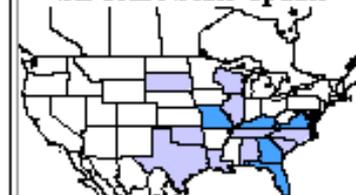
Click either **Date** or **State - County** to sort entries and click again to switch between ascending and descending order.

Date ▼	State - County	Status
2007-01-17	Georgia - Lowndes	Confirmed
2007-01-12	Alabama - Houston	Confirmed
2007-01-12	Alabama - Geneva	Confirmed, No Longer Found
2007-01-10	Georgia - Miller	Confirmed
2007-01-10	Georgia - Brooks	Confirmed
2007-01-10	Georgia - Grady	Confirmed
2007-01-10	Georgia - Thomas	Confirmed
2007-01-09	Alabama - Mobile	Confirmed
2007-01-09	Alabama - Montgomery	Confirmed
2007-01-09	Alabama - Baldwin	Confirmed
2007-01-08	Florida - Leon	Confirmed
2007-01-05	Florida - Gadsden	Confirmed
2007-01-05	Florida - Hernando	Confirmed
2007-01-05	Florida - Marion	Confirmed
2007-01-05	Florida - Alachua	Confirmed

SB Rust Observation



SB Rust State Update



Chronology of Positive Detections

SBR Forecast
Click For Details...

Management Toolbox

- Tactics - USA
- Guidelines - USA
- GFP Tool
- Insurance Docs
- Commentary Chron

med, no longer found

: 09/29/06)

ot 9/28. This is the first
in 2005. The soybeans
with PCR.

Rust was found in the Suwannee County soybean sentinel plot 9/27. This is the first time we found rust in this county. we had 2 sentinel plots in 2005 that never became

- Getting
- Prev
- Septem
- 3 4 5
- 10 11 12 1
- 17 18 19 2
- 24 25 26 2
- October
- 1 2 3
- 8 9 10
- 15 16 17
- 22 23 24
- 29 30 31
- November
- 5 6 7
- 12 13 14
- 19 20 21
- 26 27 28
- FL Comm
- FL Links
- ID/Scouting
- Not sure if it
- Other SBR S
- Hurricane Animations
- Observation Animations
- Partners

Done

Internet

Good Farming Practice Documentation Tool for Growers

Disclaimer: Use of this documentation tool is strictly voluntary. Information entered by you is not retained on this system and may only be printed or saved on your system in a PDF format. RMA does not control or guarantee the accuracy, relevance, timeliness, or completeness of this information. Neither RMA nor any of its employees makes any warranty, express or implied, including the warranties of fitness for a particular purpose, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of this tool.

First time users are strongly encouraged to read the instructions prior to using this documentation tool.

Preparer Name

Grower Name

State *

County *

Farm Description

Field ID(s)

Crop *

Crop Stage * [Crop Stage Images](#)

* = Required

Mississippi Scouting and Management Commentary

Soybean Rust

- August 02, 2006: Producers in the SW portion of that state that have soybeans that are in reproductive growth stage R5.5 or a younger reproductive stage, need to consider application of a fungicide, particularly a triazole or a mix. Soybean growers in our major growing areas in North Mississippi and the Delta have nothing to be concerned about at this time. It's been hot and extremely dry in those areas, unfavorable for rust development. Scouting will continue, and these management suggestions will be modified based on the scouting results and weather conditions. Concentrate scouting efforts along areas of the field that can have longer dew periods and cooler conditions. Focus the scouting more intensely during the reproductive stage.
- August 01, 2006: Producers in the SW portion of that state that have soybeans that are in reproductive growth stage R5.5 or a younger reproductive stage, need to consider application of a fungicide, particular a triazole or a

Getting Started

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July - 2006

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August - 2006

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September - 2006

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National Commentary

- [ID/Scouting Tools](#)
- [Not sure if it is Rust?](#)
- [Other SBR Sites](#)
- [Hurricane Animations](#)
- [Observation Animations](#)

Soybean rust has been found in two sites in Jefferson County, SW Mississippi. Rust was confirmed on both kudzu and soybeans in that county. This is the first report of rust from Mississippi in 2006. Please consult the appropriate state commentary for more information. Currently rust has been found on this week's soybeans in eight

- [GFP Tool](#)
- [Insurance Docs](#)



Sign Up For Alerts

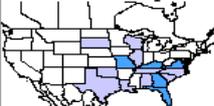
Oct 01, 2006

Legumes/Kudzu
Soybean Rust

SB Rust Observation



SB Rust State Update

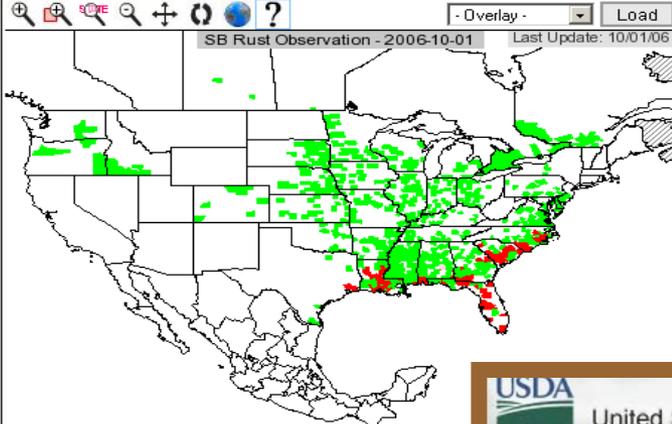


2006-2007
IPM PIPE

Getting Started

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October - 2006						
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November - 2006						
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Recently scouted, not found Scouted, confirmed Confirmed

Printable Map Legend

National Commentary

- ID/Scouting Tools
- Not sure if it is Rust?
- Other SBR Sites
- Hurricane Animations
- Observation Animations
- Partners
- Professional Societies
- Soybean Rust: Scout Before you Spray
- Management

USDA SBR Website

National Soybean Rust Commentary (updated 9-30) Georgia reported a new find in Toombs County in eight state: AL, FL, GA, LA, MS, SC, TX, and NC. In total there is a total of 83 counties in eight states with rust in Alabama; 15 in Florida; 18 in Louisiana; 17 in South Carolina; 2 in Mississippi; and 10 in North Carolina. Sporadic throughout the U.S. using both active and passive traps. This information does not imply infection has taken place and is exclusively for recording positive rust occurrence. Much information on soybean rust finds are expected late this season through the end of the season. Please consult your state commentary for more detailed information in your state.

Terms and Conditions

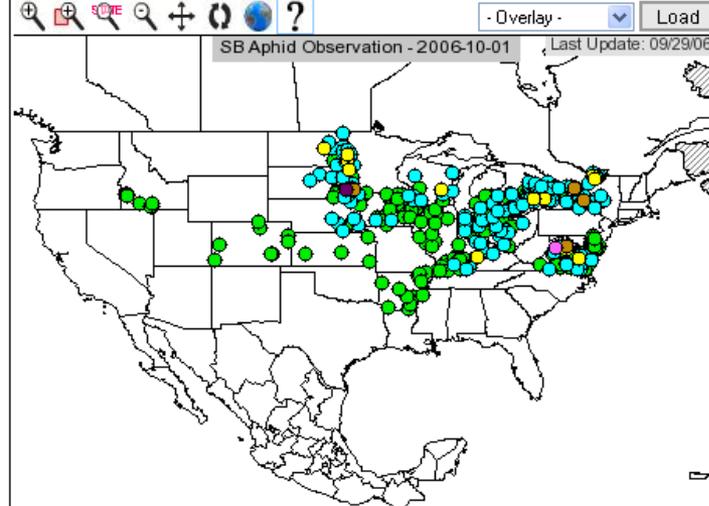
Sources of Geographic Data



Getting Started

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Average number of aphids per plant
0 1 - 39 40 - 149 150 - 249 250 - 499 > 500

Printable Map Threshold

National Commentary

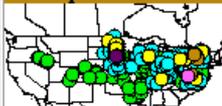
- University SBA Sites
- USDA SBA Sites
- Private/Industry SBA Sites
- International SBA Sites
- Observation Animations
- Not Sure if it is Soybean Aphid

National Soybean Aphid Commentary (updated:)
National Map Commentary Not Available

Oct 01, 2006

Legumes/Kudzu
Soybean Aphid

SB Aphid Observation



SB Aphid State Update



Management Toolbox

- Guidelines - USA
- GFP Tool
- Insurance Docs
- Commentary Chron

What Made the Soybean Rust Information System/*ipmPIPE* So Attractive

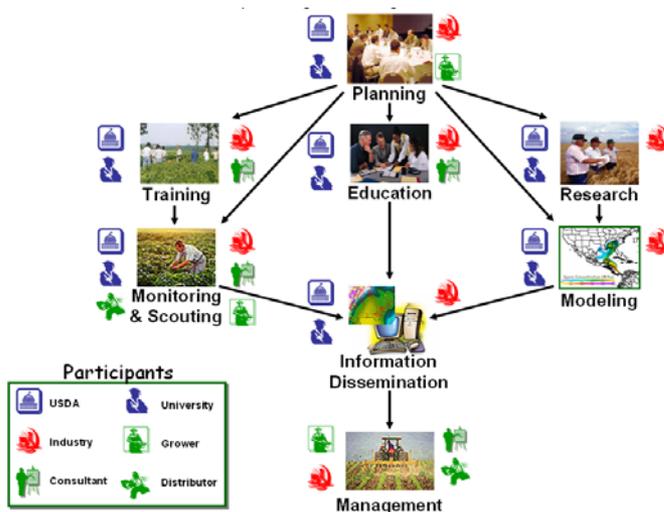
Simple design - flexible and expandable

Empowers the State Extension Specialists (protocols & dissemination)

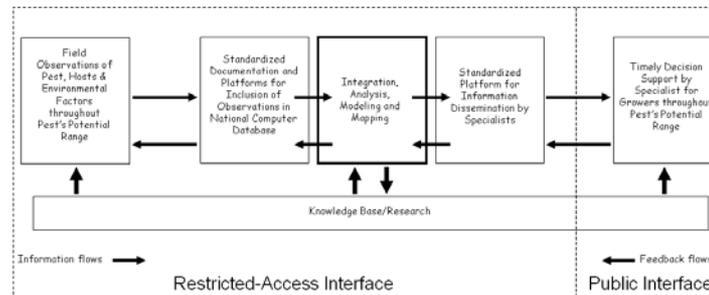
Enhances communications among stakeholders

Provides “one-stop” rapid access to information in easy-to-use formats

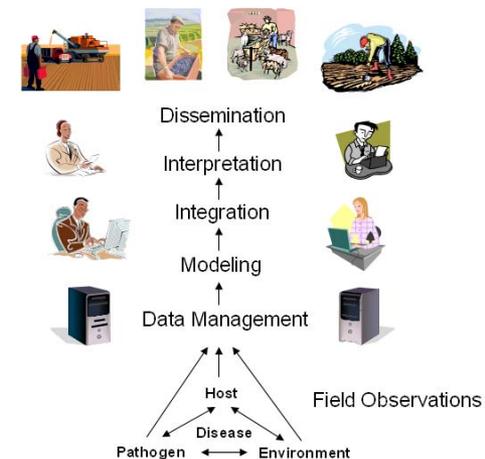
Coordinated Framework



State-of-the-Art IT Platform



Integration of Tasks



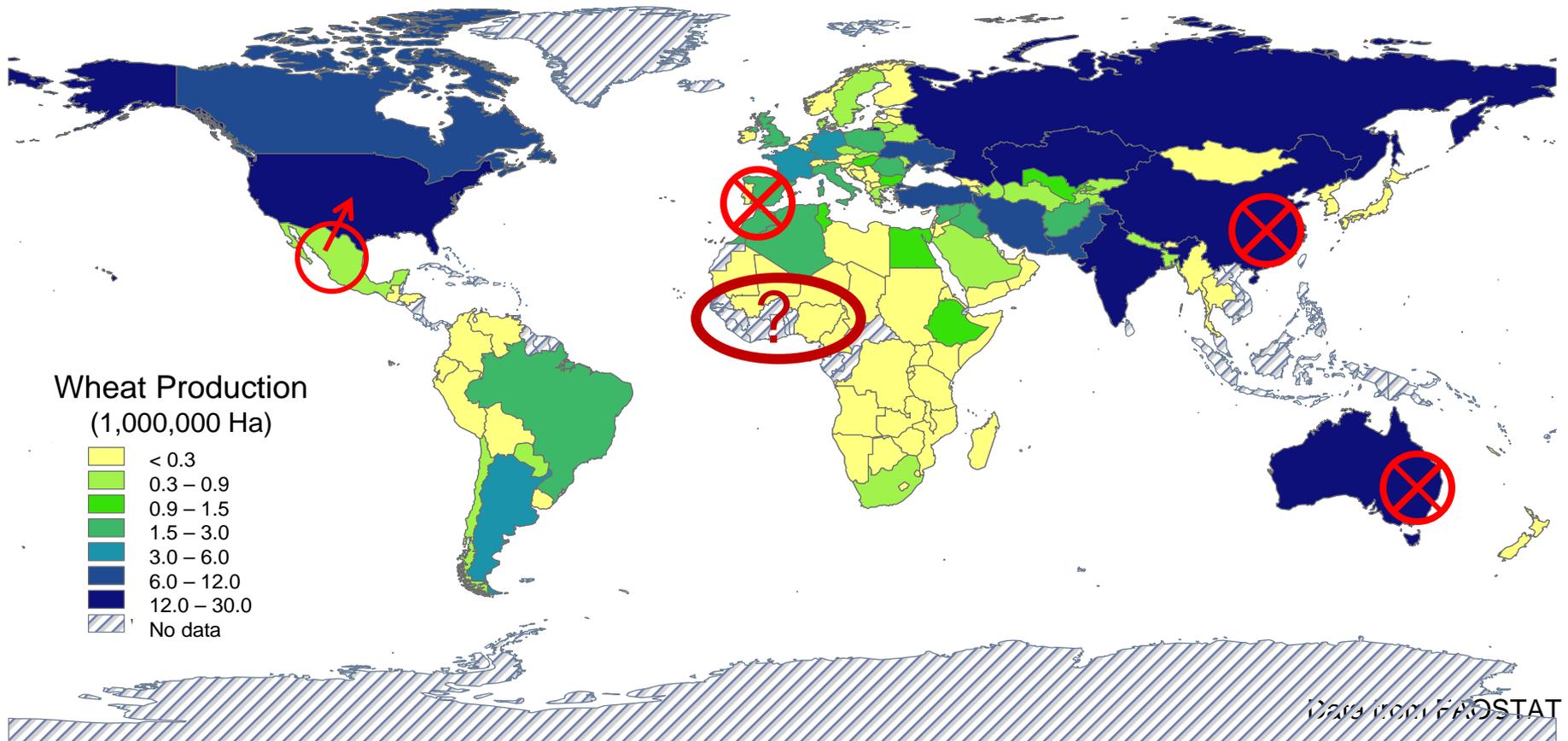


Challenges associated with providing
"state-of-the-art" IT for effective
"in-season" management of wheat
rusts



Challenges Associated with Providing an Effective Early Warning System for New Races of Stem Rust

New races of WSR are not known to be present in Western Hemisphere and IAMS model simulations suggest that they will not likely survive aerial transport across the Atlantic or Pacific Oceans.



tropical western Africa is the most likely source area for aerobiota that are blown to the Western Hemisphere. However as far as we know, wheat/barley production is very low in this region. IAMS simulations suggest that it is likely that spores from heavily infected Mexican wheat production regions would be blown to U.S. wheat fields on a seasonal basis.

Challenges Associated with Providing an Effective Early Warning System for New Races of Stem Rust

Regardless of how new races are transported to the North America, they are likely to cause a sudden and dramatic alarm

How to expand existing surveillance programs? Effective "inseason" management of new virulent wheat stem rust races would require a high resolution (spatial and temporal) monitoring network of either 1) disease severity in potential inoculum source regions, 2) spore deposition throughout the region potentially impacted by the pathogen, or better yet, 3) both.

Overall, 17,797 observations of the presence and severity of soybean rust were submitted to the national soybean rust database in 2006 from over 2000 different geographic locations throughout the U.S., southern Canada, and Mexico. More than 15,000 observations were submitted to the system in both 2007 & 2008.

disease incidence and/or severity observations from:

- sentinel plots
- commercial fields
- mobile scouts
- industry plots
- diagnostic labs

spore collections from:

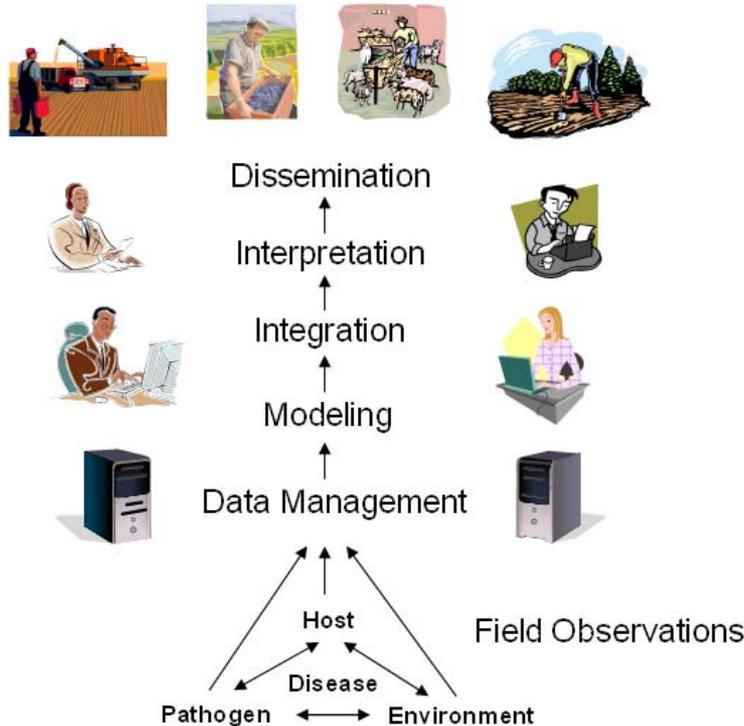
- Industry passive vane trap network
- NADP rainwater trap network

Challenges Associated with Providing an Effective Early Warning System for New Races of Stem Rust

The IT functionality to manage, interpret, and communicate a large volume of wheat rust observations from diverse sources is not currently needed.

How do we prepare an IT system to anticipate a potential "overnight" onslaught of observations and demands for information.

Tasks



Potential Bottlenecks

Agreement among stakeholders regarding who will take responsibility for each of the 6 tasks.

Agreement among stakeholders regarding information dissemination (public vs restricted-access)

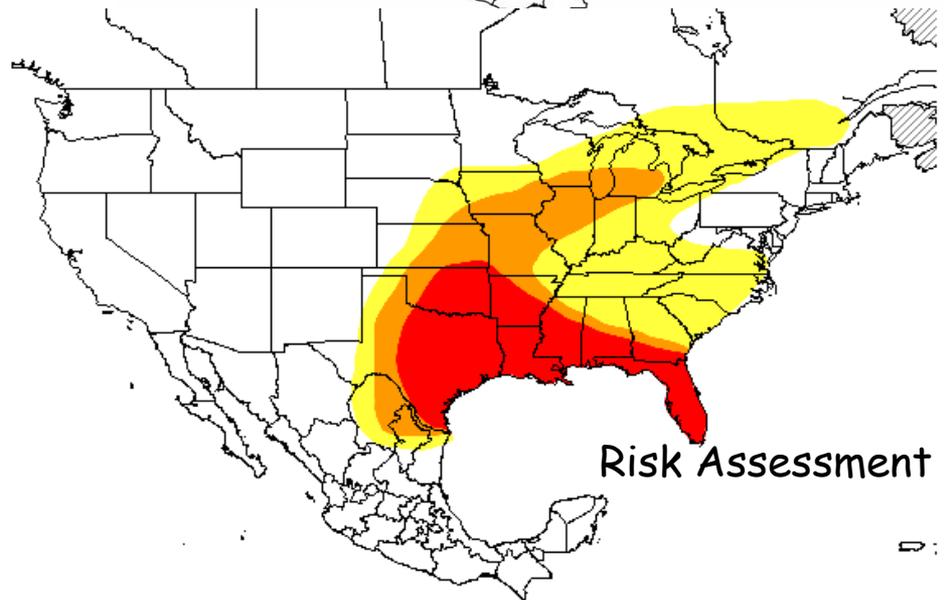
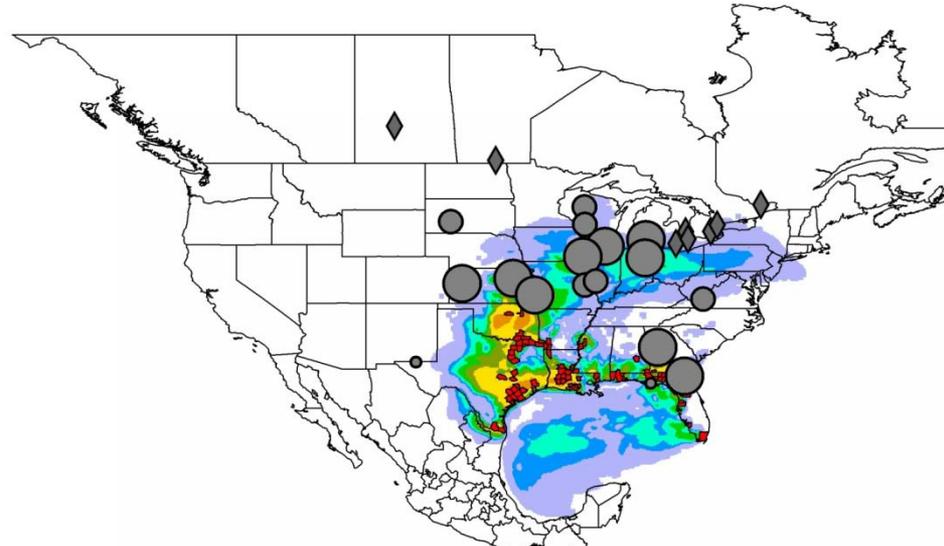
Development and deployment of rapid diagnostic tools

Agreement on field scouting and information dissemination protocols

Answers to anticipated stakeholder questions
 What are the variety reactions?
 What is my potential for yield loss?
 What can I spray?
 Is my current technology going to be effective?

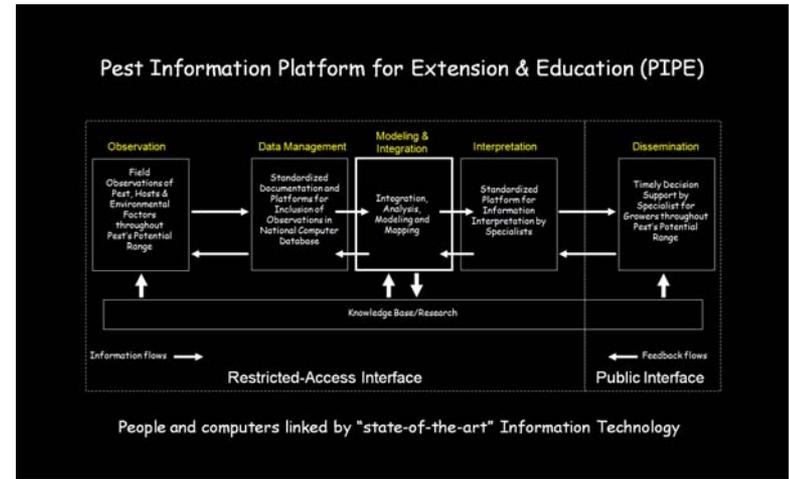
Early Warning Systems for Rust Diseases

Integration of Observations and Model Output



Risk Assessment

State-of-the-art IT Platform



One Stop Information Shop for Stakeholders

USDA United States Department of Agriculture Soybean Rust Information Site

Getting Started

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September - 2005

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October - 2005

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26	27	28
29	30	31

Map Description - Overlay - Load

Observation - 2005-09-09 - Last Update: 09/22/05

scouted, not found | scouted, confirmed

Sign Up For Alerts

Sep 09, 2005

Observation

State Update Map

Chronology of Positive Detections

SBR Forecast (09/09/05)

Tropical storm Ophelia brings new spore depositions to the southeastern U.S. coast. [Click For Details...](#)

Additional Links

[Anisology Risk Analysis](#)

[American Phytograph Society Home Page](#)

[Animated Hurricane Maps](#)

[Soybean rust Identification card](#)

Printable Map

National Map Commentary (updated: 09/09/05)

Marion county in Georgia is the newest county to report soybean rust. Oconee County in Georgia is the furthest northern location where soybean rust has been found in 2005. Calhoun County in SC is the furthest east that soybean rust has been found while Pearl River County in Mississippi is the furthest west that rust has been found in 2005. Alabama now has 13 counties reported positive with rust, Florida has 22, Georgia has 16, Mississippi has two, and South Carolina has three. There were 35 counties reporting soybean rust in the month of August with five reports so far in September. New reports of soybean rust are expected to continue within states

USDA Links

[APHIS-PPQ Soybean Rust Site](#)

[CSREES Web site](#)

[National Plant Diagnostic Network site](#)

[Return to USDA SBR website](#)

[USDA Position on Spore trapping](#)