

# Protocols for Sentinel Plots, Mobile and Industry Monitoring

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# **Monitoring Program**

- 1. Fixed-site sentinel plots**
- 2. Mobile survey**
- 3. Industry survey**
- 4. Sample submission through National Plant Diagnostic Network**
- 5. International monitoring**

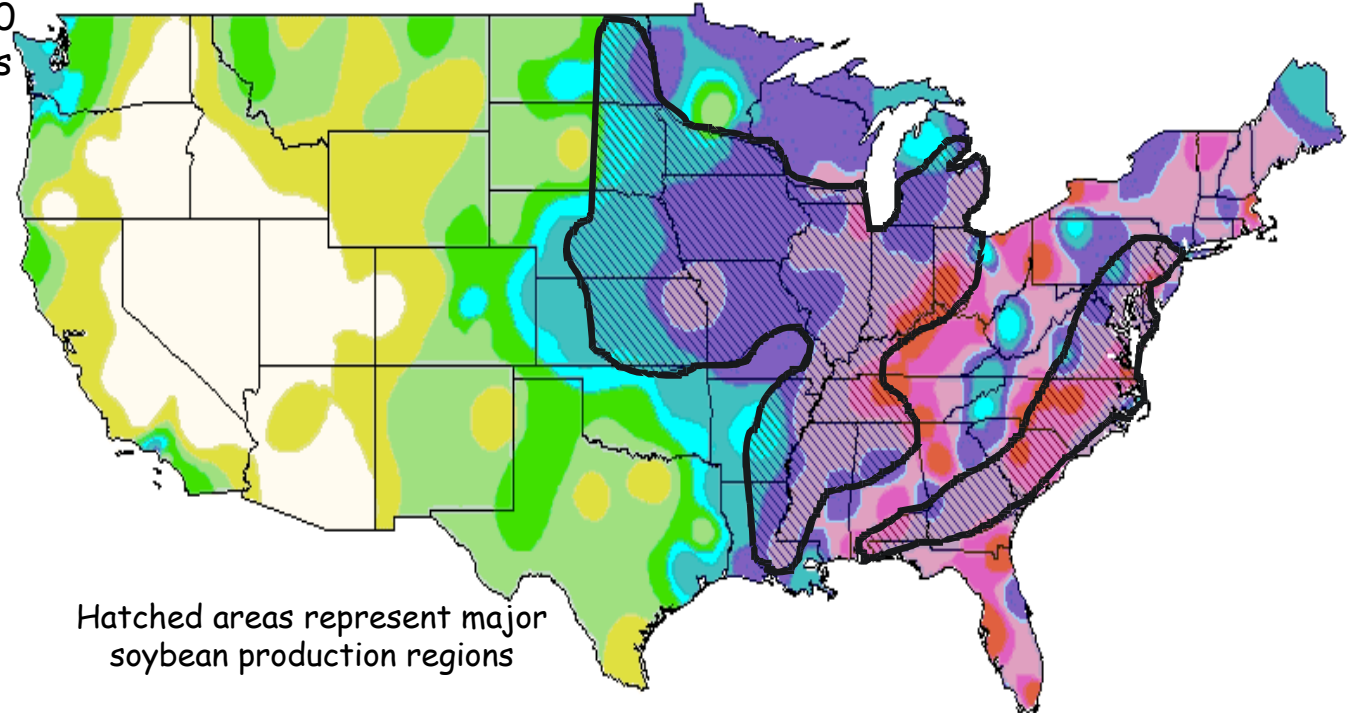
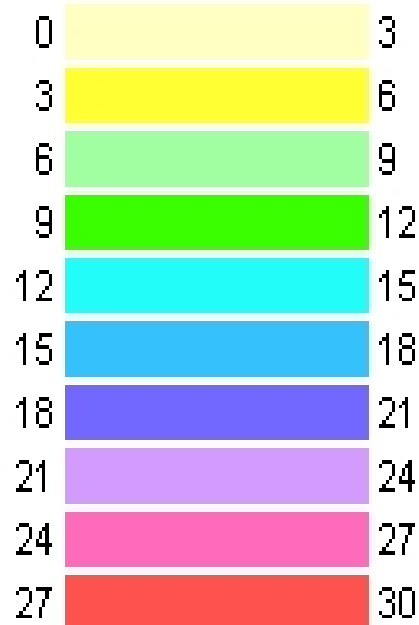
# **Objectives of Monitoring**

- 1. Serves as a warning network for new disease observations - provides a “real time” map on the occurrence of soybean rust**
- 2. Quantify timing of spore production in source areas and provide epidemiological data on spread over time and space - these data will also be useful inputs for the rust forecasting model**

# Soybean Rust Epidemiology Model

Estimated years expected to be favorable for soybean rust development during June - August from 30 years of daily temperature and leaf wetness data.

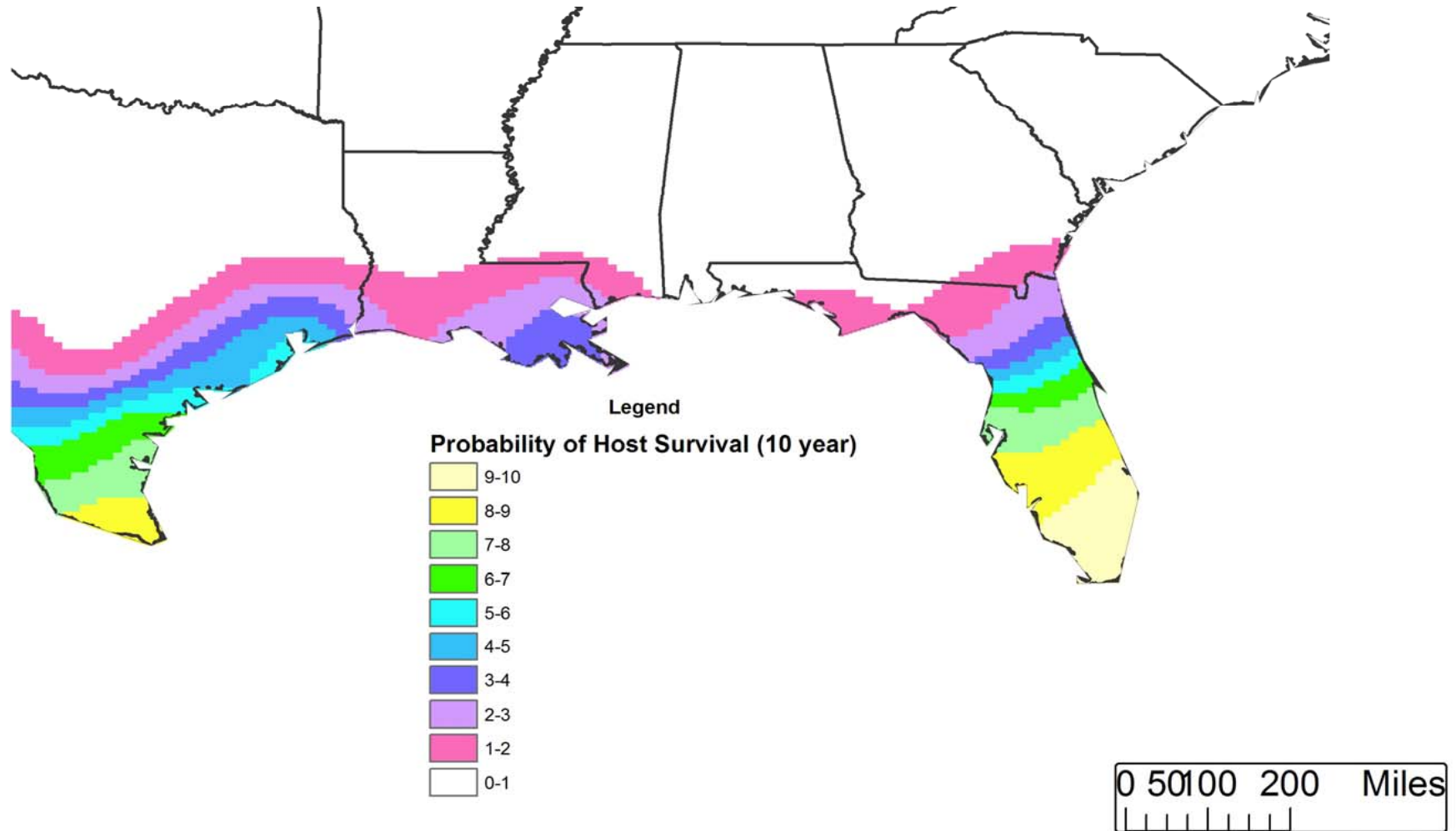
Number of years out of last 30 having >15 days with conditions conducive to infestation





# Overwintering Potential of Leguminous Hosts

Probability for survival of overwintering hosts based on occurrence of temperatures greater than 28° F in a given year using 10-year daily climate data interpolated to a 10km<sup>2</sup> resolution.

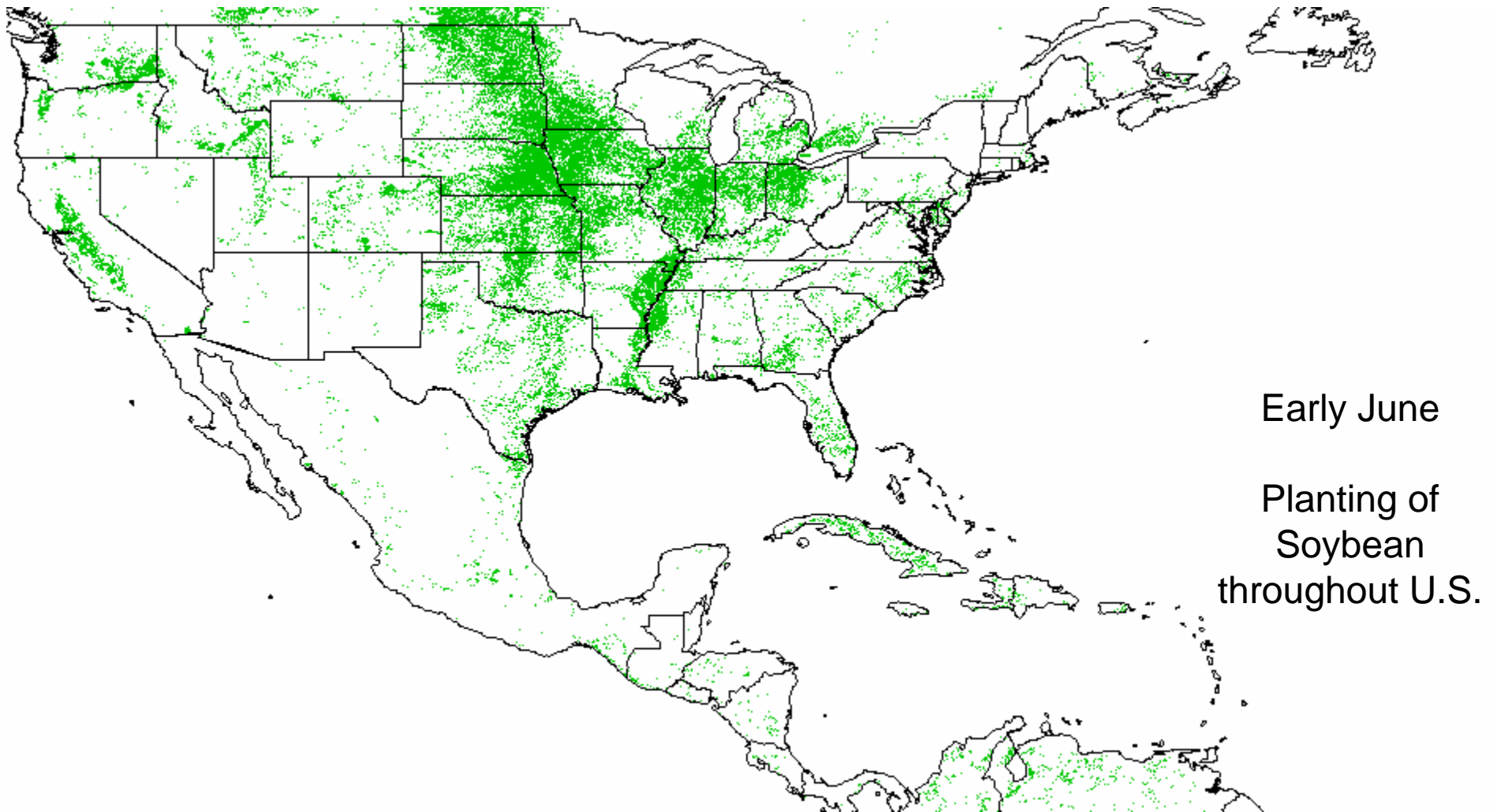


February, 2005  
Dade City,  
Pasco County

QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

[http://spdn.ifas.ufl.edu/Florida\\_Soybean\\_Rust.htm](http://spdn.ifas.ufl.edu/Florida_Soybean_Rust.htm)

# The “Greening” of Soybean Rust Hosts in North America

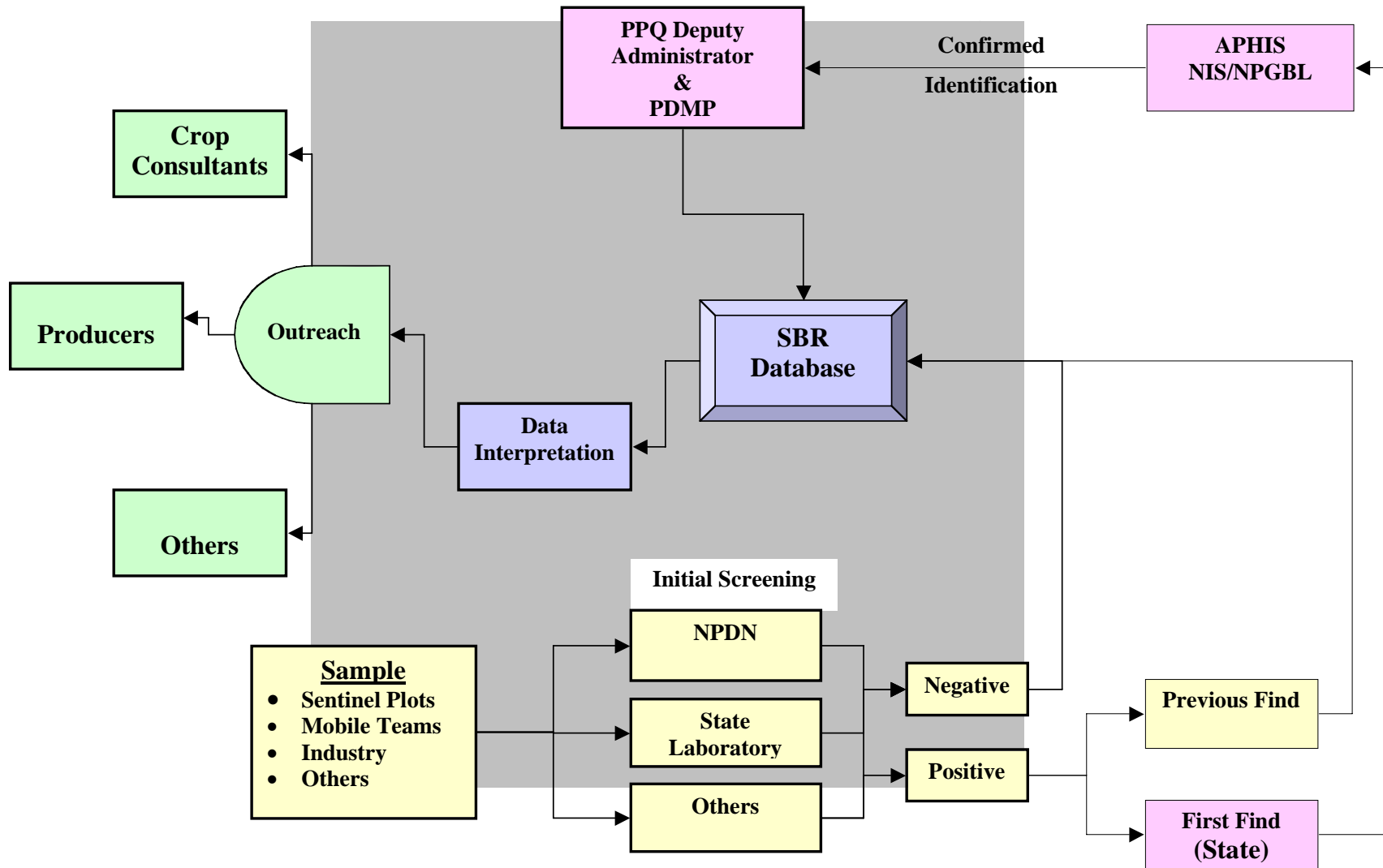


QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

**Low Risk for  
the transport  
events of  
Saturday and  
Sunday (March  
5 & 6, 2005)**

<http://www.ces.ncsu.edu/depts/pp/soybeanrust/index.php>

# 2005 Soybean Rust Coordinated Framework



# **Fixed-Site Monitoring**

- 1. Five to 15 plots per state minimum**
- 2. Early planting or staggered planting is suggested**
- 3. Can be soybean planted as plots or marked out areas in existing fields, or another species**
- 4. Plots should be visited weekly or more**
- 5. Upload data on web site by typing or by PDA**

# **Industry Monitoring**

- 1. Data may be collected in commercial soybean production fields as part of commercial services, research or variety trials**
- 2. The data may be collected by field agronomists, crop consultants or individual growers**
- 3. The industry data provides additional confirmation of the spatial extent of disease spread over an area**

# **Mobile Team Monitoring**

- 1. Deployment based on predicted spore deposition and infection**
- 2. Observations will define new sources areas**
- 3. At least five mobile teams are suggested with each having a team leader**
- 4. More than one team may be deployed depending upon the size of the predicted spore deposition**
- 5. Data will be uploaded back to central command for immediate analysis**

## Soybean Rust Scouting Form

### Report Type

- Sentinel Plot
- Industry
- Mobile Team

Date

### Report Type Form

*This screen will automatically advance after a short delay once a "Report Type" button is touched.*

*The "Date" field will be extracted from the PDA and attached to each report.*

# Soybean Rust Scouting Form

## Sentinel Plot Report

Observer (pull down menu)

Plot ID:  
Latitude:  
Longitude:

### Host Type

- Soybean Cultivar
- Non-Soybean Host

### Evaluation Type

- Plant-based
- Row-based

Back

Continue

## Sentinel Plot ID Form

*Buttons in the "Observer" pull down menu will be set such that only one name can be highlighted. Touching a second button will automatically clear a previously selected name. If "unlisted observer" is indicated, an additional screen will appear for adding a new name to the list using the PDA keypad.*

*Plot ID, Latitude and Longitude will be entered by the user at the start of the first plot assessment using the PDA keypad. Thus a Sentinel Plot observer does not need a GPS unit.*

*Plot ID will be a unique identifier (e.g., IL001) assigned by the appropriate State agency. After this information has been specified for the first time, the user need only specify the Plot ID and these data will be retrieved from storage in the PDA.*

## Soybean Rust Scouting Form

### Sentinel Plot Report

Number of Cultivars/Practices

Enter

Cultivars # 1

Cultivar Name

Planting Date

Row Spacing

Stand Count

Plot Size

Enter

Back

Continue

## Soybean Cultivar Information Form

*If "Soybean Cultivar" is chosen, a screen will appear for indicating how many different soybean cultivars and cultural practices are to be scouted in the sentinel plot (This number is one for a homogeneously planted plot). After indicating this number the user touches the enter button. This number will control the number iterations through the cultivar information box below. For each cultivar the user will specify: 1) cultivar name, 2) planting date, 3) row spacing (ft or cm), 4) stand count (# of plants per ft or m), and 5) plot size (ft x ft or m x m). After specifying all of this information the user touches the "Enter" button to go to the next cultivar*

*These data will be stored in the PDA in association with the Plot ID and will be retrieved from memory whenever a user specifies the Plot ID,*

# Soybean Rust Scouting Form

## Sentinel Plot Report Soybean Cultivar #1

Cultivar Descriptor

### Plant Height

- < 12 in (30 cm)
- 12-24 in (30-61cm)
- 24-36 in (61-91cm)
- >36 in (91 cm)

### Canopy Closure

- < 50 %
- 50-75 %
- 75-95 %
- > 95 % (closed)

### Soybean Growth Stage

#### Vegetative Stages

**VE VC V1 V2 V3 V4 V5 V6 V7 V8 V9 V10 V11 V12**

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#### Reproductive Stages

**R1 R2 R3 R4 R5 R6 R7 R8**

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Continue

## Soybean Cultivar State Form

*This screen will appear if "Soybean Cultivar" is specified as the crop in the Sentinel Plot. The Soybean Cultivar # and the "Cultivar Descriptor" field will be filled automatically using information already specified.*

*The "Plant Height" and "Canopy Closure" buttons will be set so only one can be highlighted at a time. Touching a second one will automatically clear others in the same category.*

*Buttons will be set so only one in each set (vegetative and reproductive) can be highlighted at a time. Touching a second one will automatically clear all others in the set. The "Continue" button will advance the screen.*

**Soybean Rust Scouting Form**  
**Sentinel Plot Soybean Report**  
**Soybean Cultivar #1: Plant-based Evaluation**

Set Same as Previous Plant

Soybean Node #		CN	UN	1	2	3	4	5	6	7	8	9
<b>Rust Severity Rating</b>	None	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Medium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	High	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Soybean Node #		10	11	12	13	14	15	16	17	18	19	20
<b>Rust Severity Rating</b>	None	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Low	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Medium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	High	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Next Plant

Next Site

Next Cultivar

**Soybean Cultivar -Plant Evaluation Form**

*This screen will appear if “Soybean Cultivar” is specified as the crop and “Plant-based” is specified as the “Evaluation Type”. It is expected that 3 sites per field and 5 plants per site will be scouted. However, the user can determine the number of plants and sites with the “Next Plant” and “Next Site” buttons. When data are entered and one of these buttons is touched, a new screen will appear with the “Soybean Cultivar #”, “Cultivar Descriptor”, “Plant ID” and/or “Site ID” incremented appropriately. CN and UN represent cotyledon and unifoliolate leaf nodes.*

*The user first marks the button indicating the node with the lowest attached leaf on the major stem of the soybean plant and then marks the button indicating the upper most node having a fully expanded leaf on the main stem. All buttons in the “None” row between these two buttons will be automatically marked. The user may then indicate a “Rust Severity Rating” (i.e., “Low”, “Medium”, “High” or leave the “None” button marked) for each of these nodes by examining the middle leaflet of a trifoliolate at the node. Buttons will be set so only one in each column can be highlighted at a time. Touching a second one in a given column will automatically clear all other buttons in the same column. Nodes that have yet to develop or no longer have attached leaves should be left blank.*

*The “Set Same as Previous Plant” button is a convenient short cut for when there is little variance among plants at the site. After using this shortcut, the user can still alter the data on the screen by touching other buttons. When the current cultivar is the last cultivar, the “Next Cultivar” button becomes a “Finish” button.*

## Soybean Rust Scouting Form

### Industry Report

**Observer** (pull down menu)

Plot ID:  
Latitude:  
Longitude:

### Survey Type

- Incidence
- Severity

Back

Continue

### Industry ID Form

*Buttons in the “Observer” pull down menu will be set such that only one name can be highlighted. Touching a second button will automatically clear a previously selected name. If “unlisted observer” is indicated, an additional screen will appear for adding a new name to the list using the PDA keypad.*

*Plot ID, Latitude and Longitude will be typed by the user at the start of the first plot assessment using the PDA keypad. The observer does not need a GPS unit. Plot ID will be a unique identifier (e.g., IL001) assigned by the appropriate agency in the state. After this information has been specified for the first time, the user need only specify the Plot ID and the Latitude and Longitude information will be retrieved from storage in the PDA.*

*The “Severity Survey Type” of “Industry Report” is identical to the “Sentinel Plot Report”. The sequence of screens is not shown in this presentation. The following screen shows the format of an “Incidence Survey Type Industry Report”. It is only for soybean fields.*

## State soybean production, kudzu distribution and distribution of sentinel plots

	Soy Acreage	Kudzu	Number of Fixed plots
State	2004*	Acreage	
Alabama	190,000	117,510	10
Arkansas	3,150,000	10,091	15
Delaware	208,000	1	5
Florida	17,000	12,449	15
Georgia	270,000	151,318	10
Illinois	9,900,000	529	10
Indiana	5,520,000	98	10
Iowa	10,150,000		10

**...and more....**