

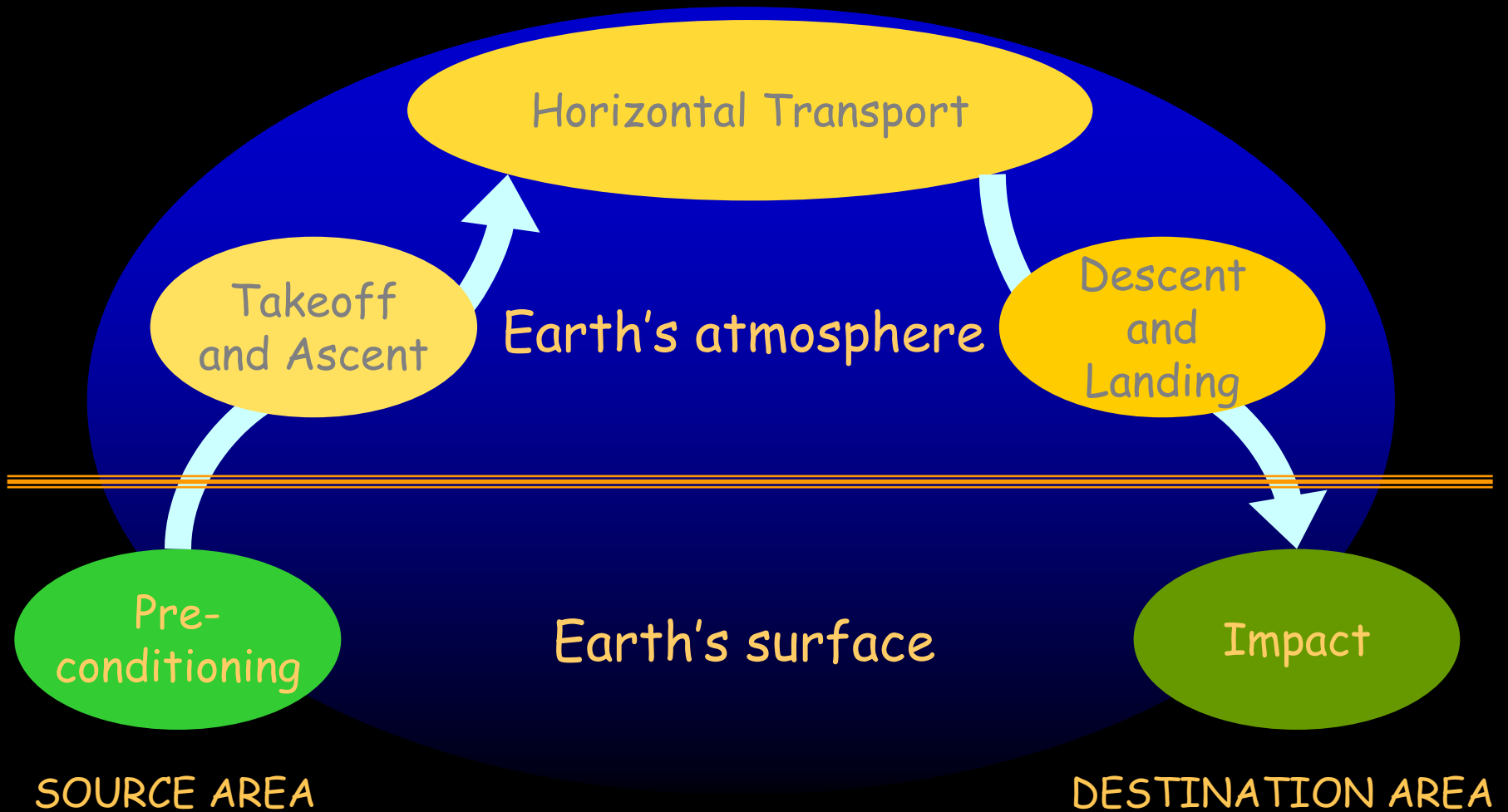
# Soybean Rust Aerobiology Model: 2005

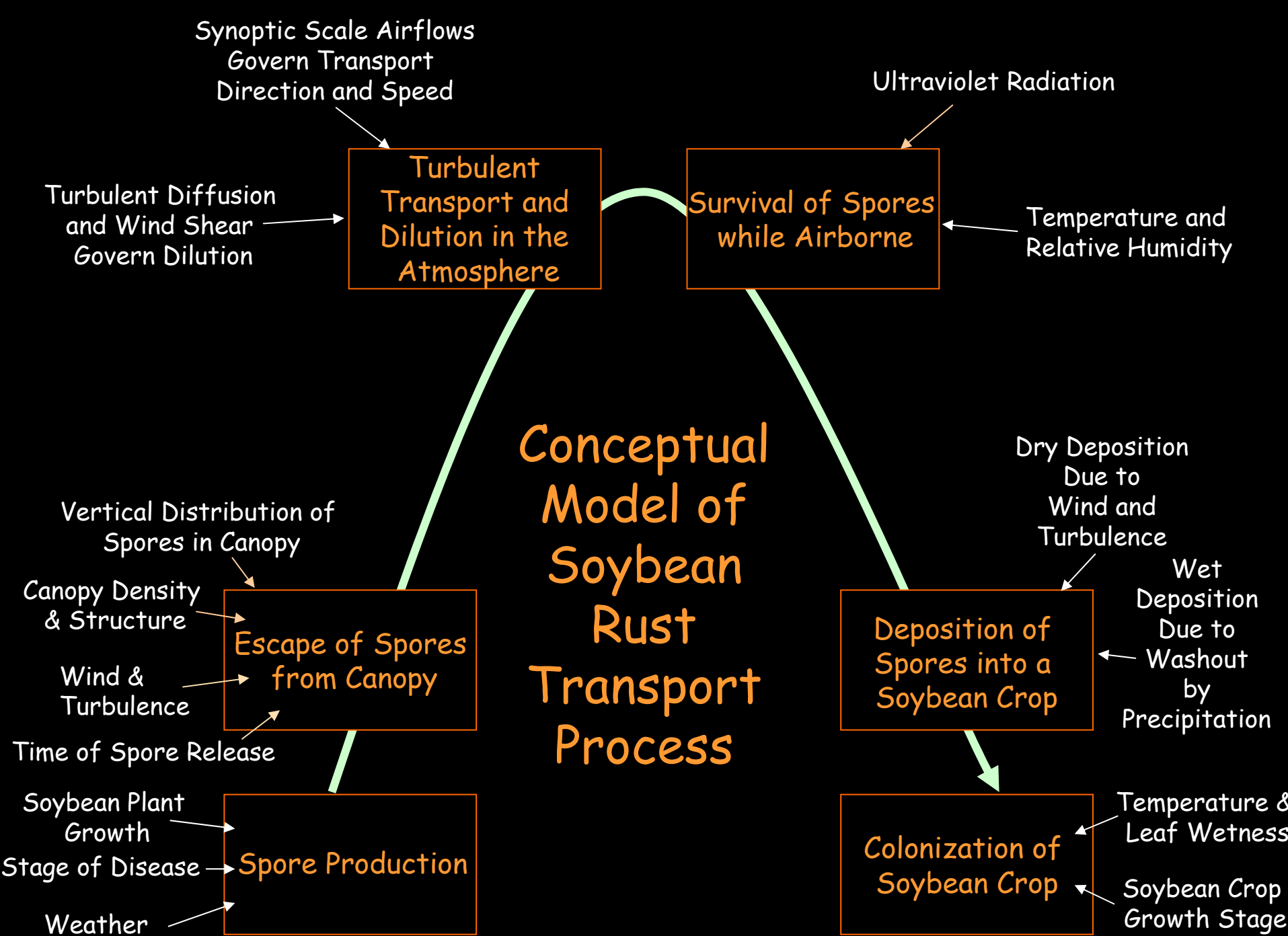
Scott Isard (Penn State)

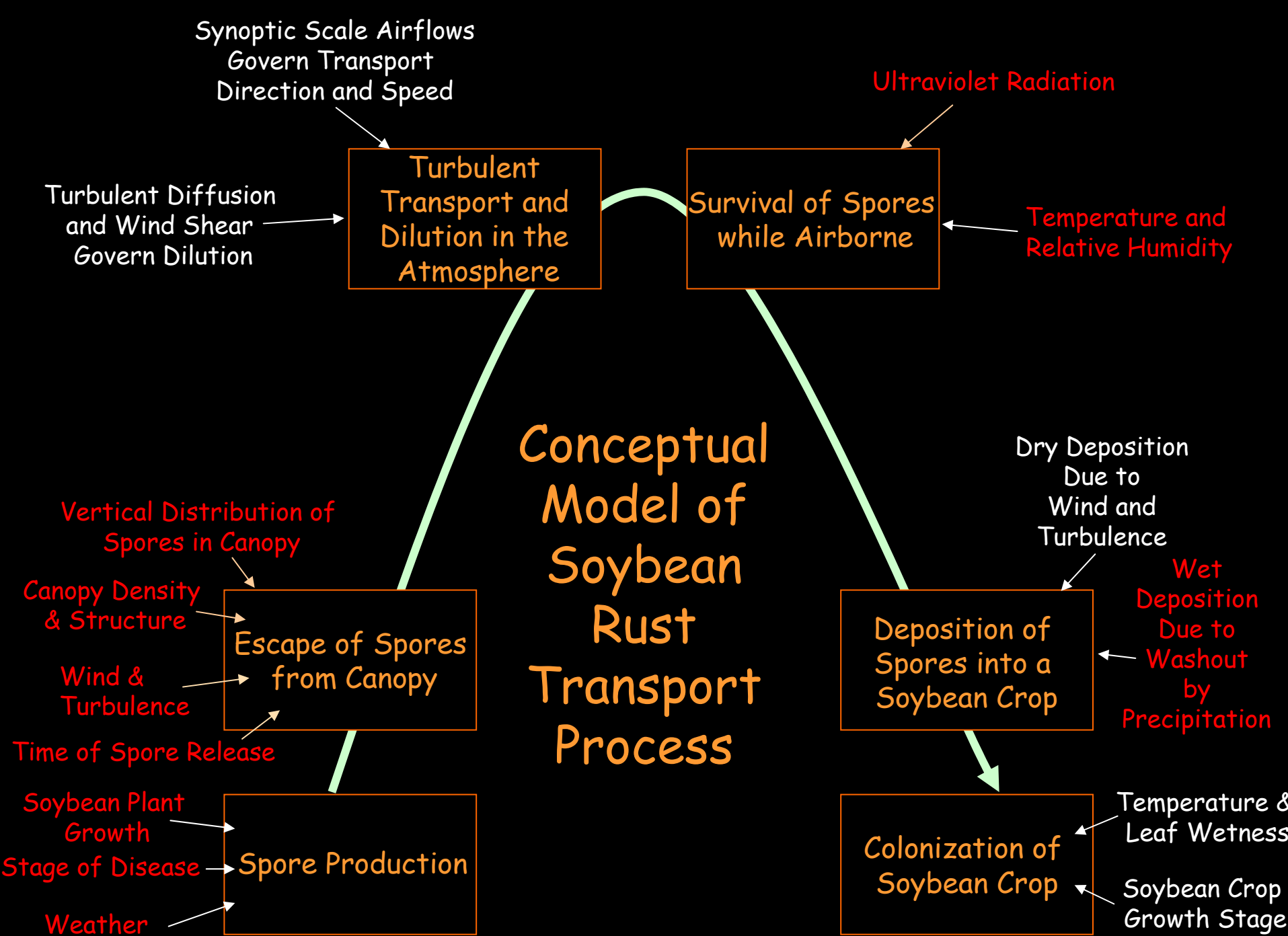
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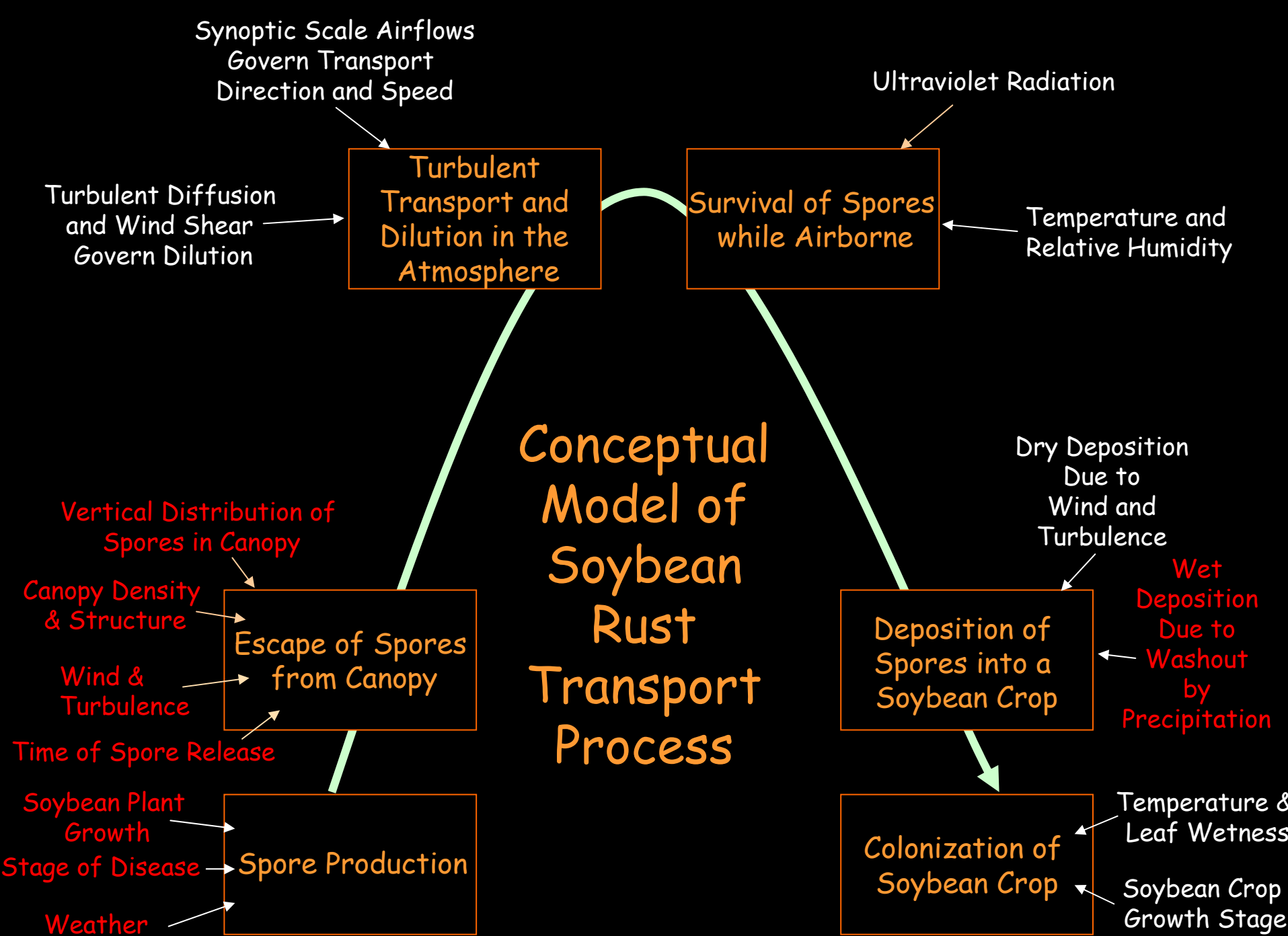
Joe Russo (ZedX)

# Aerobiota Transport Process Model









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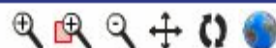
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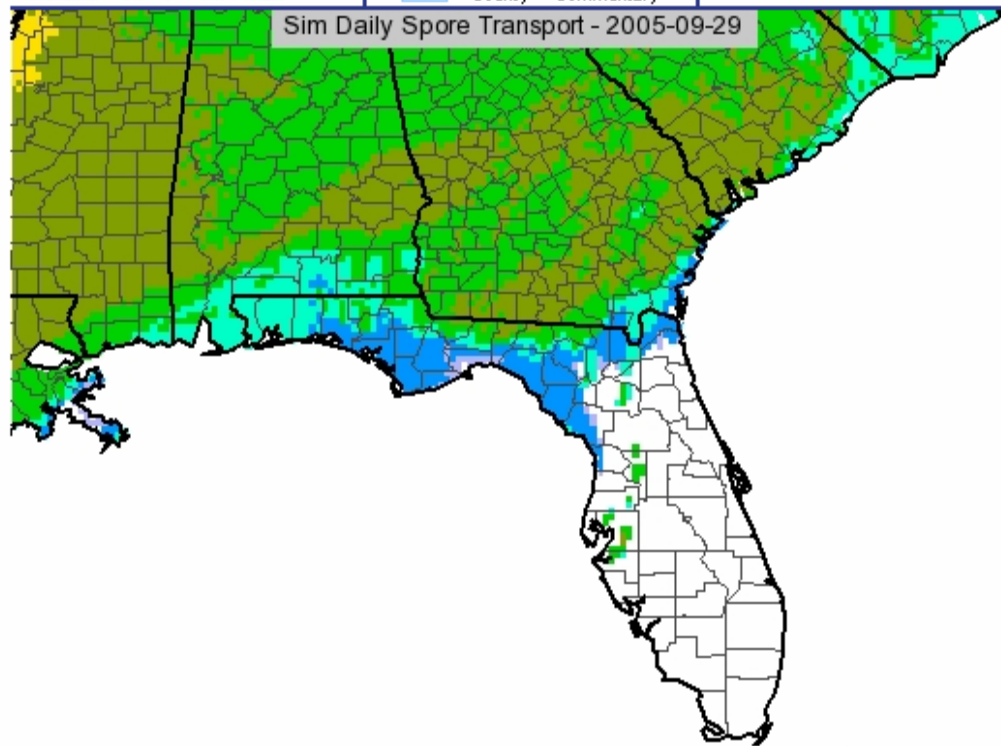
[USDA Position on Spore trapping](#)



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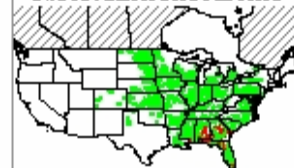
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Sep 29, 2005

### Chronology of Positive Detections

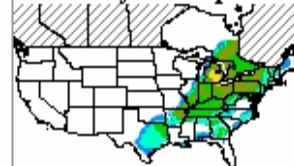
#### Observation Researcher



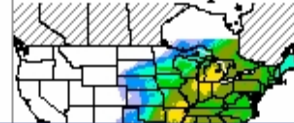
#### Sim Daily Spore Transport



#### Sim Daily Wet Dep Land



#### Sim Acc Wet Dep Land



[Edit National Commentary](#)

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

As of August 24th, several localized moderate areas of transport are predicted in LA, AR, MS, AL, and GA. The areas surrounding these moderate areas are mostly light to very light.

### Additional Links

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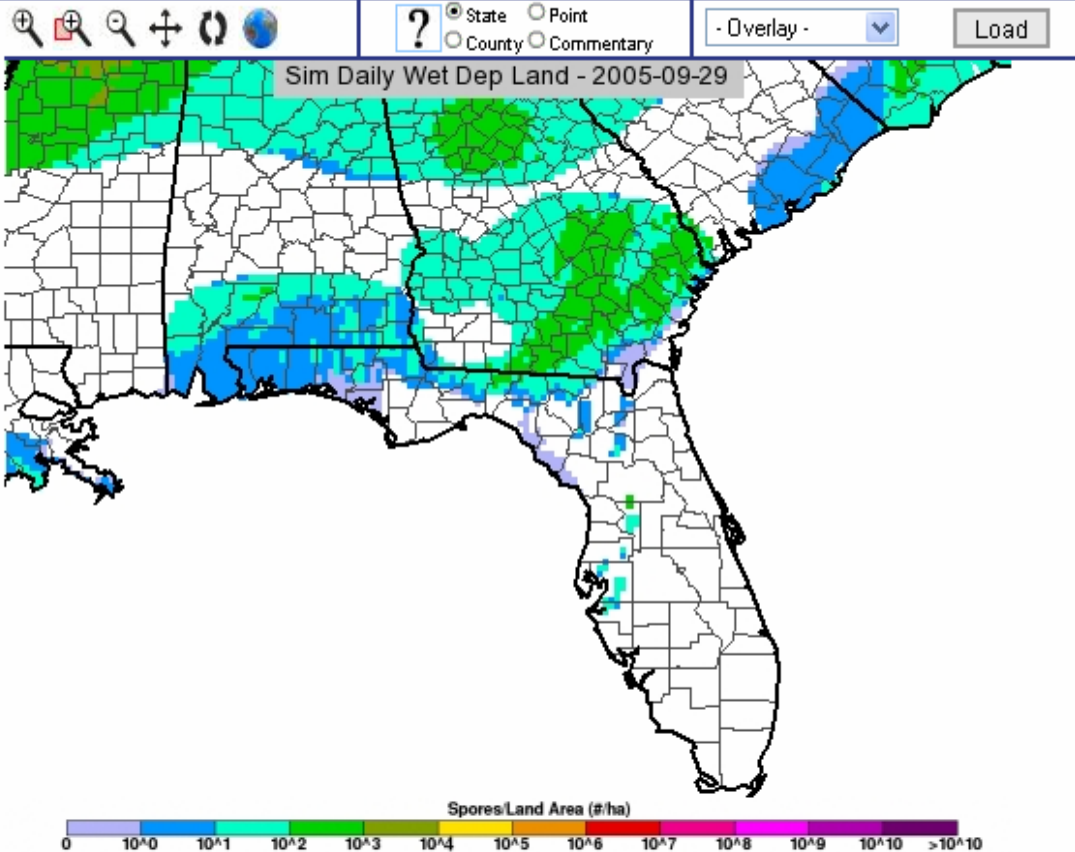
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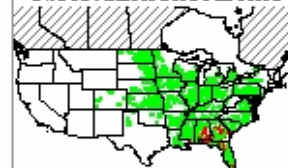
**National Map Commentary** (updated: 08/16/05)

Up to August 24th, wet deposition of spores is light to moderate in GA and AL with another hot spot in LA, MS AR. The areas surrounding these hot spots has mostly light deposition predicted over this period.

**Sep 29, 2005**

**Chronology of Positive Detections**

**Observation Researcher**



**Sim Daily Spore Transport**



**Sim Daily Wet Dep Land**



**Sim Acc Wet Dep Land**



**Additional Links**

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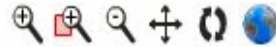
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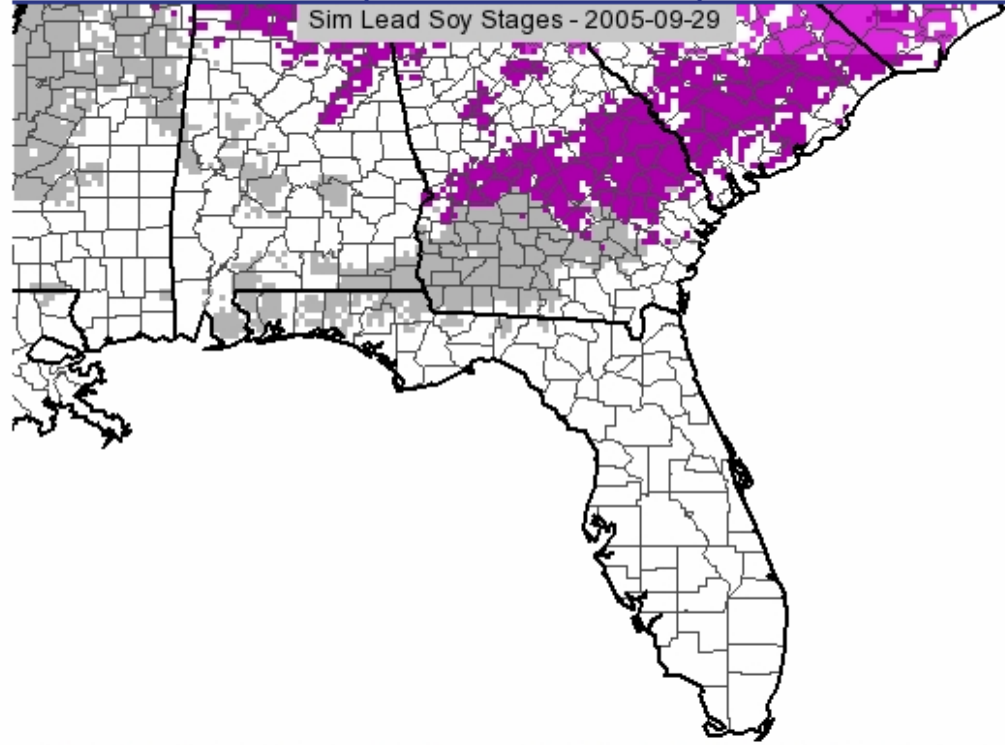
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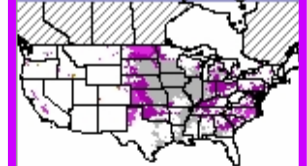
Sim Acc Dep Non Soy Leaf



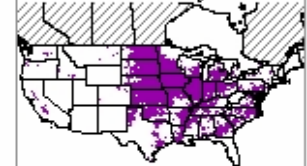
Sim Lead Dis Sev Non Soy



Sim Lead Soy Stages



Sim Lead Soy LAI



[Edit National Commentary](#)

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

This simulation, based on USDA agricultural statistics and other communications, appears to be slightly ahead of the growth stages at most locations. In many locations it is running 1 to 2 weeks ahead of observed.

### Additional Links

- [Aerobiology Risk Analysis](#)
- [American Phytopath. Society Home Page](#)
- [Animated Hurricane Maps](#)
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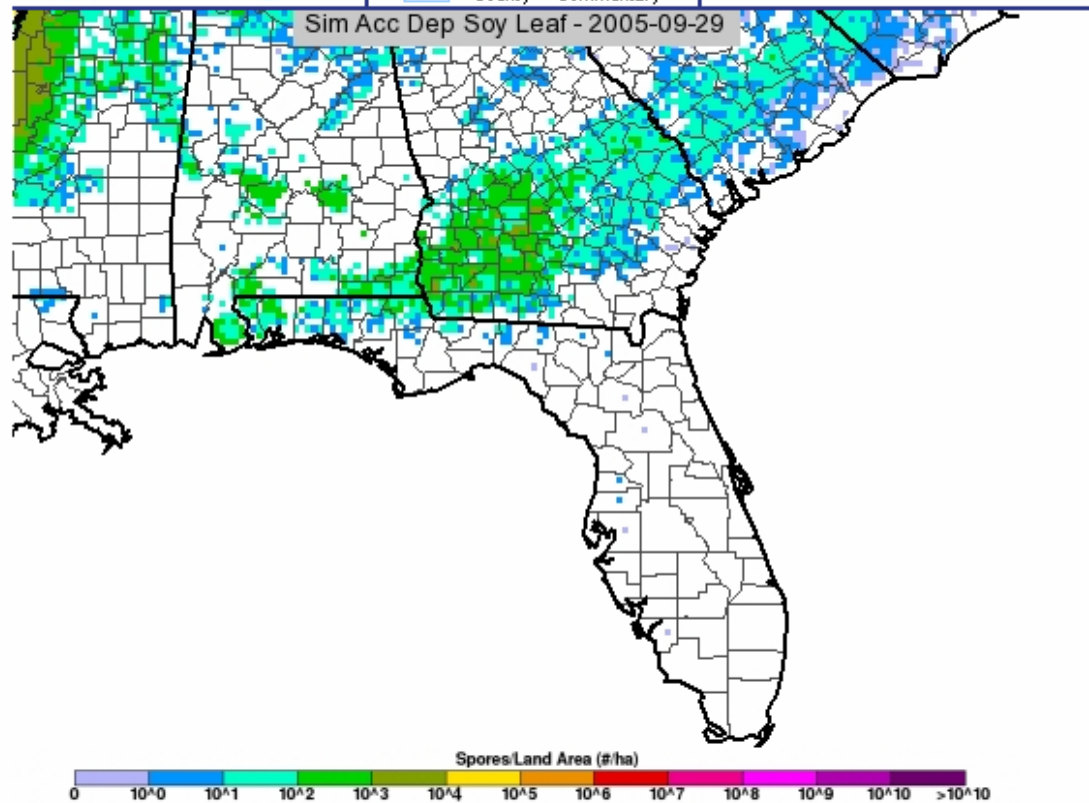
- [APHIS-PPO Soybean Rust Site](#)
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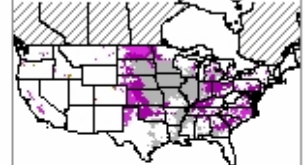


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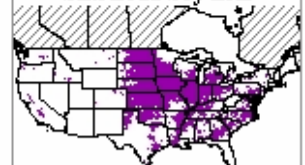
### National Map Commentary (updated: 08/16/05)

The simulation up to August 24th, indicates that there are low to moderate levels of accumulated spore deposition on soybean leaves in Georgia with light deposition in surrounding states except for an area on the border of MS and AR along the Mississippi River.

### Sim Lead Soy Stages



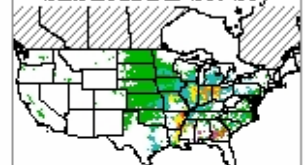
### Sim Lead Soy LAI



### Sim Acc Dep Soy Leaf



### Sim Lead Dis Sev Soy



### Sim Soy Scouting Areas

### Additional Links

- [Aerobiology Risk Analysis](#)
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- [Animated Hurricane Maps](#)
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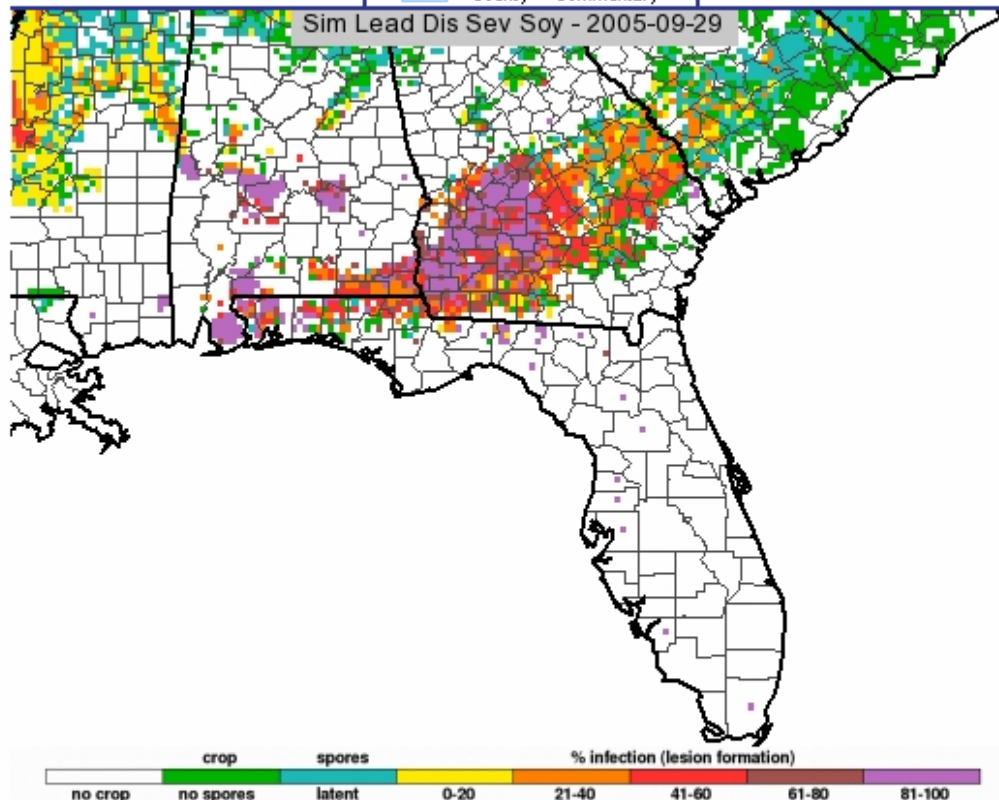
- [APHIS-PPO Soybean Rust Site](#)
- [CSREES Web site](#)
- [National Plant Diagnostic Network site](#)
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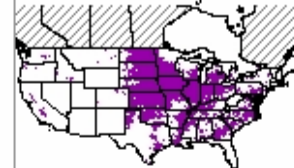
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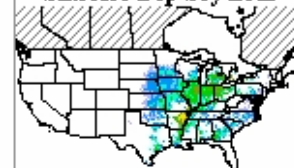
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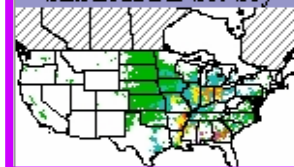
## Sim Lead Soy LAI



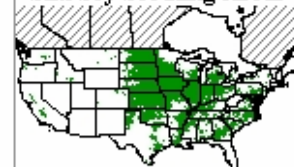
## Sim Acc Dep Soy Leaf



## Sim Lead Dis Sev Soy



## Sim Soy Scouting Areas



## Observation Public

[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](#)
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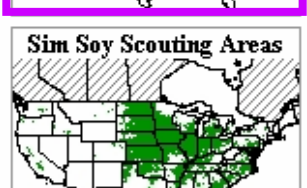
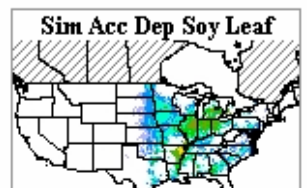
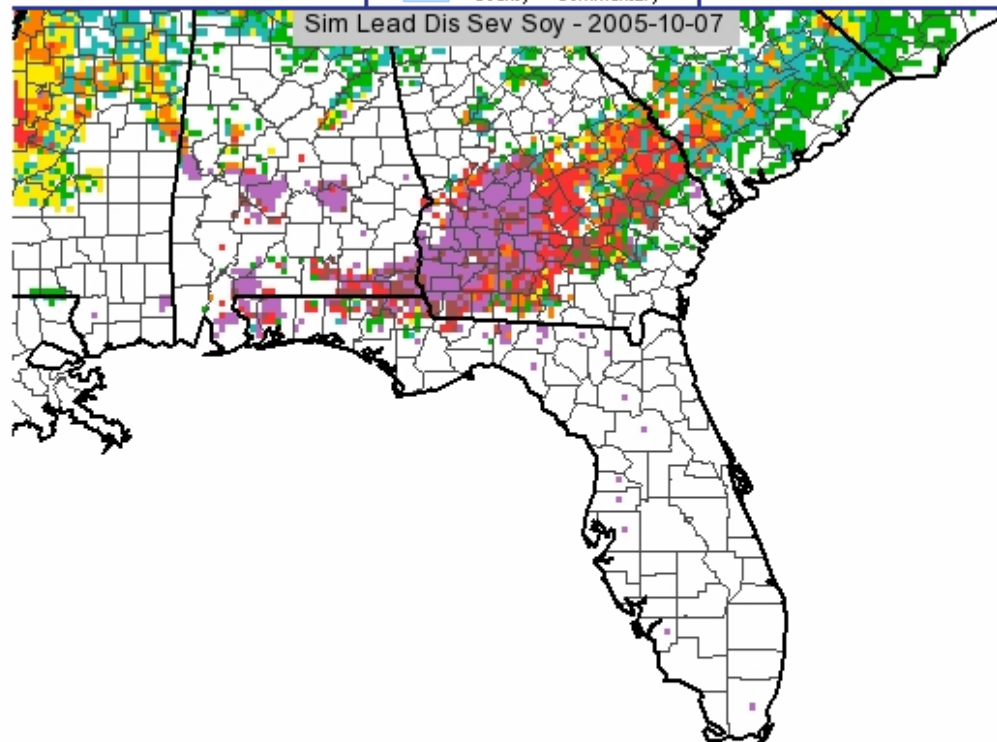
- [APHIS-PPO Soybean Rust Site](#)
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### Edit National Commentary

#### 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

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

# What Did We Learn

Geographic distribution of and number of spores produced in source areas is critical to forecasting.

Caribbean basin was not a significant source region for soybean rust spores in 2005.

Local spread is very complicated. Observations in 2005 revealed that pathogen spread more slowly within Kudzu patches than in infected soybean sentinel plots.

Soybean rust spores are very sensitive to exposure to solar radiation.

PSU/ZedX Soybean Rust Aerobiology Model over-predicted spread in 2005.

In 2005, we had to rely on sentinel plots and mobile scouting for reliable information on soybean rust spread. Clearly scouting in the southern states will be a critical component of the USDA Soybean Rust Information System in 2006. We need both sentinel and mobile scouting during late winter and throughout the growing season.

# Research Areas Remaining that are Important to Modeling Effort

Environmental and host influences on spore production

Influence of environmental factors and canopy structure on escape of spores from the canopy

Spatial assessment of disease severity

Wash off by rain during deposition events

Measurements of deposition

Is long range (in time) forecasting applicable to soybean rust prediction

# What Will We Improve for 2006

Better Kudzu map?

Sub-grid cell parameterization of source areas for inoculum production

Improve canopy escape function

Add consideration of thermal hydration to survivability function

Include dry deposition

Ensemble approach to transport and local disease modeling