

Soybean Rust Aerobiology Model: 2005

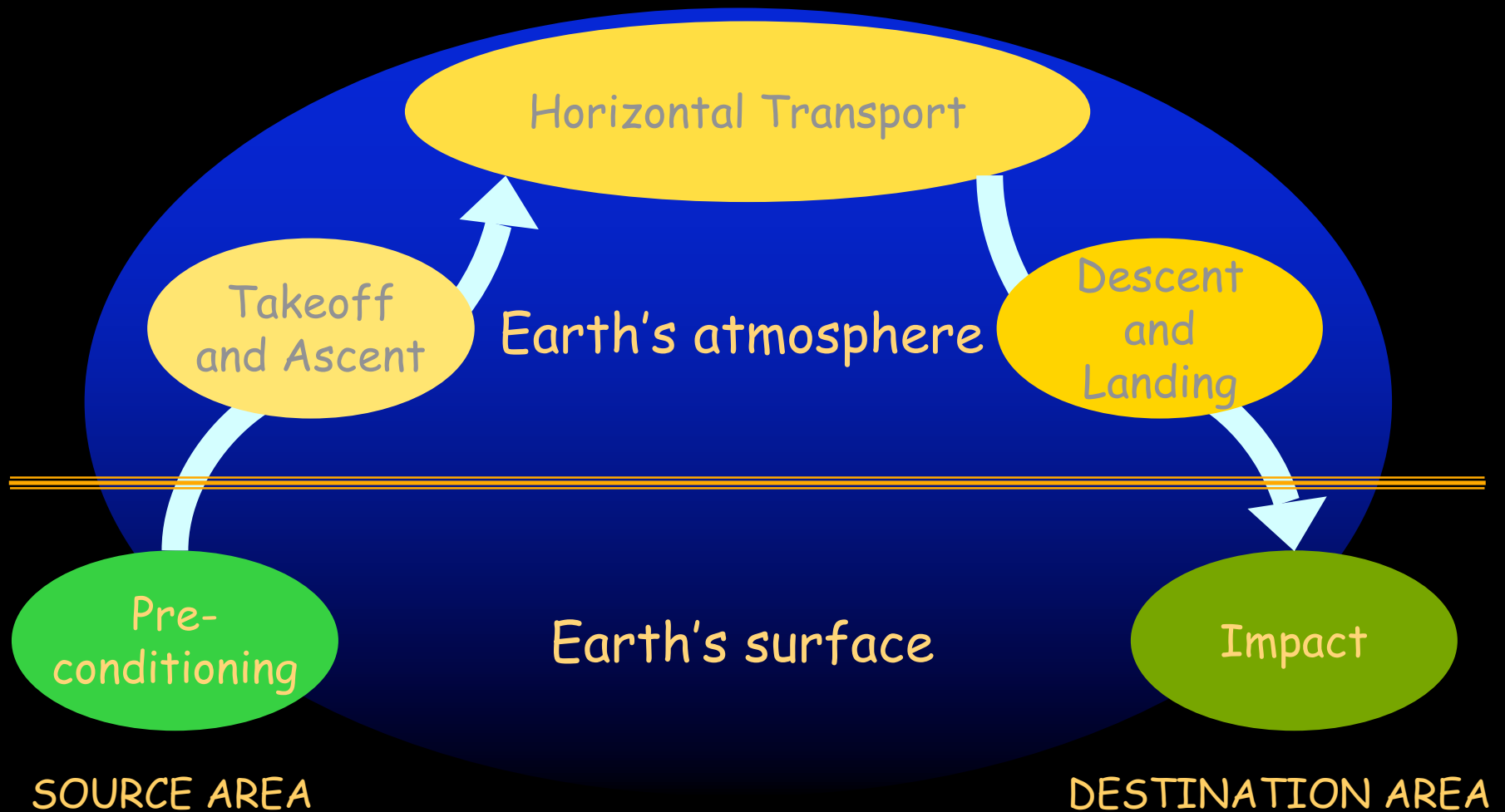
Scott Isard (Penn State)

Joe Russo (ZedX)

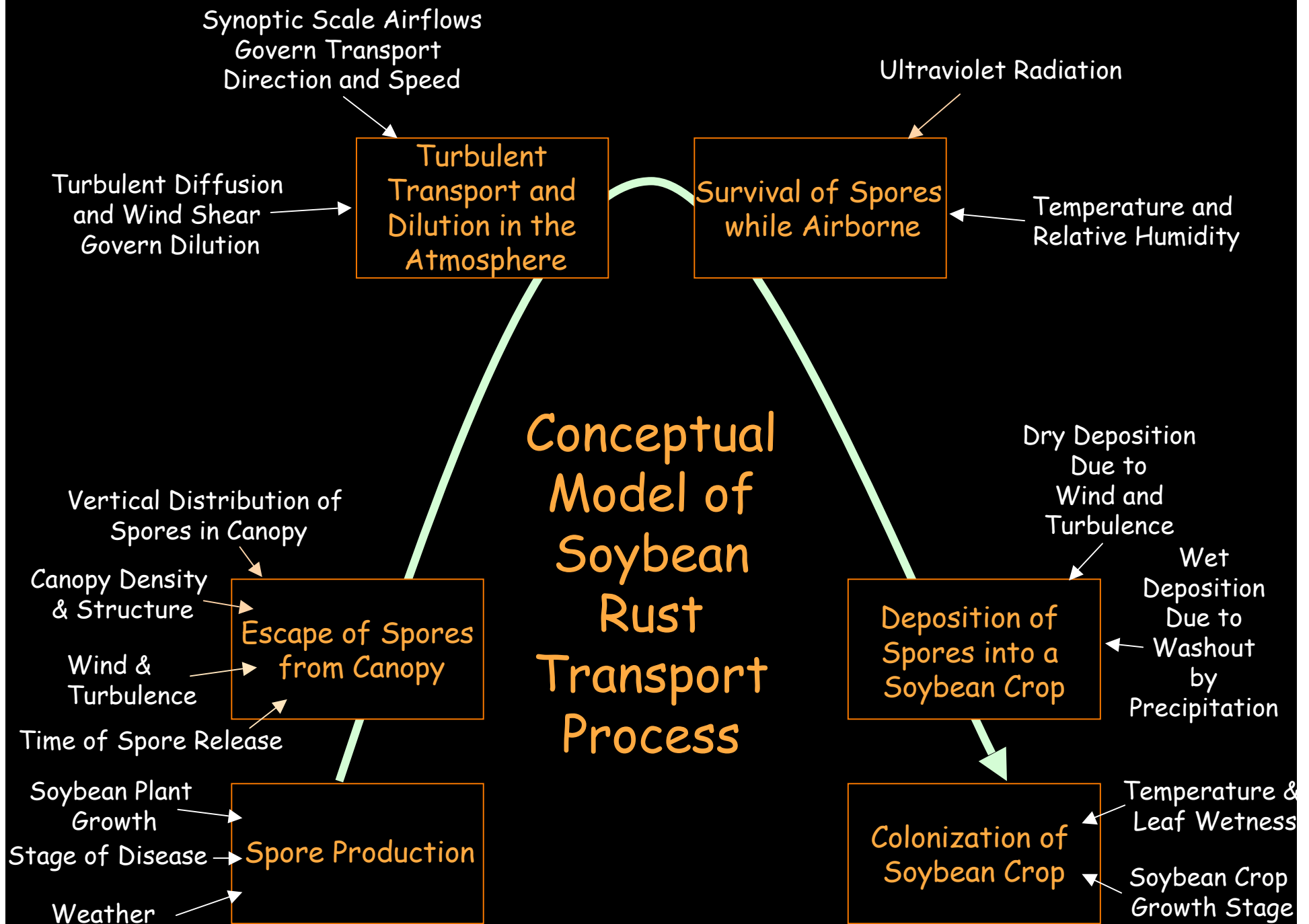
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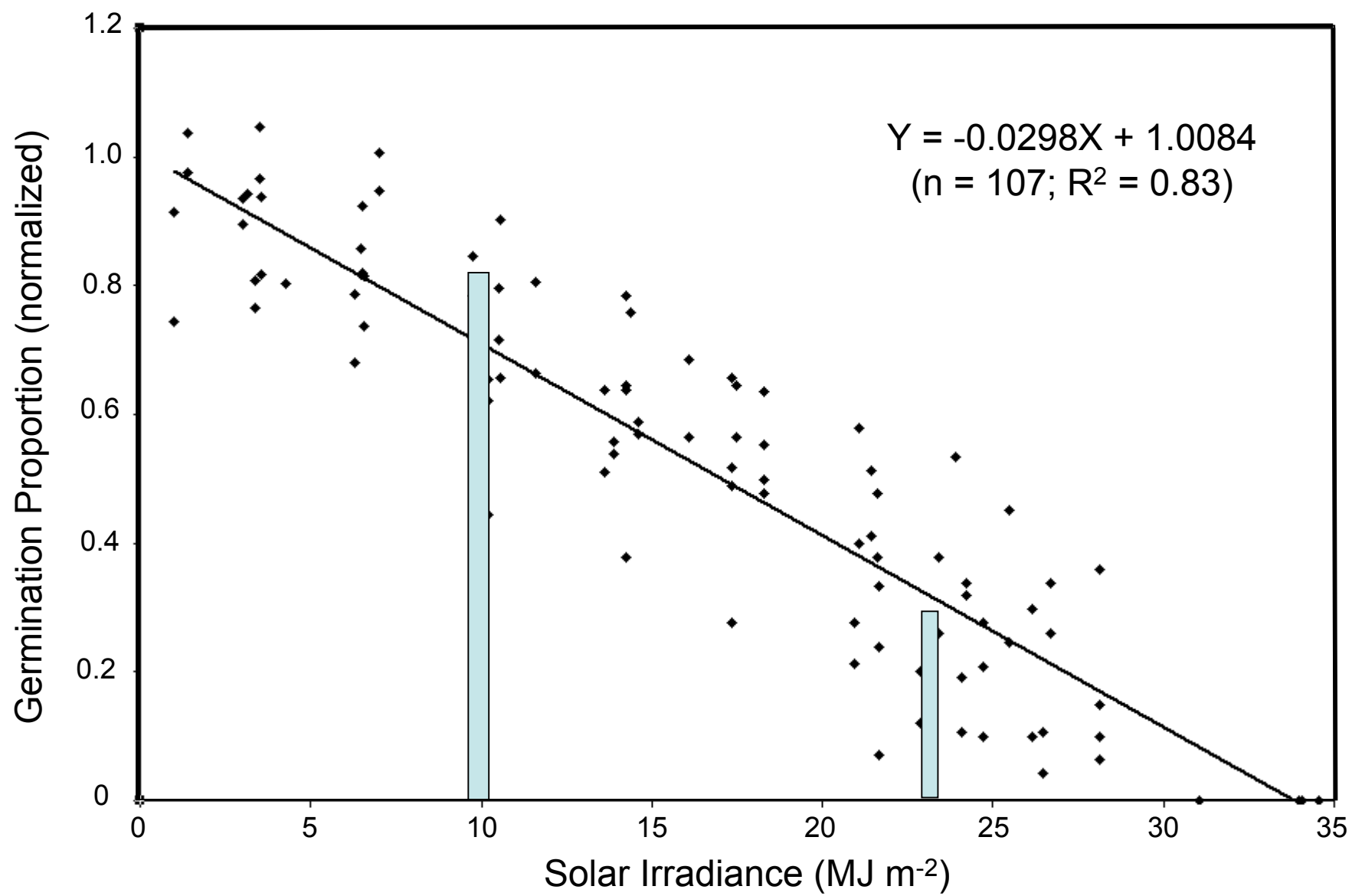
Jeff Grimm (ZedX)

Aerobiota Transport Process Model



Conceptual Model of Soybean Rust Transport Process





Modeling: Information for Specialists, Researchers, and Administrators

APHIS researcher

Sentinel Protocol Map Description Download Geotiff SBR Images Help

Up

August - 2005						
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21	22	23	24	25	26	27
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September - 2005						
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October - 2005						
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State Point County Commentary

Overlay

Load

Sim Daily Spore Transport - 2005-09-29

Spores/Land Area (#/ha)

0 10⁰ 10¹ 10² 10³ 10⁴ 10⁵ 10⁶ 10⁷ 10⁸ 10⁹ 10¹⁰ >10¹⁰

Sep 29, 2005

Chronology of Positive Detections

Observation Researcher

Sim Daily Spore Transport

Sim Daily Wet Dep Land

Sim Acc Wet Dep Land

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](#)

[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

[Aerobiology Risk Analysis](#)

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[Animated Hurricane Maps](#)

[Soybean rust Identification card](#)

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October - 2005

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[National Plant Diagnostic Network site](#)
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Sim Daily Wet Dep Land - 2005-09-29

Spores/Land Area (#/ha)

0 10^0 10^1 10^2 10^3 10^4 10^5 10^6 10^7 10^8 10^9 10^10 >10^10

?
☐ State
☐ Point
☐ County
☐ Commentary
- Overlay -
Load

Chronology of Positive Detections
Observation Researcher

Sim Daily Spore Transport

Sim Daily Wet Dep Land

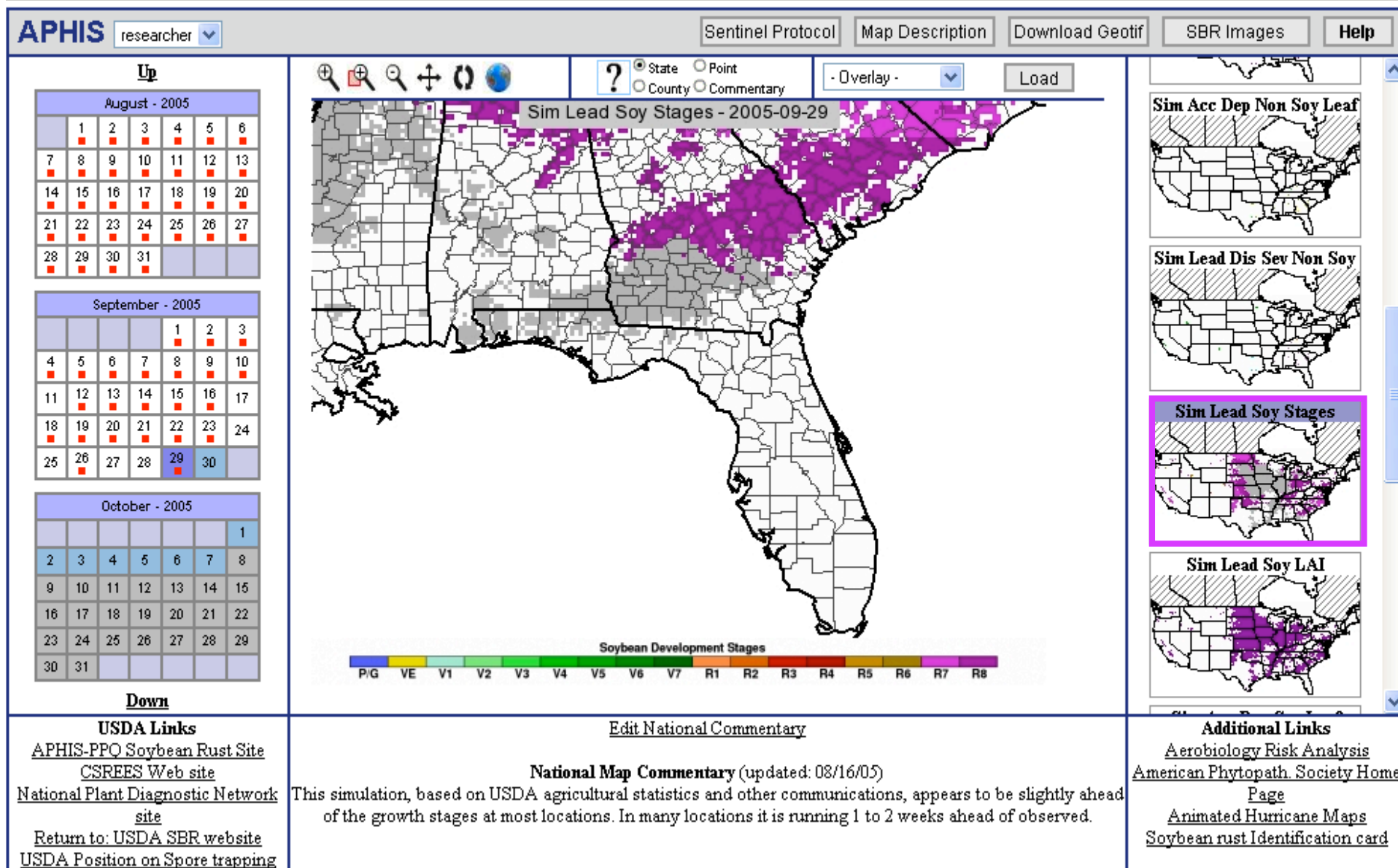
Sim Acc Wet Dep Land

Edit National Commentary

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

Additional Links
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?
☒ State
☐ Point
☐ County
☐ Commentary

- Overlay -
Load

Sim Acc Dep Soy Leaf - 2005-09-29

Spores/Land Area (#/ha)

0 10^0 10^1 10^2 10^3 10^4 10^5 10^6 10^7 10^8 10^9 10^10 >10^10

Sim Lead Soy Stages

Sim Lead Soy LAI

Sim Acc Dep Soy Leaf

Sim Lead Dis Sev Soy

Sim Soy Scouting Areas

Additional Links
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[Animated Hurricane Maps](#)
[Soybean rust Identification card](#)

Edit National Commentary

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.

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?
State
Point
County
Commentary

- Overlay -
Load

Sim Lead Dis Sev Soy - 2005-09-29

crop
spores

no crop
no spores
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

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[Soybean rust Identification card](#)

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.

Modeling: Information for Specialists, Researchers, and Administrators

APHIS researcher

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30	31					

Down

Sim Lead Dis Sev Soy - 2005-10-07

Sim Lead Soy LAI

Sim Acc Dep Soy Leaf

Sim Lead Dis Sev Soy

Sim Soy Scouting Areas

Observation Public

USDA Links

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[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.

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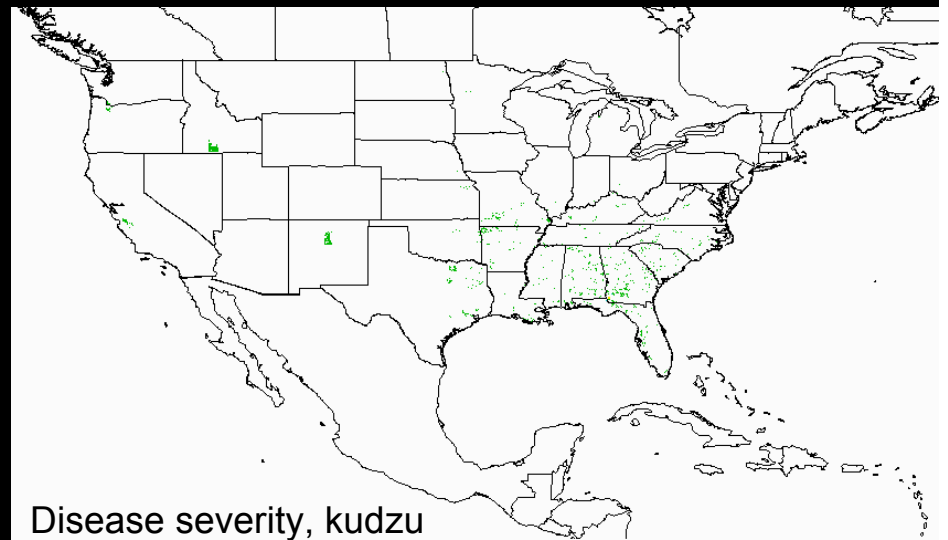
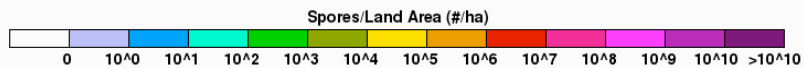
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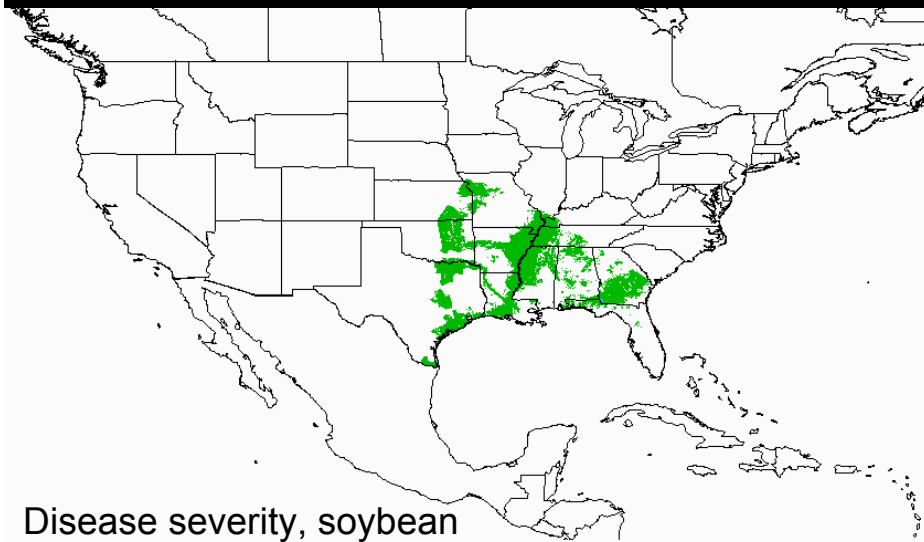
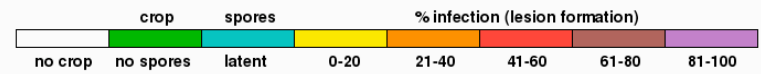
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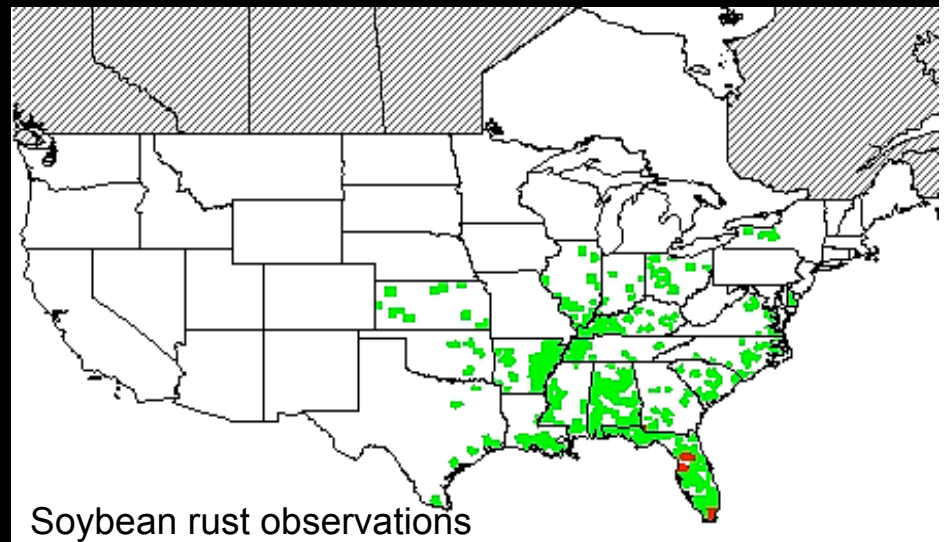
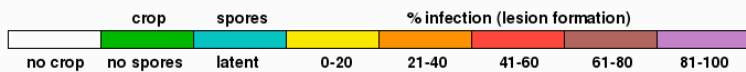
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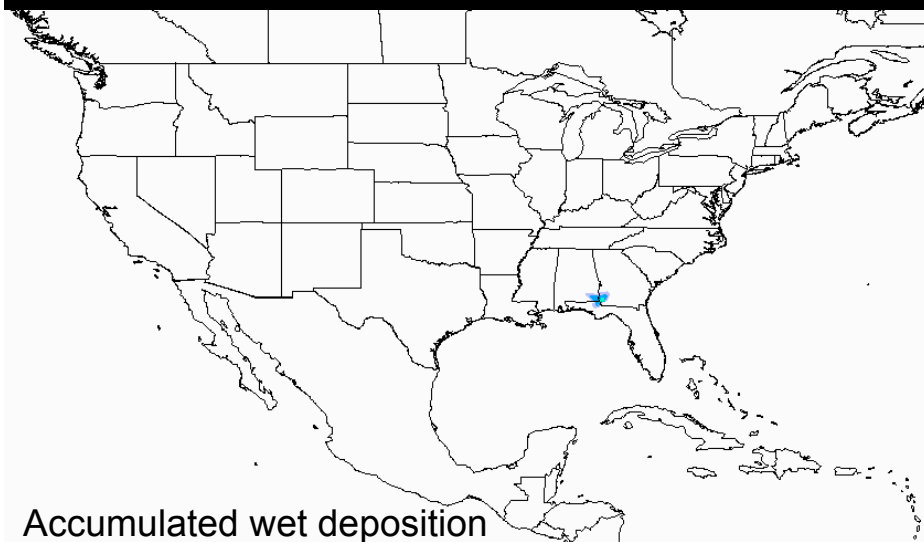
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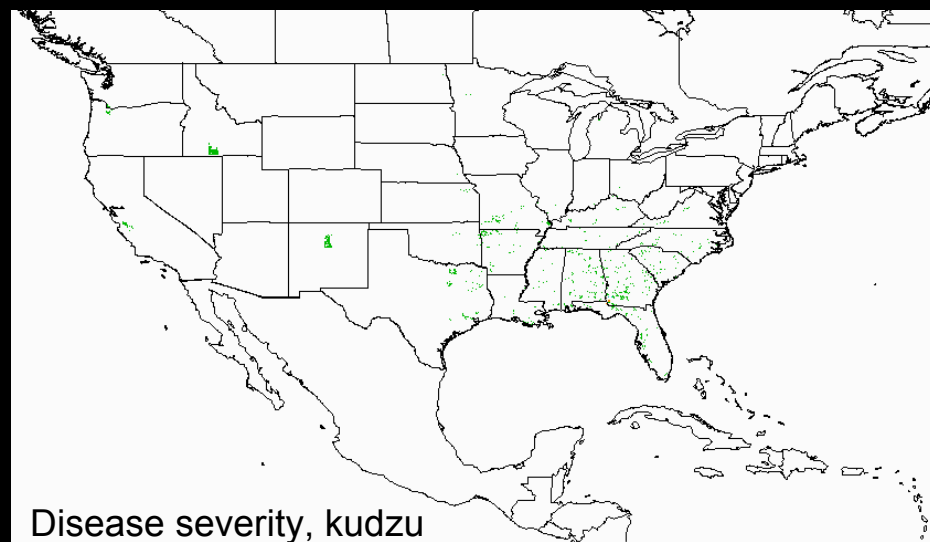
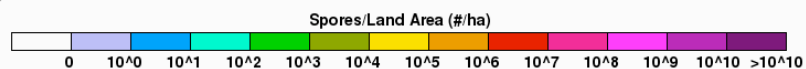
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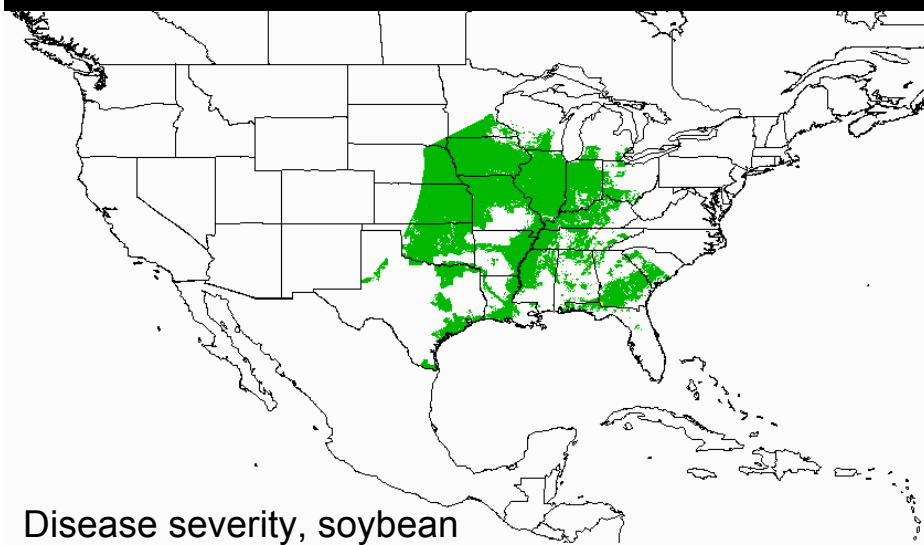
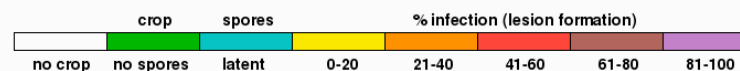
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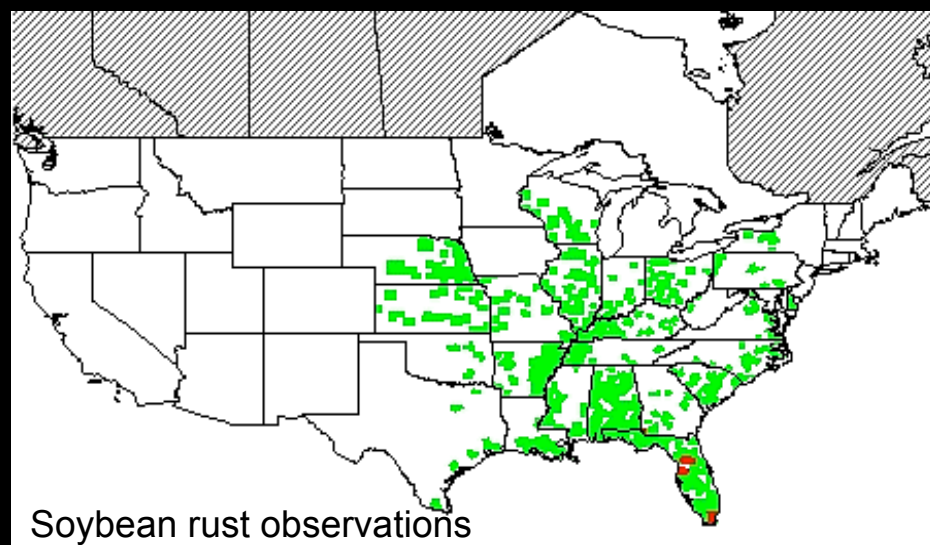
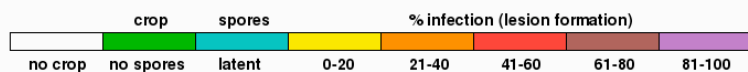
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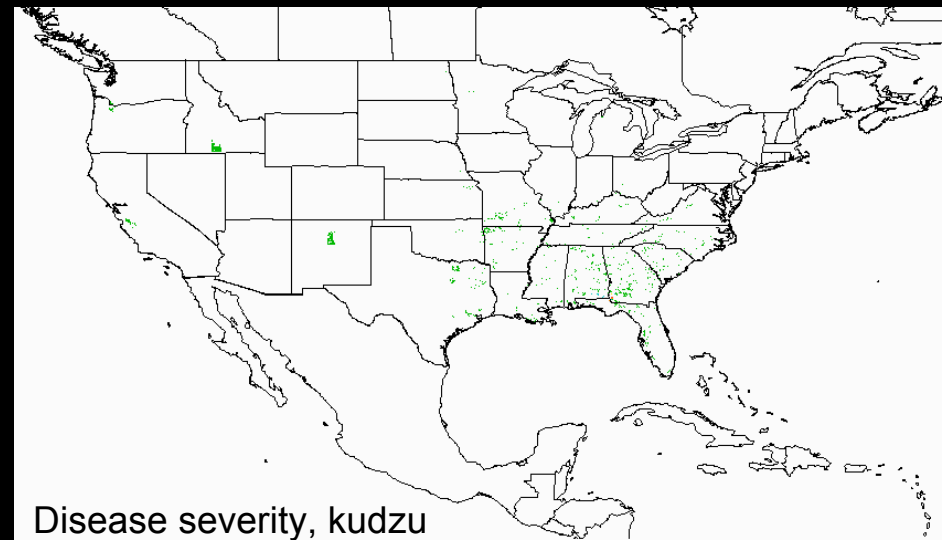
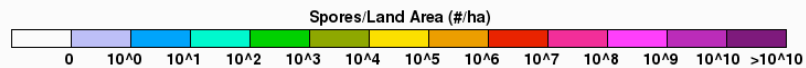
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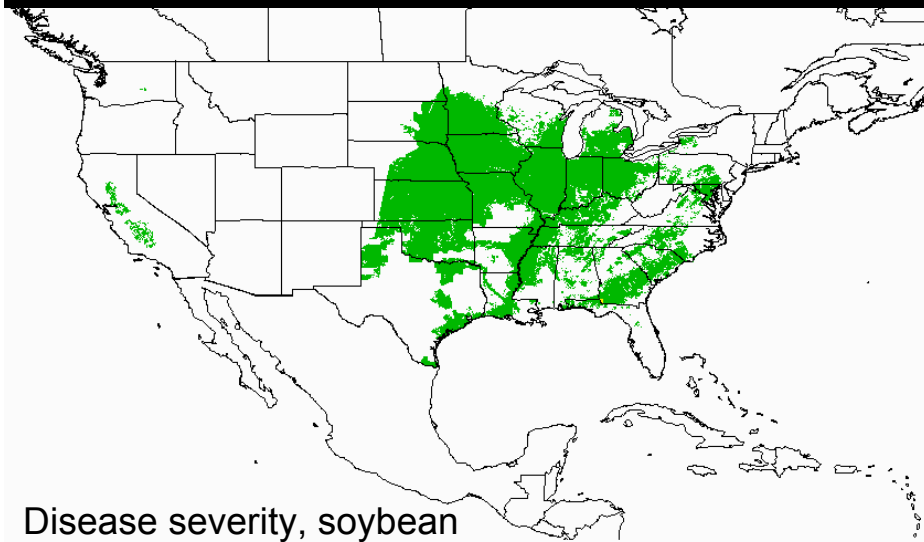
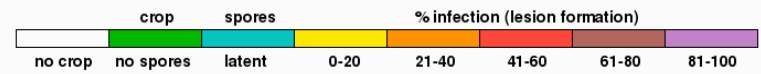
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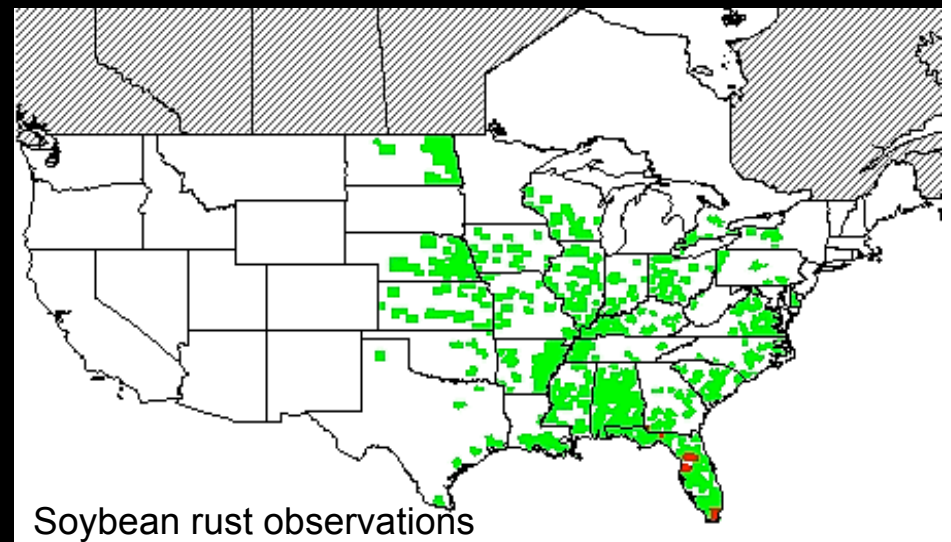
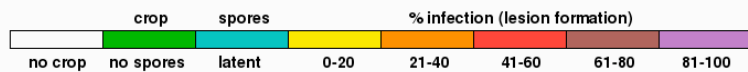
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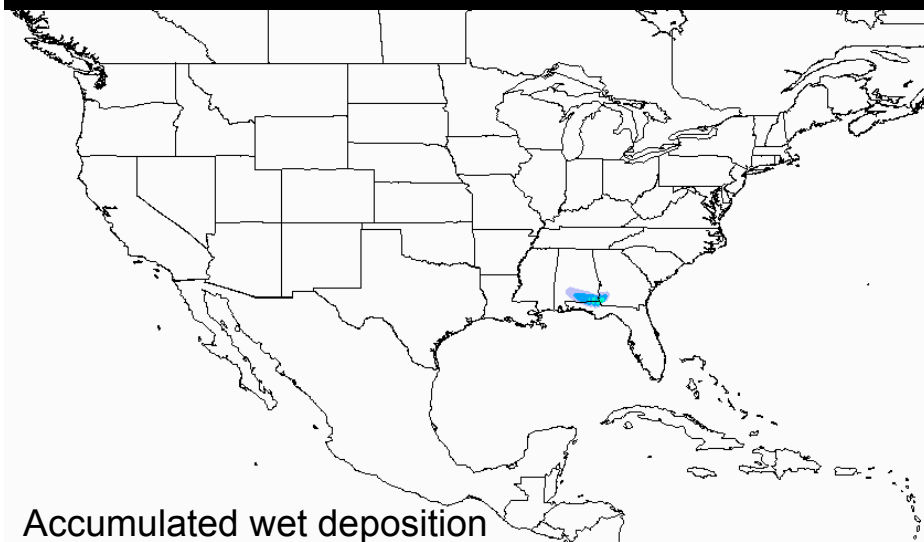
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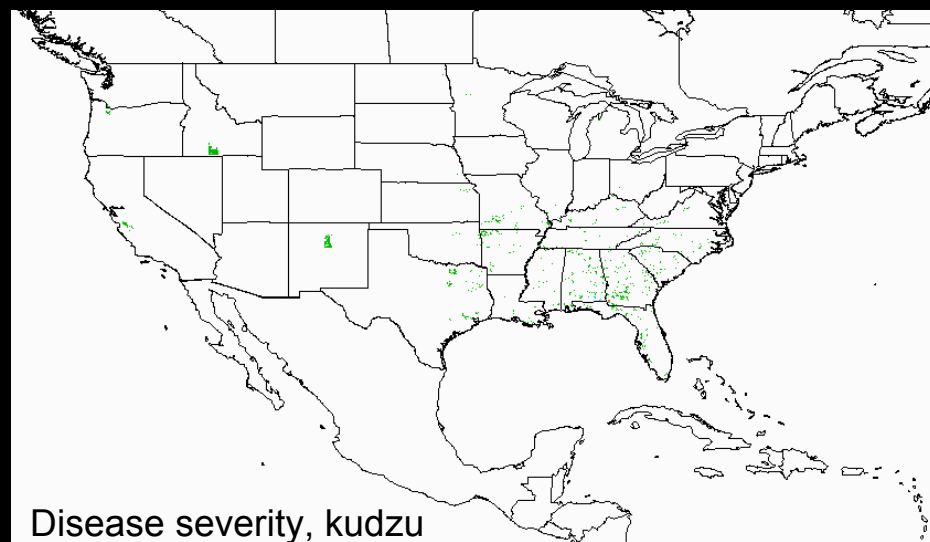
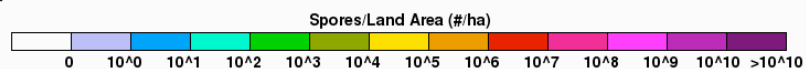
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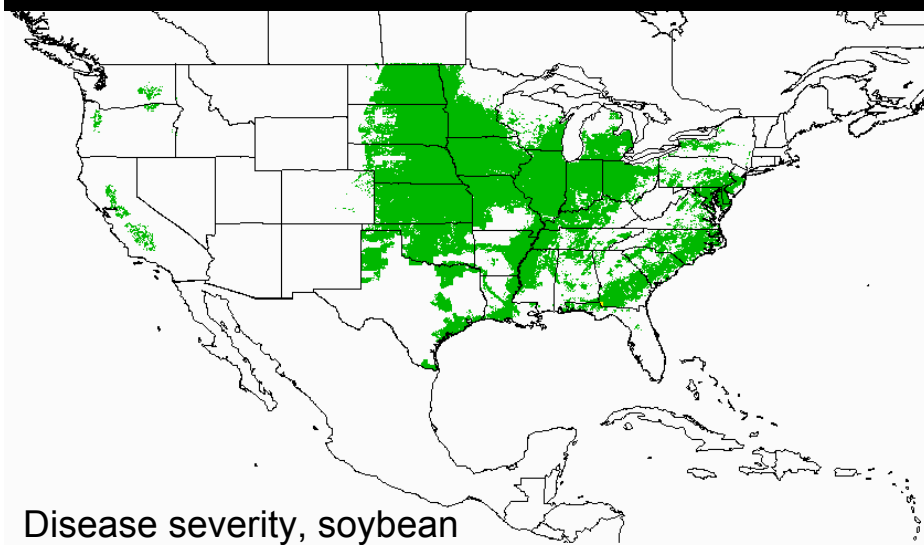
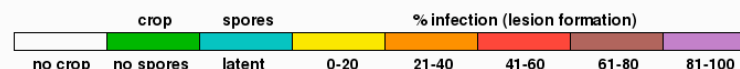
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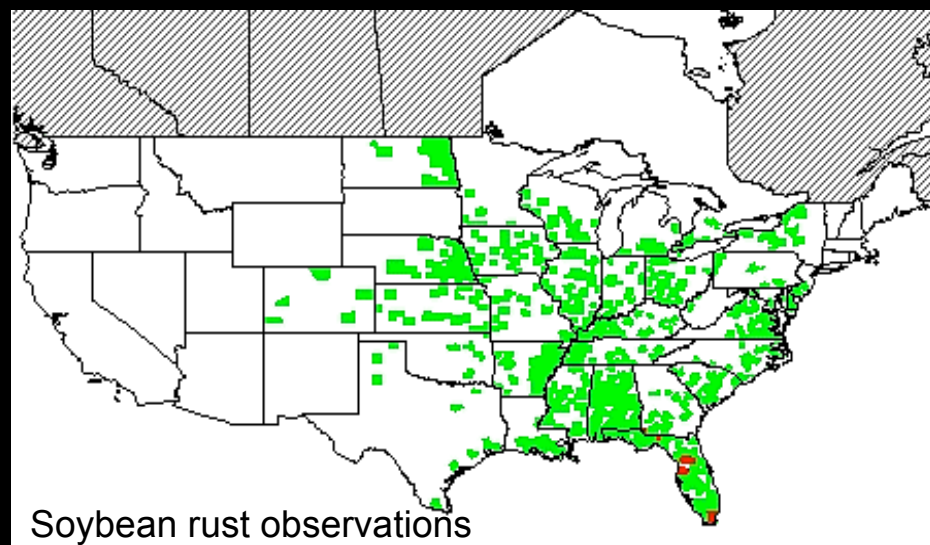
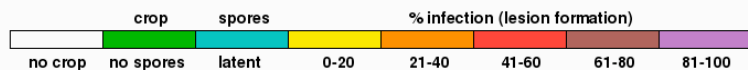
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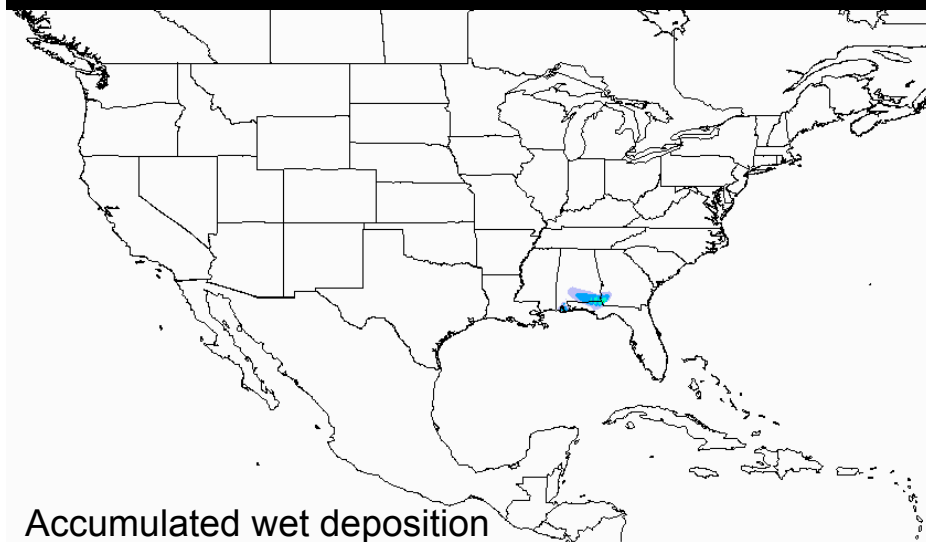
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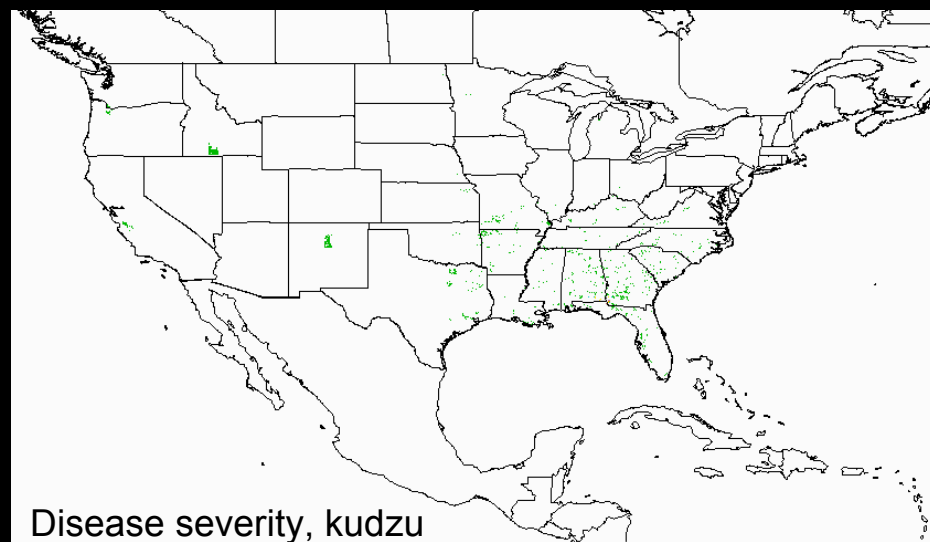
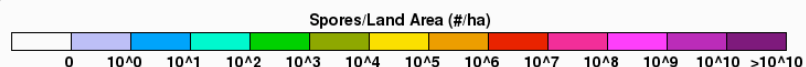
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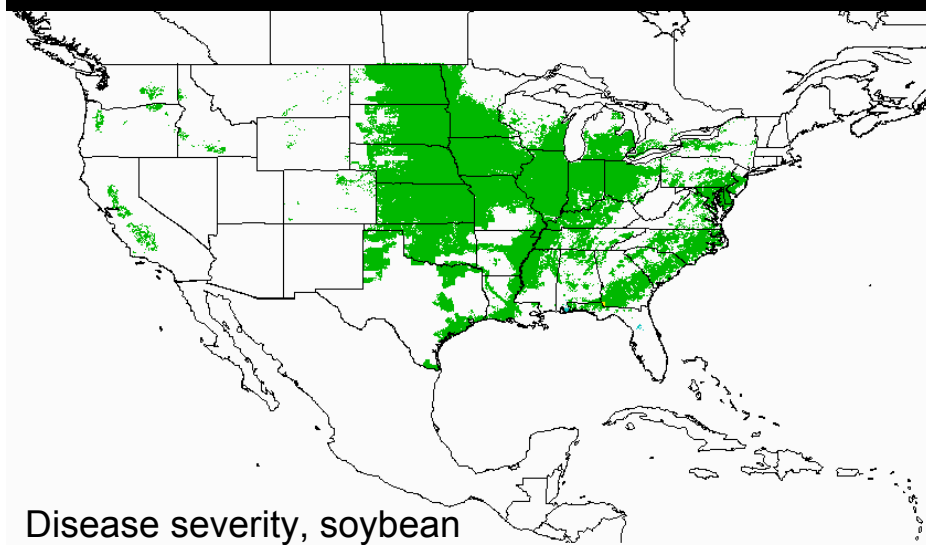
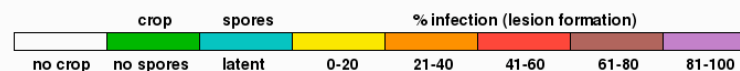
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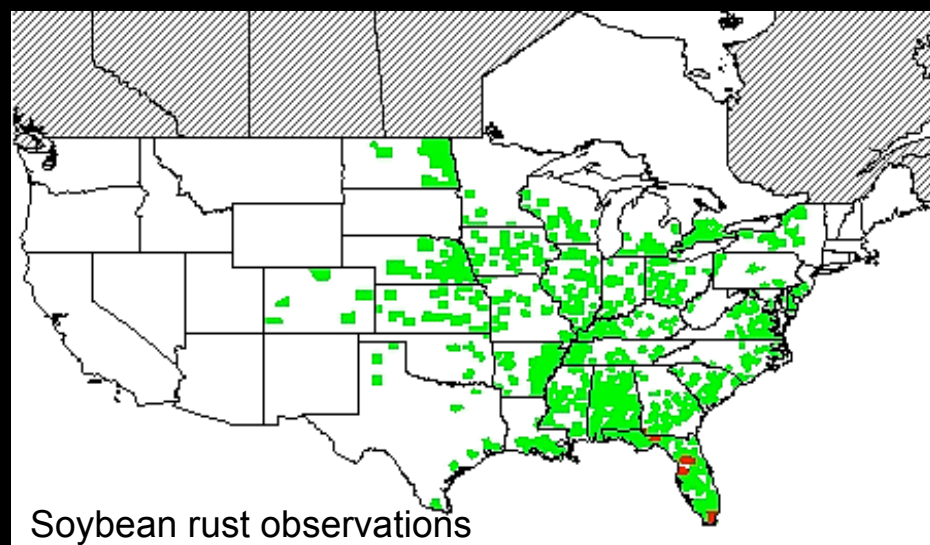
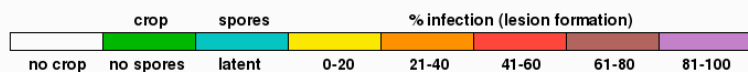
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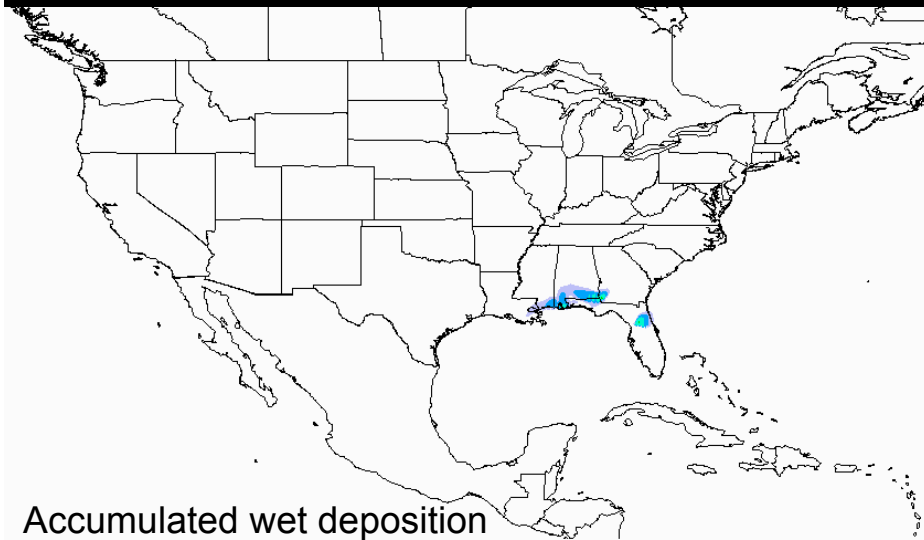
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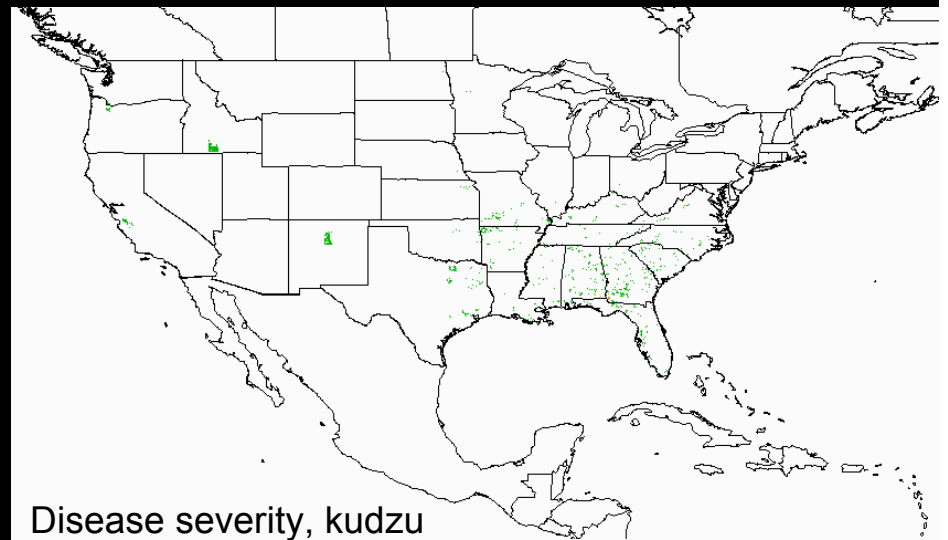
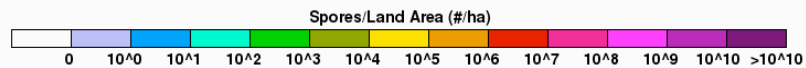
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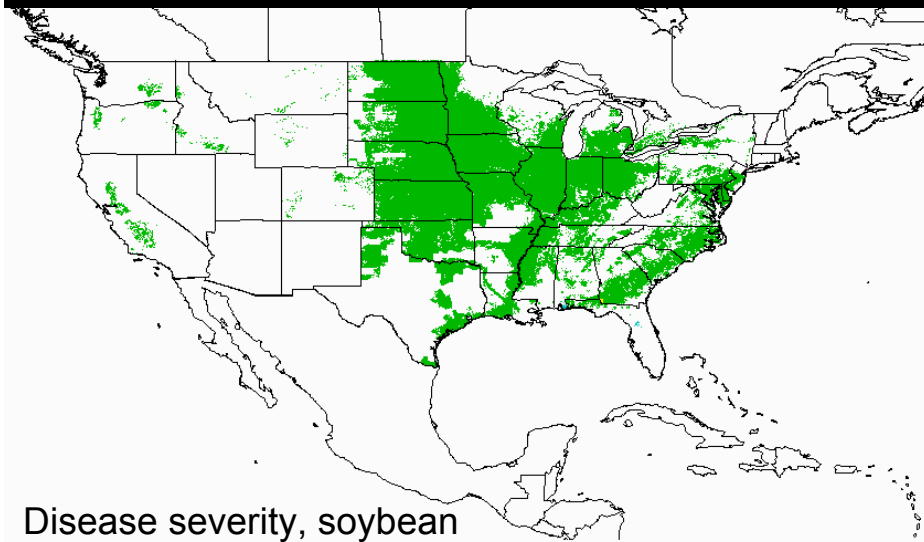
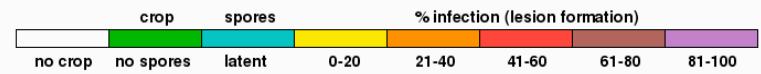
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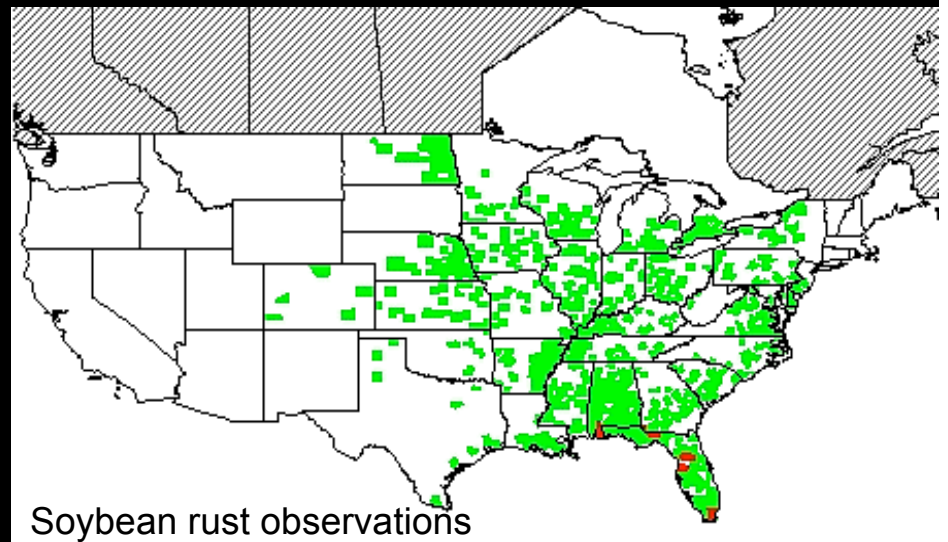
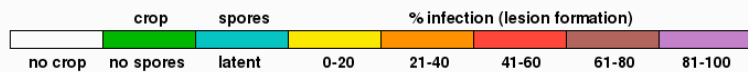
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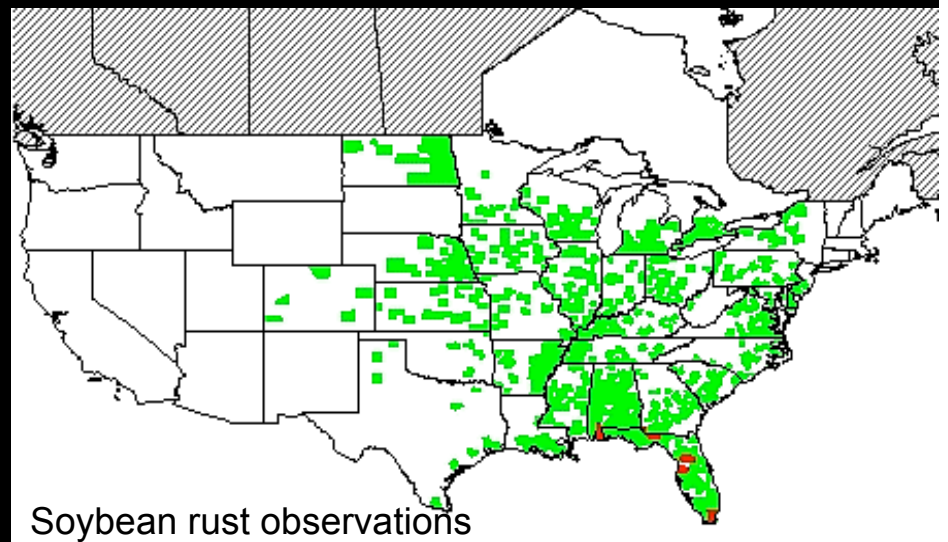
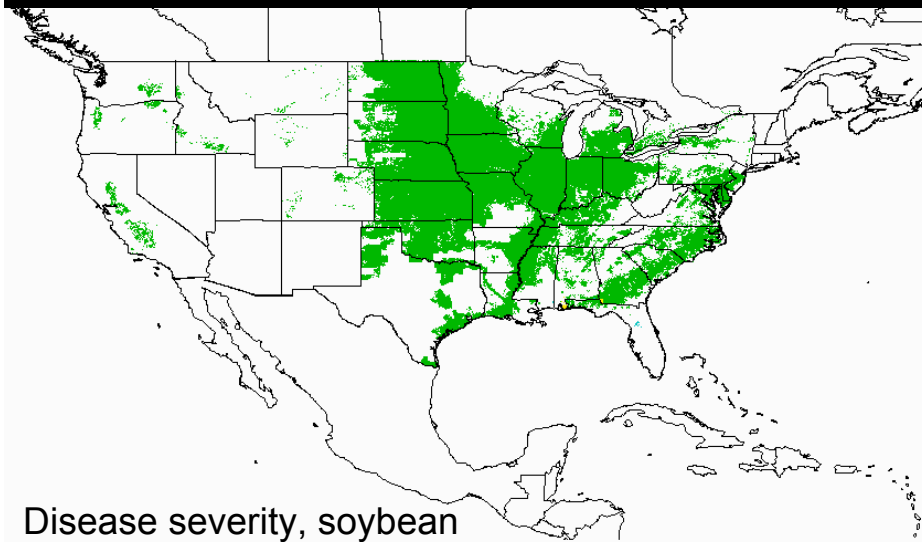
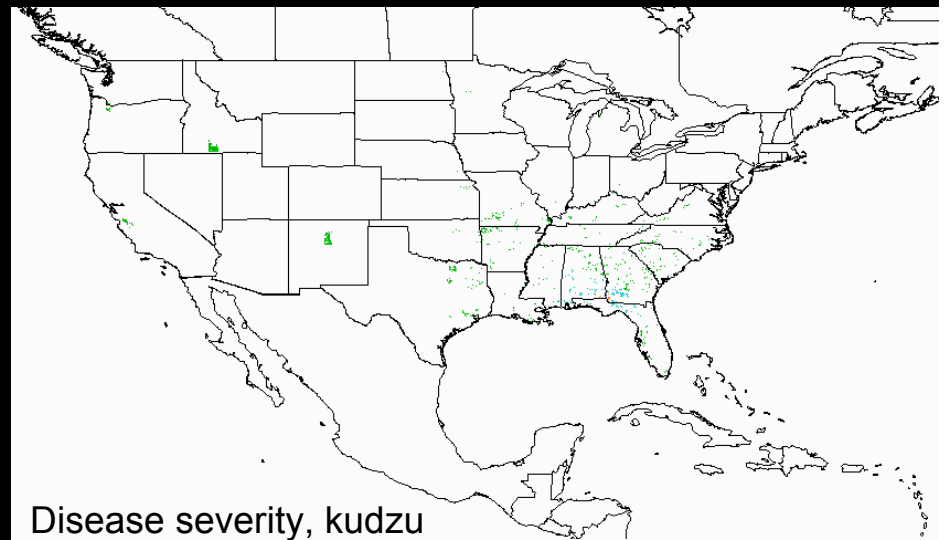
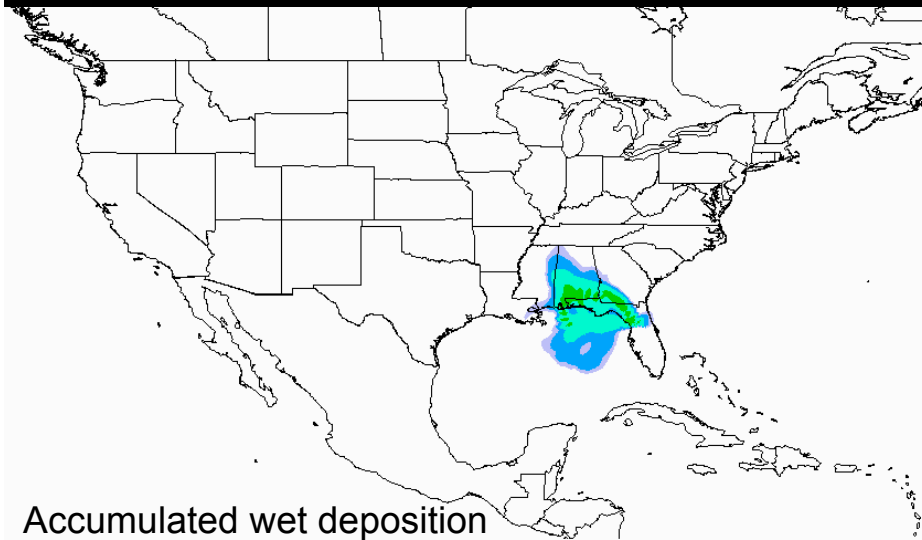
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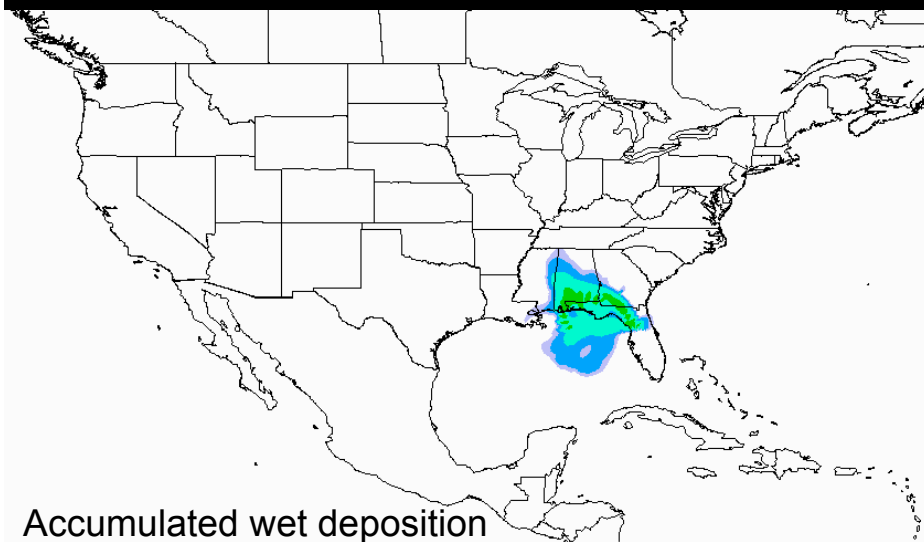
Soybean rust observations



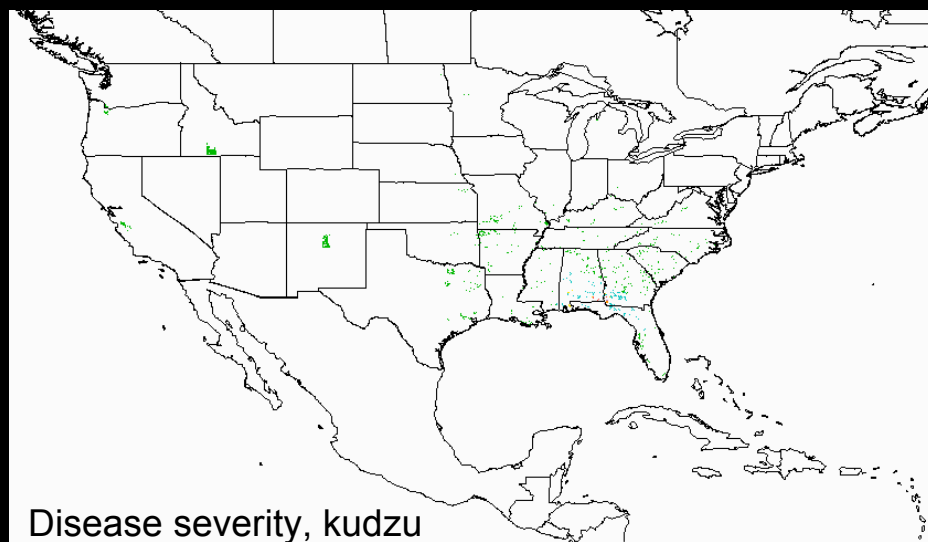
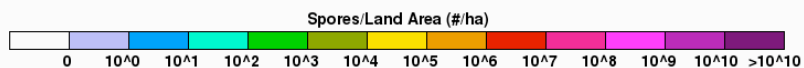
13 July 2005



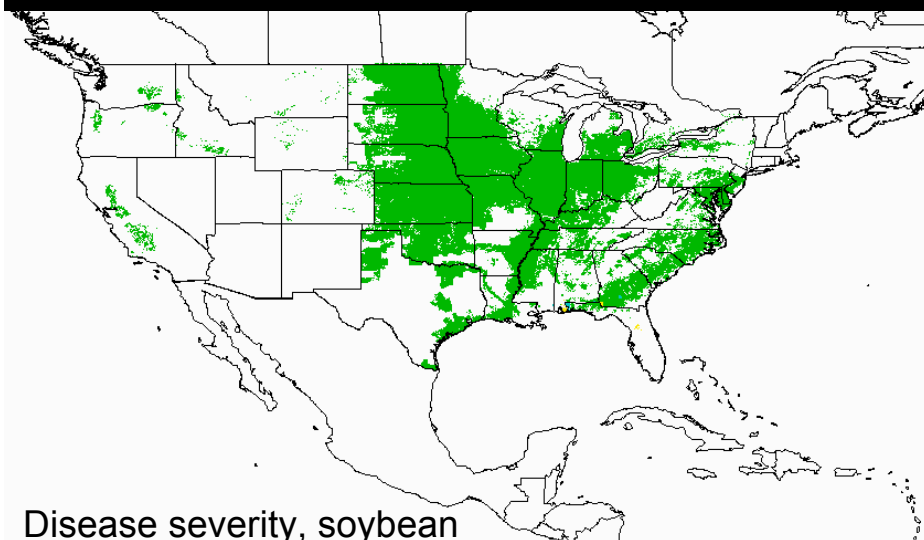
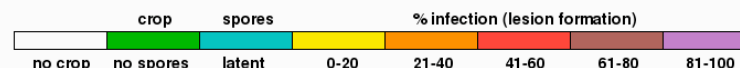
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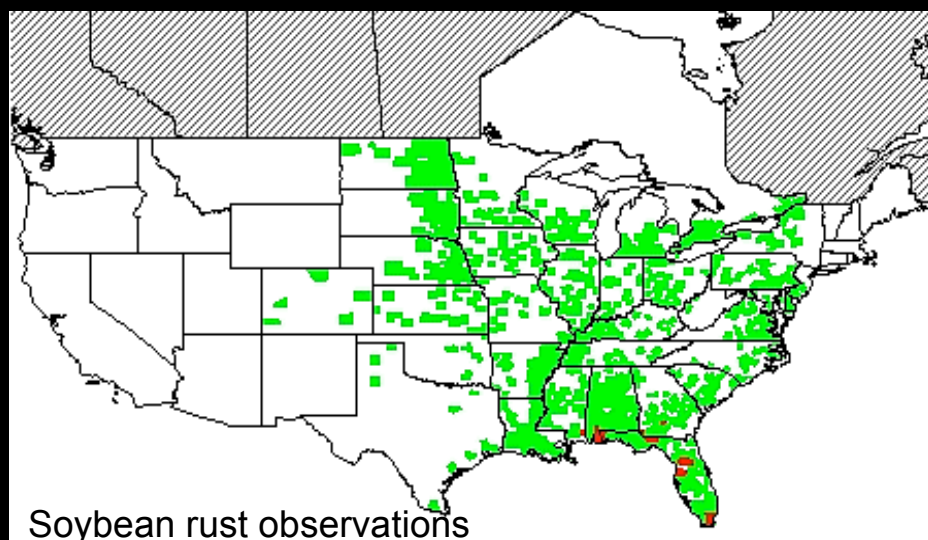
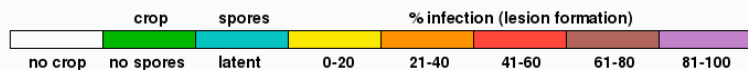
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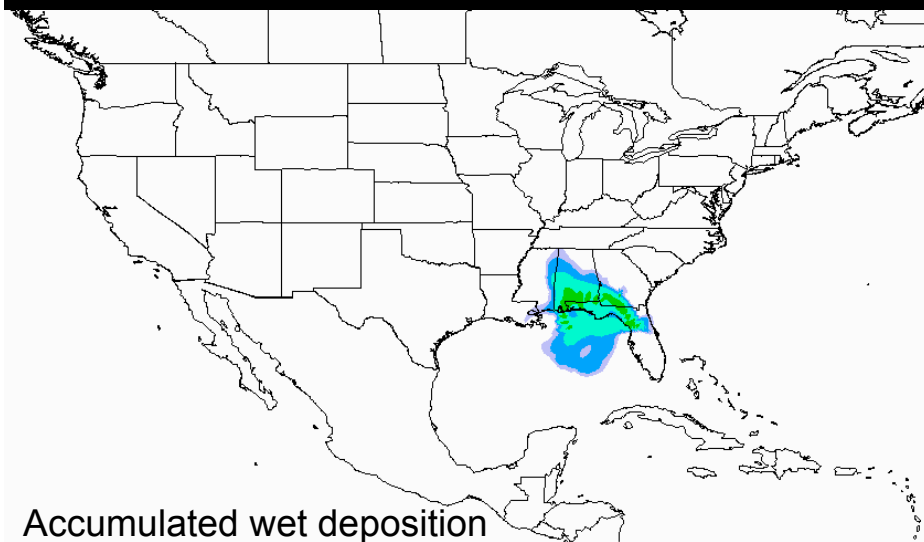
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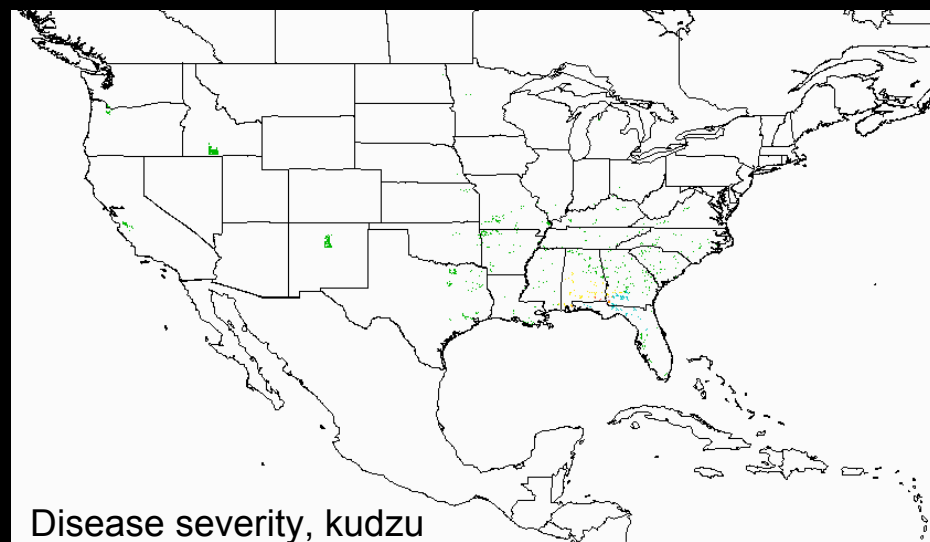
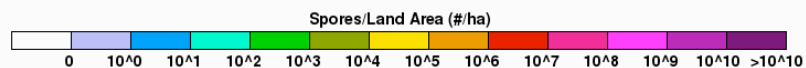
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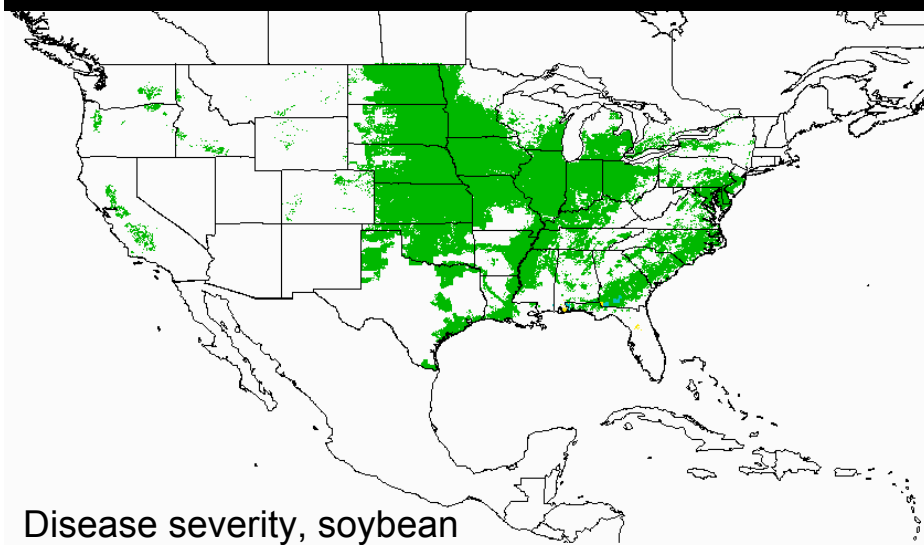
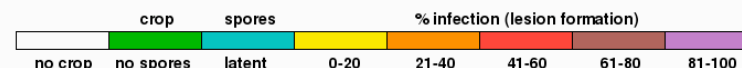
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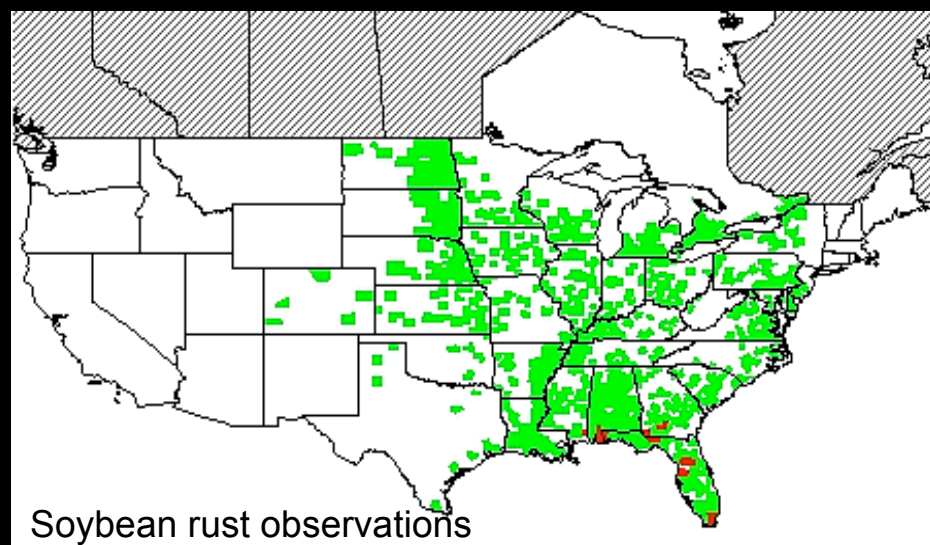
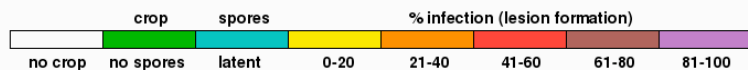
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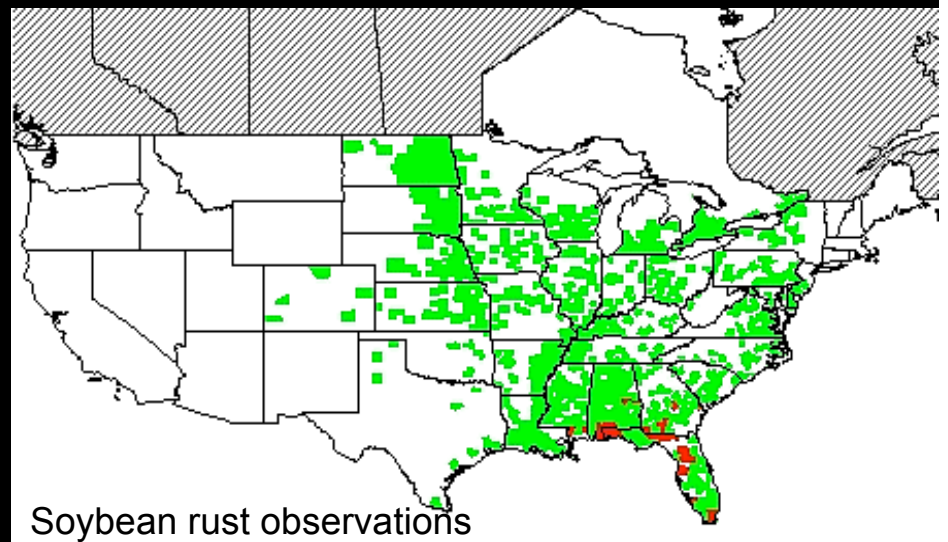
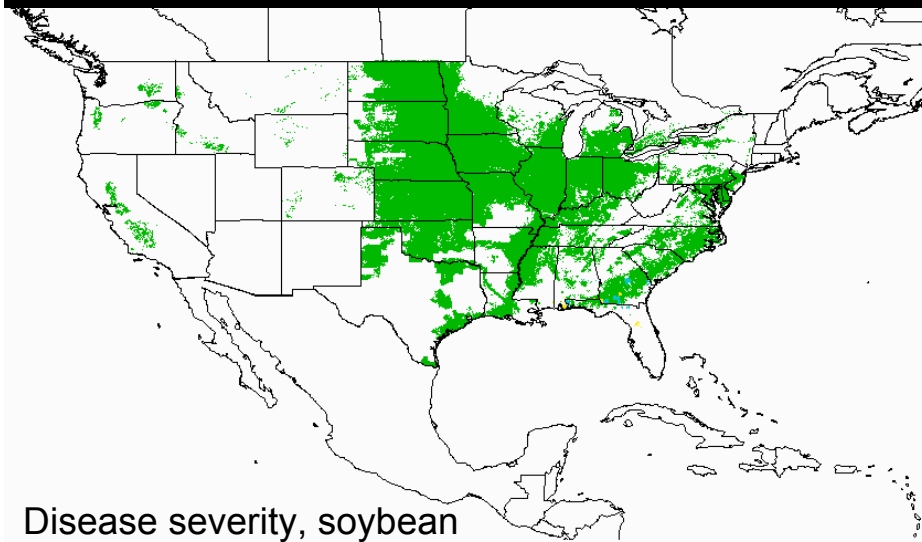
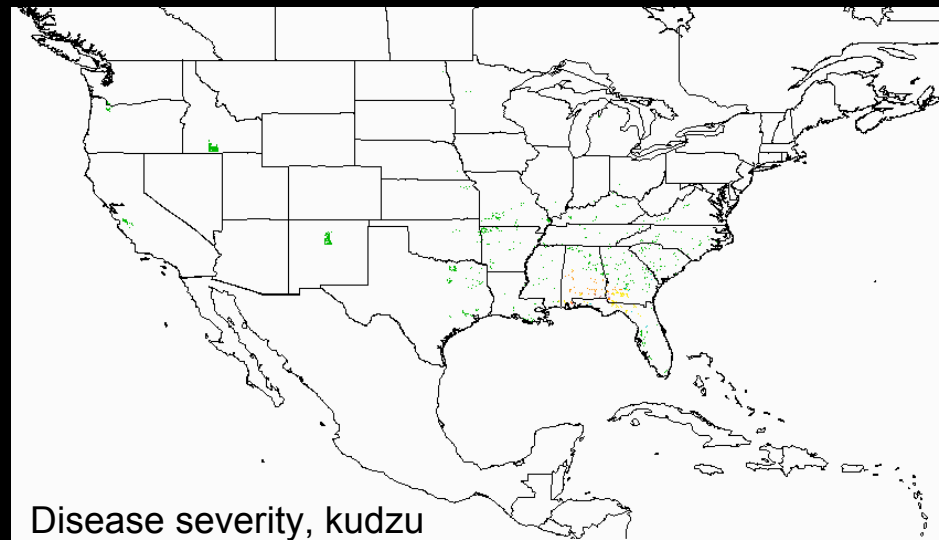
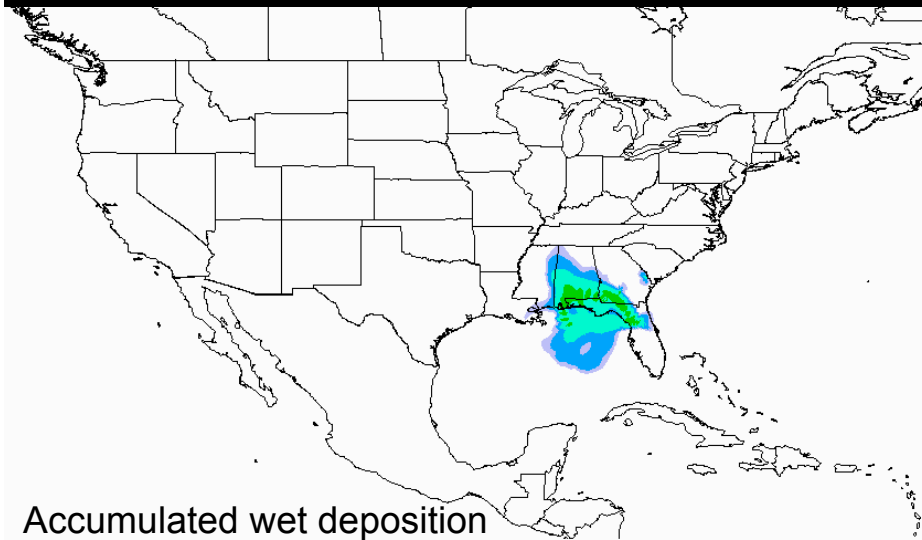
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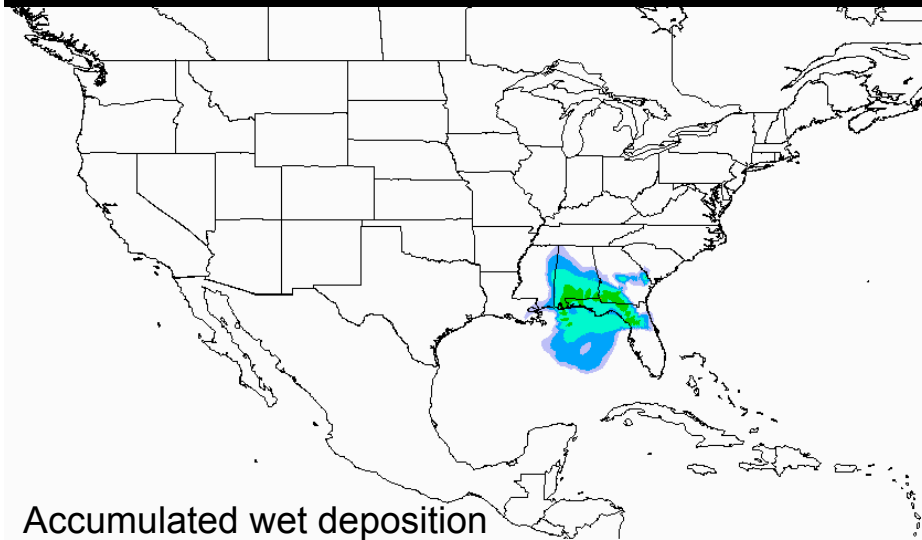
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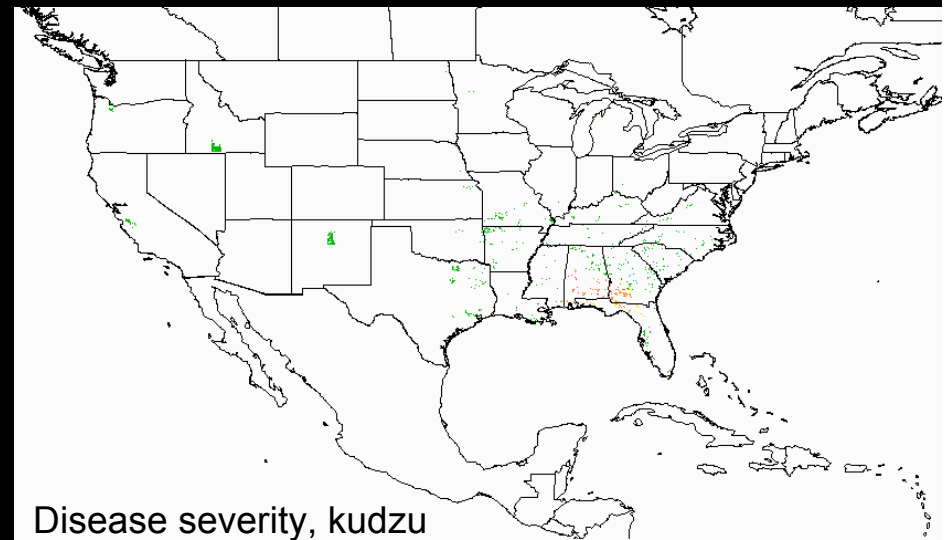
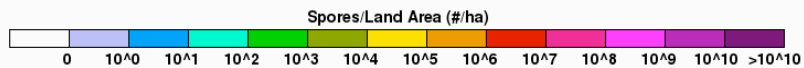
03 August 2005



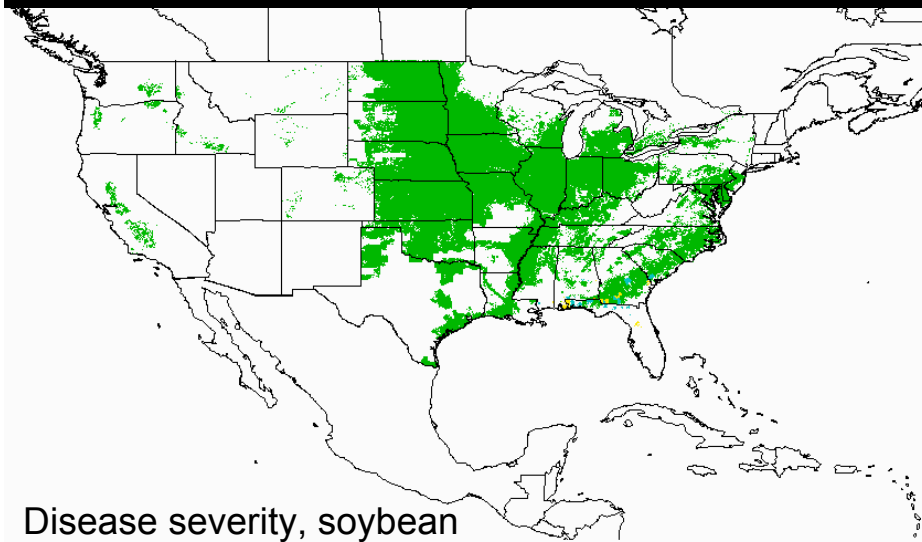
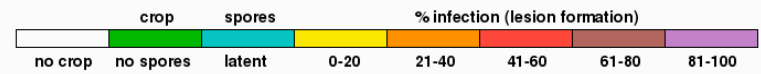
10 August 2005



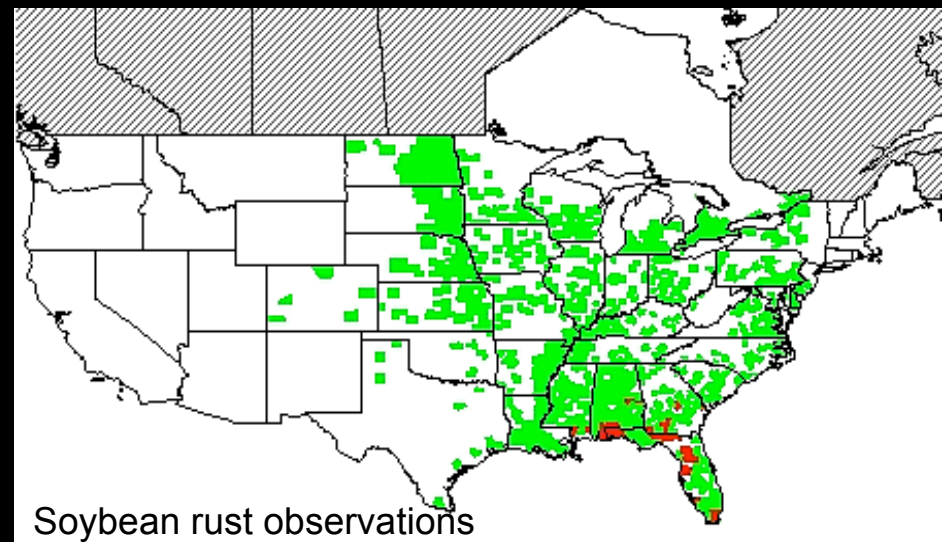
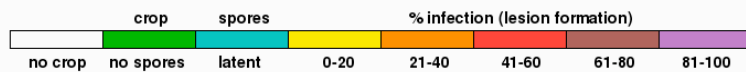
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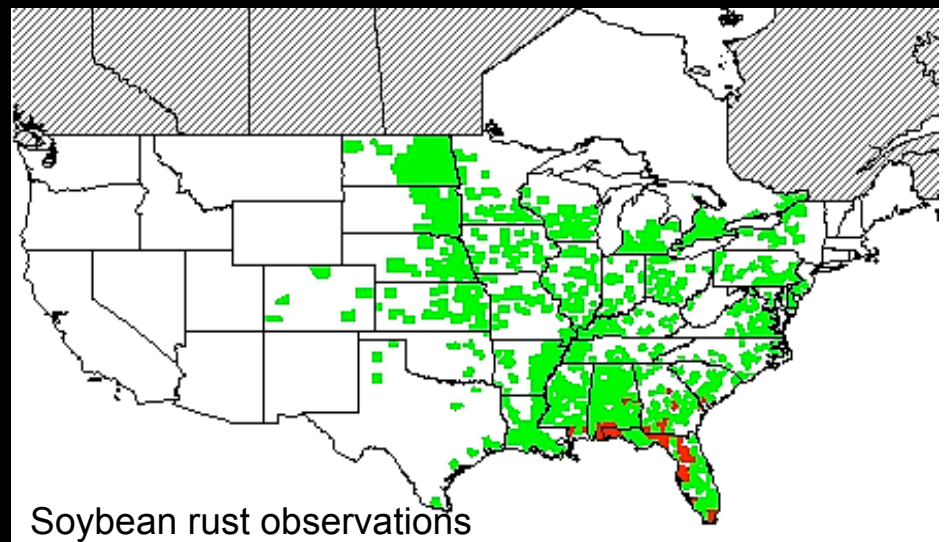
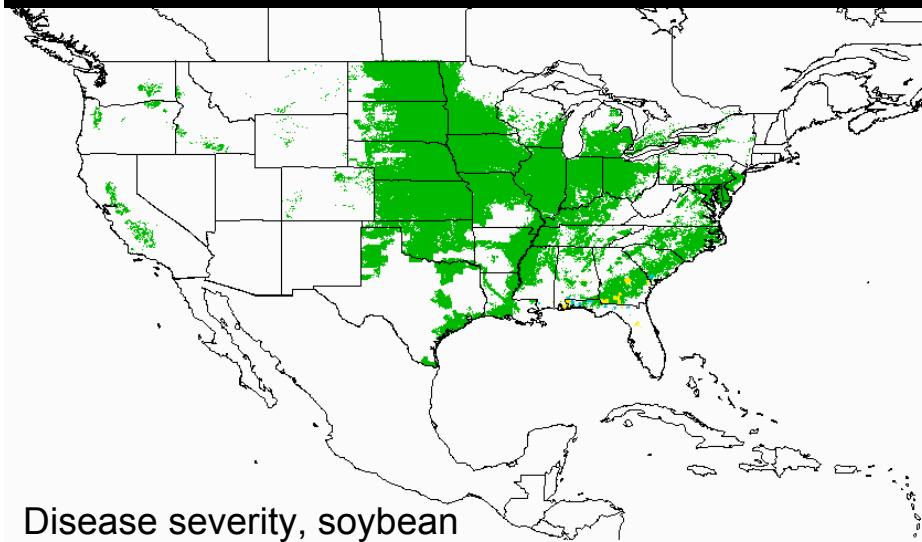
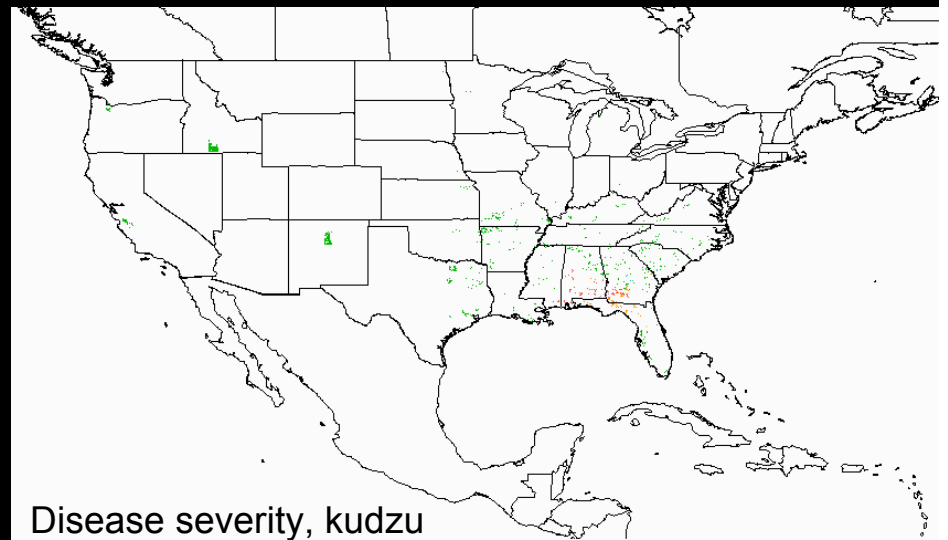
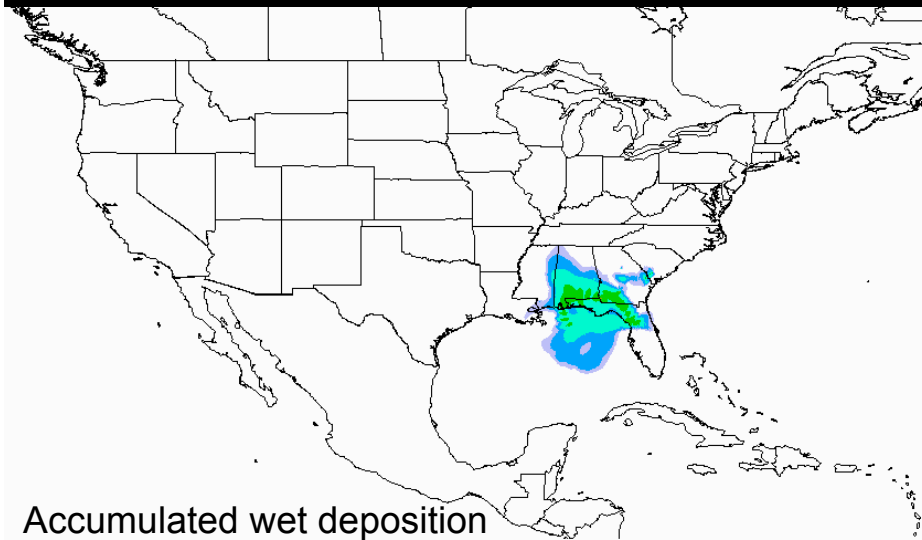
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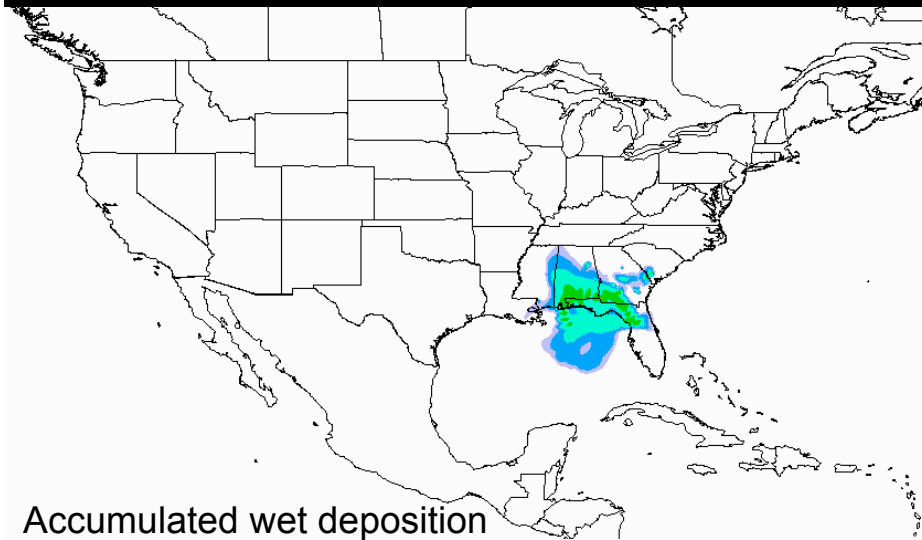
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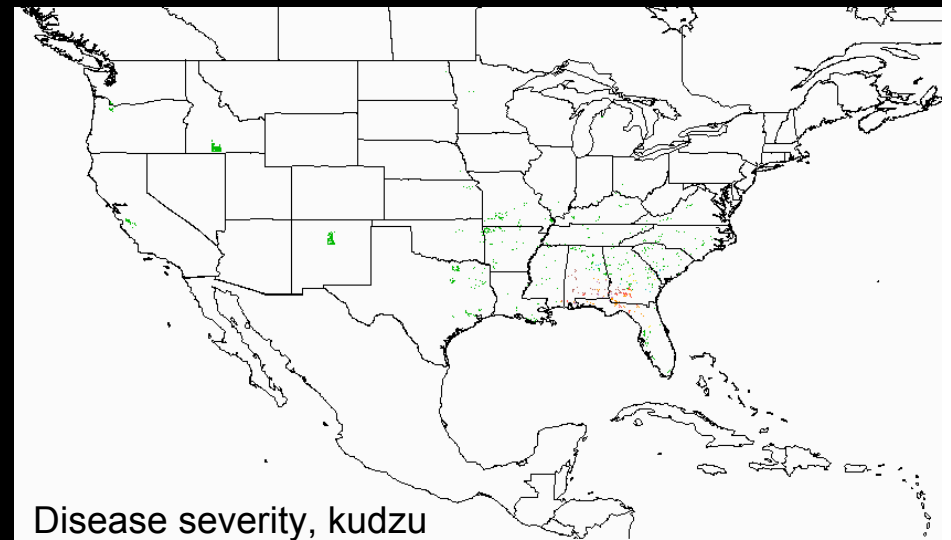
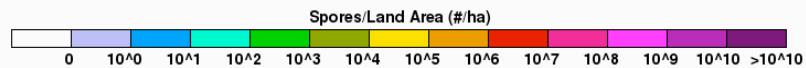
17 August 2005



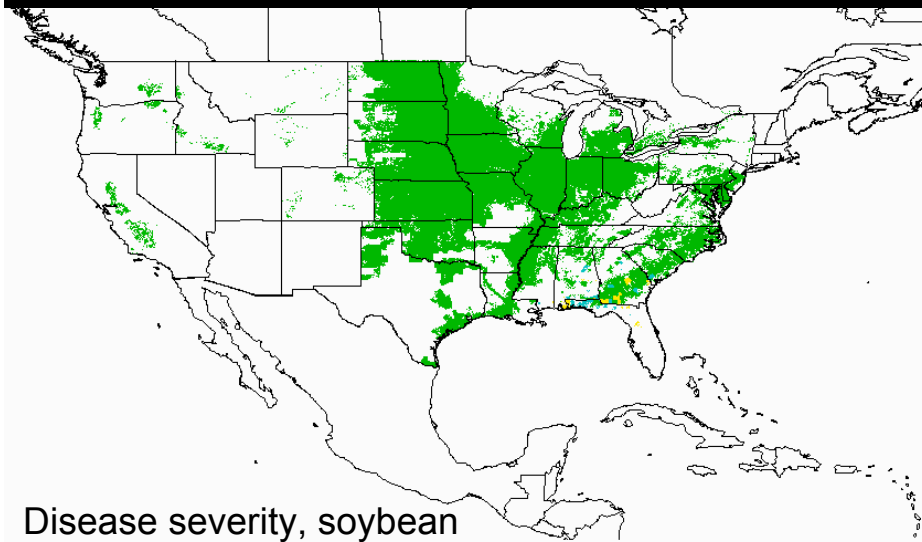
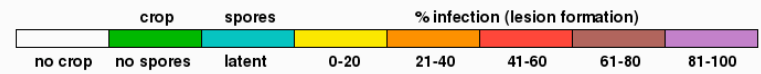
24 August 2005



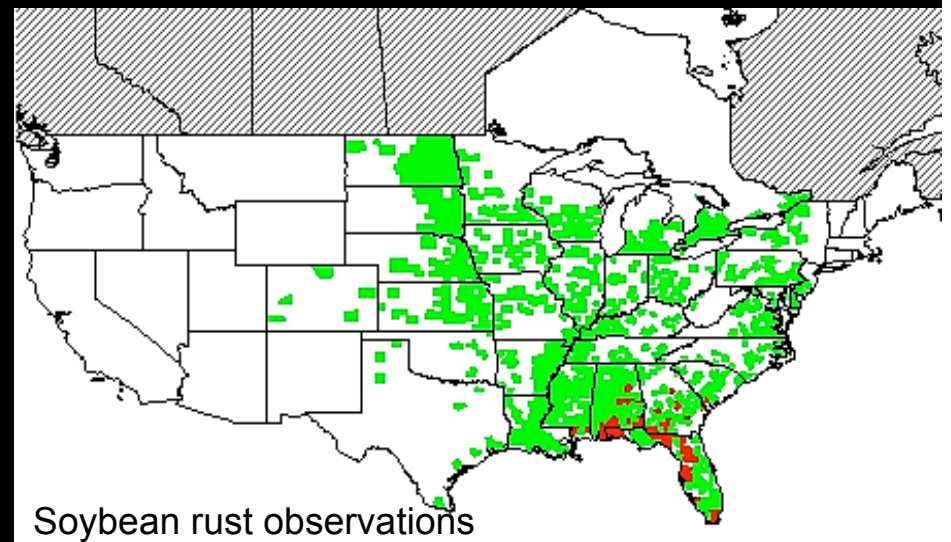
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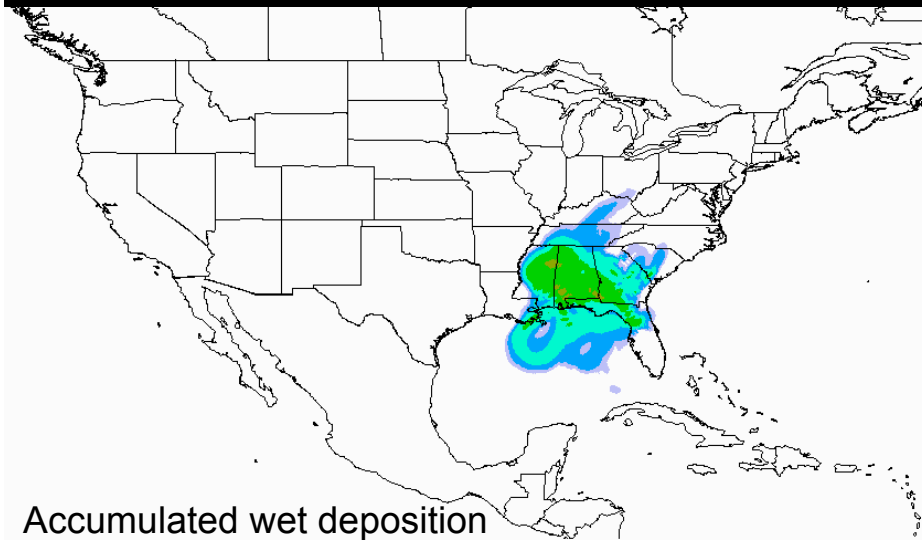
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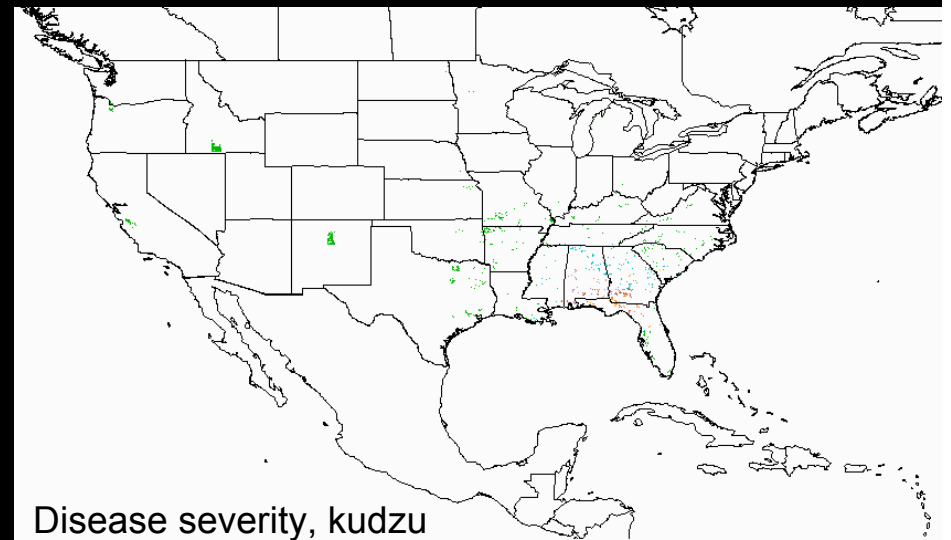
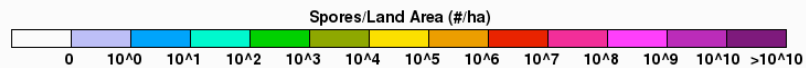
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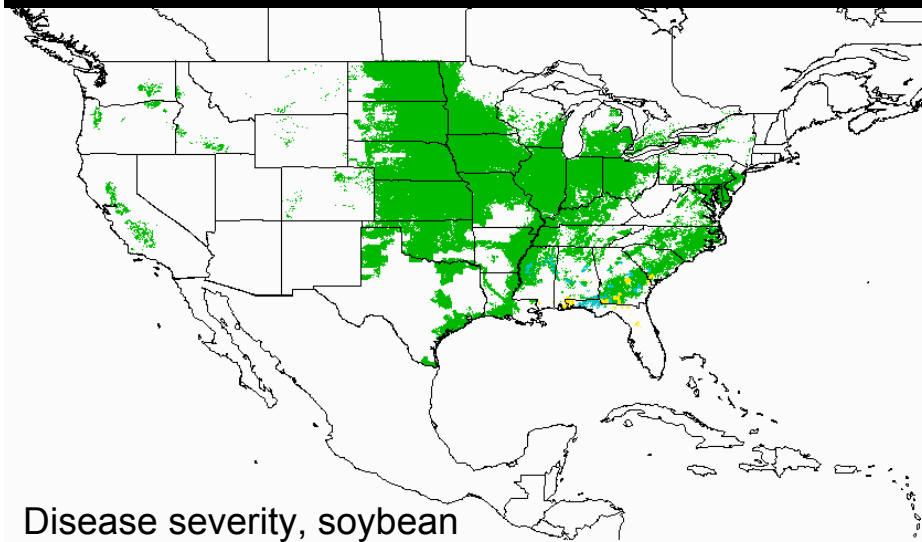
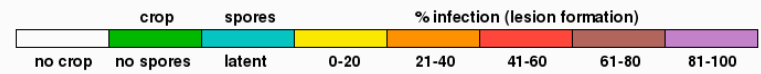
31 August 2005



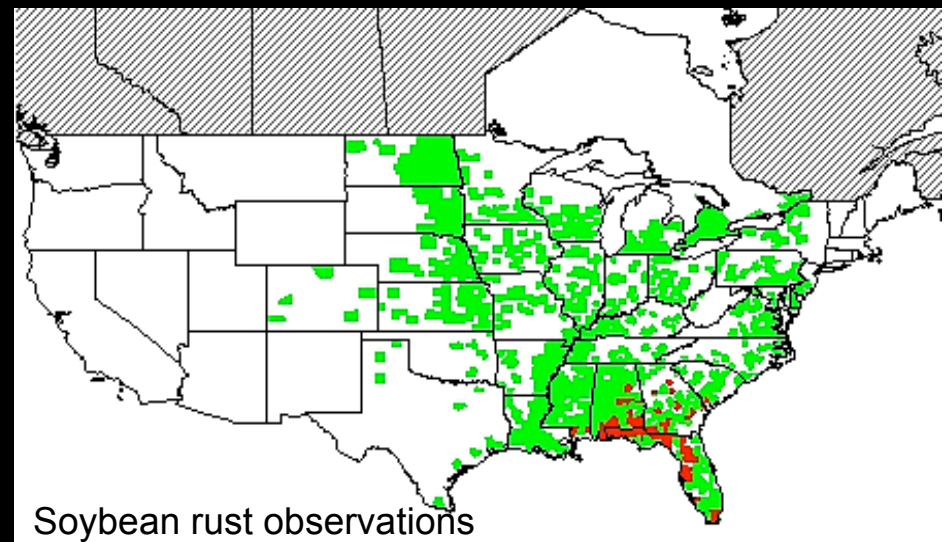
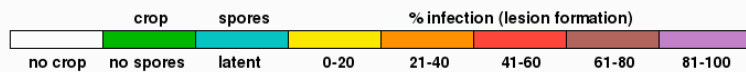
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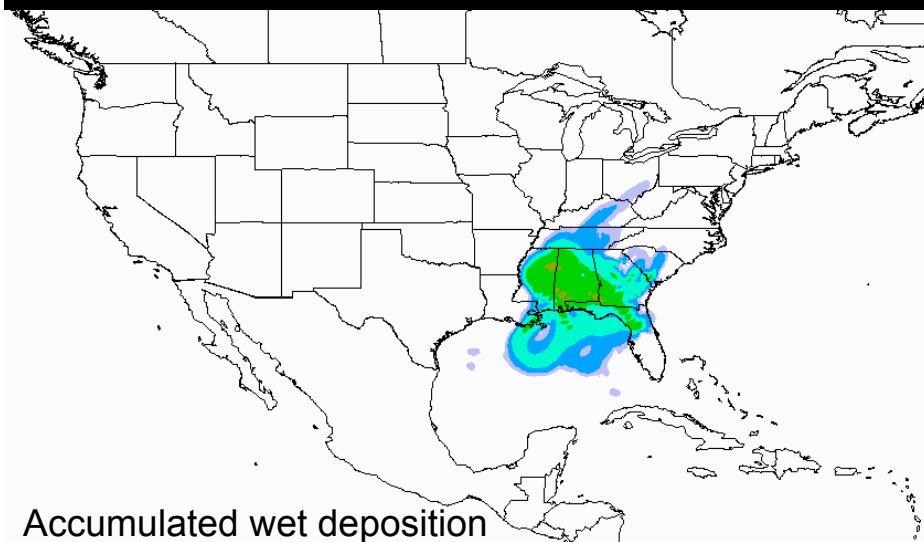
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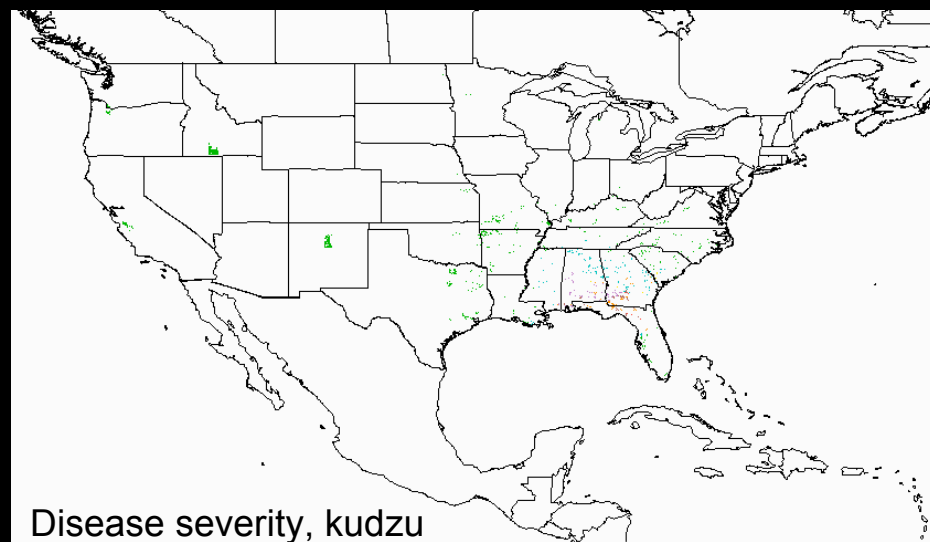
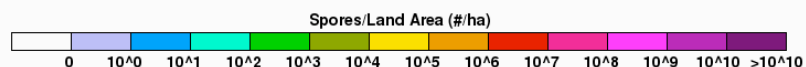
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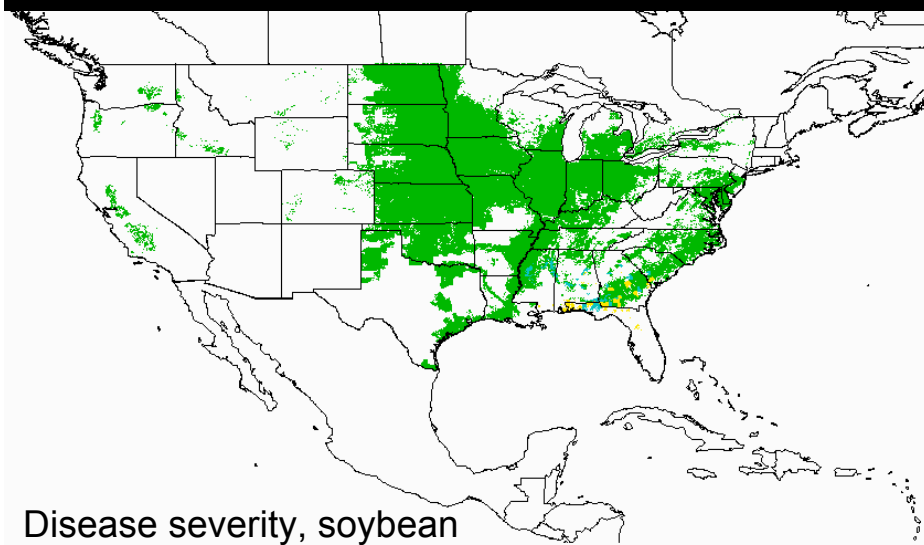
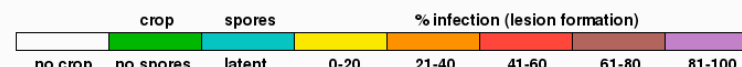
07 September 2005



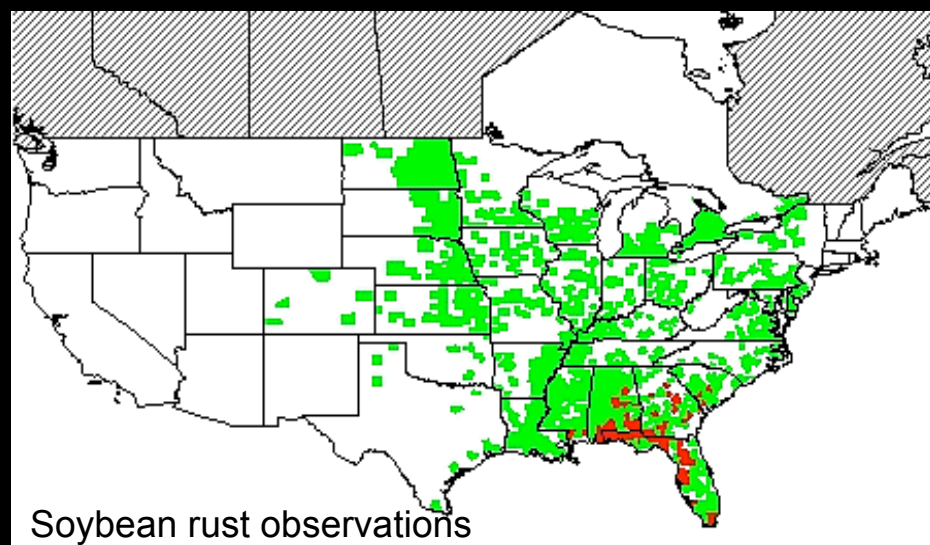
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20050907

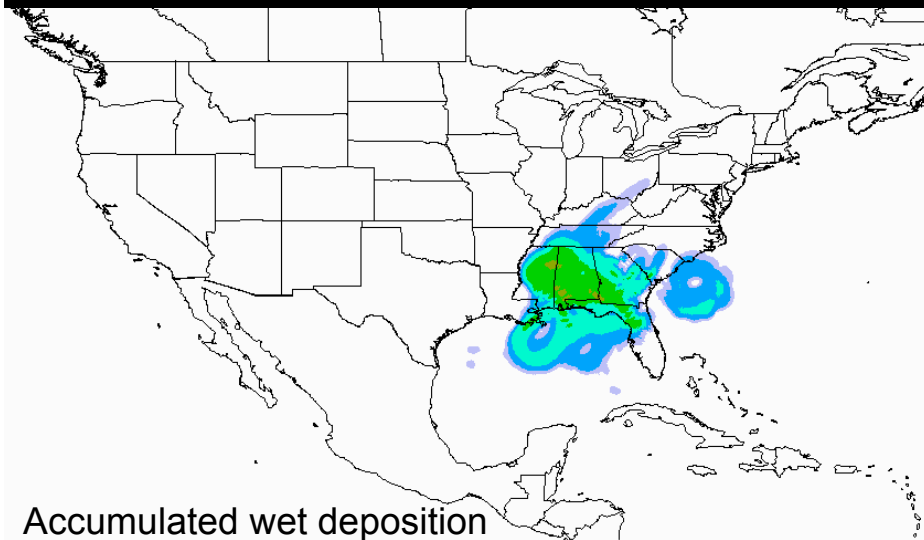


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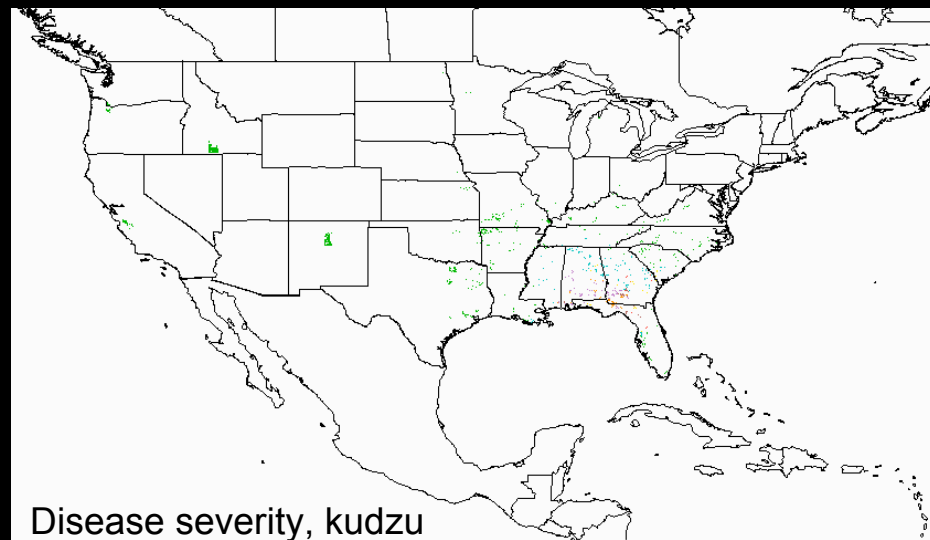
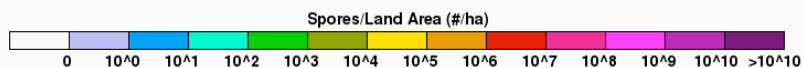


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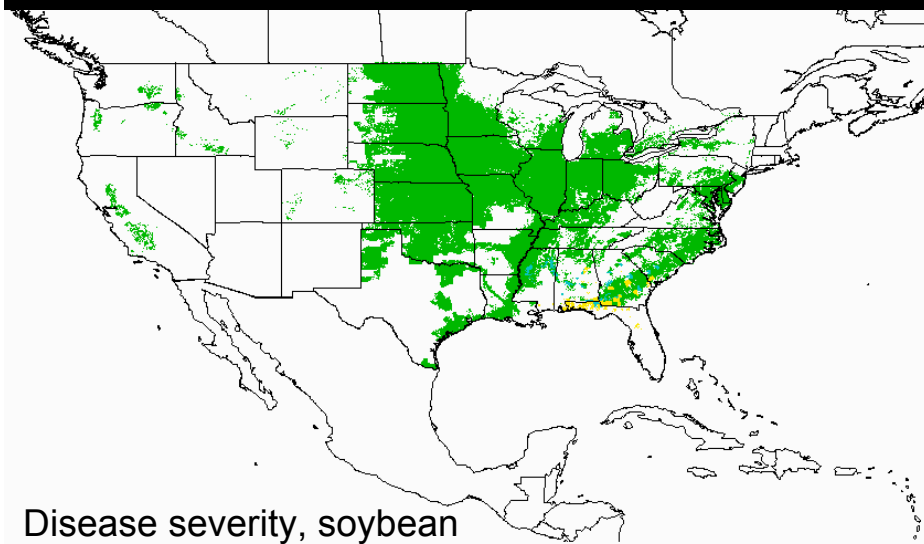
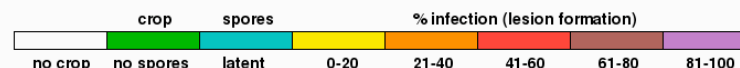
14 September 2005



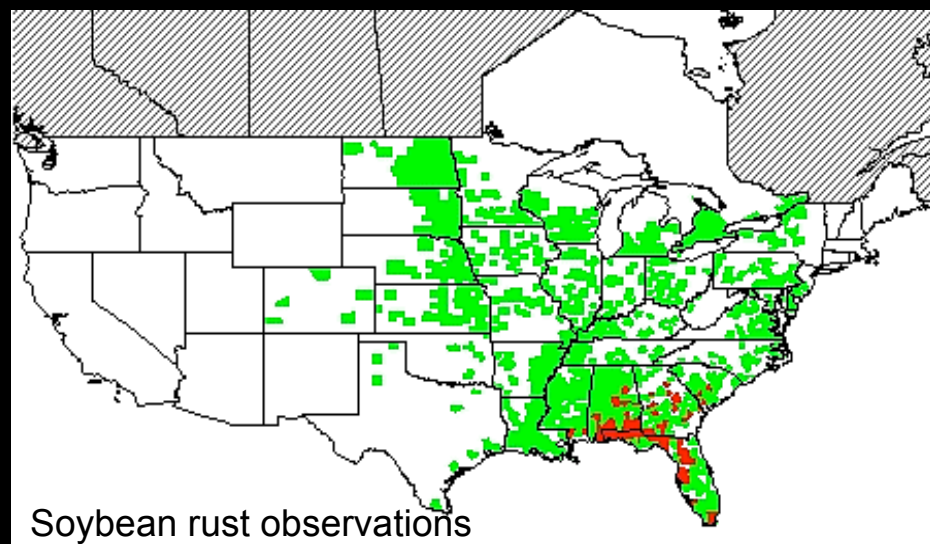
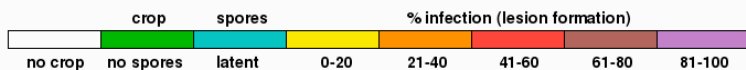
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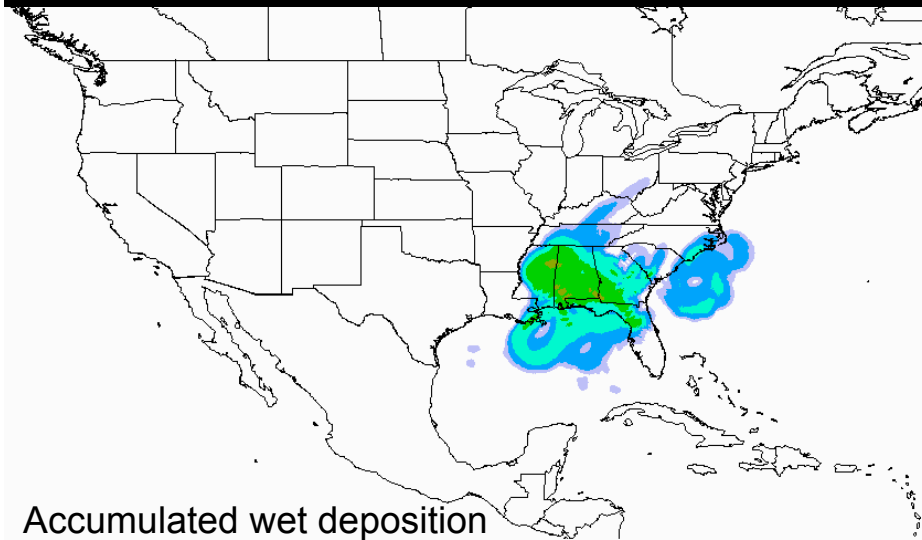
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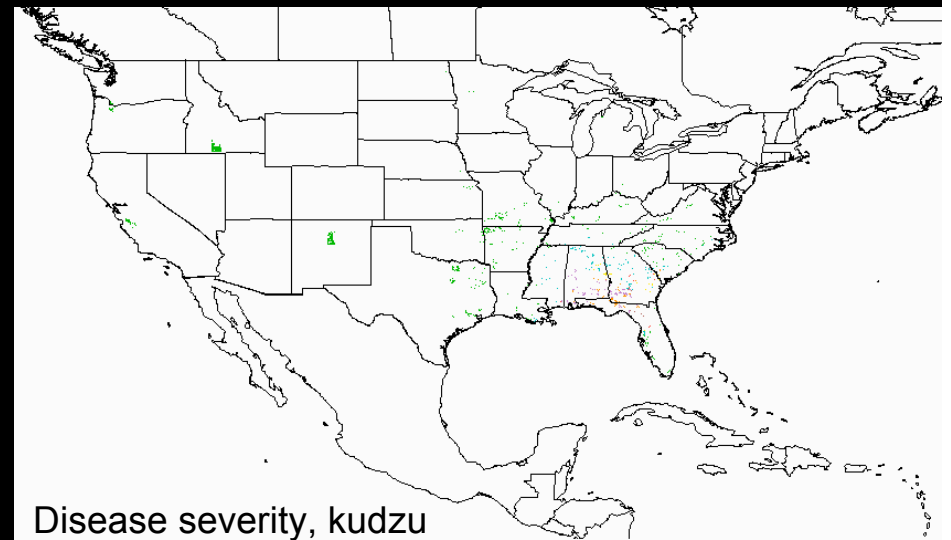
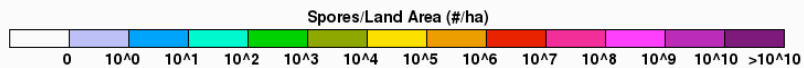
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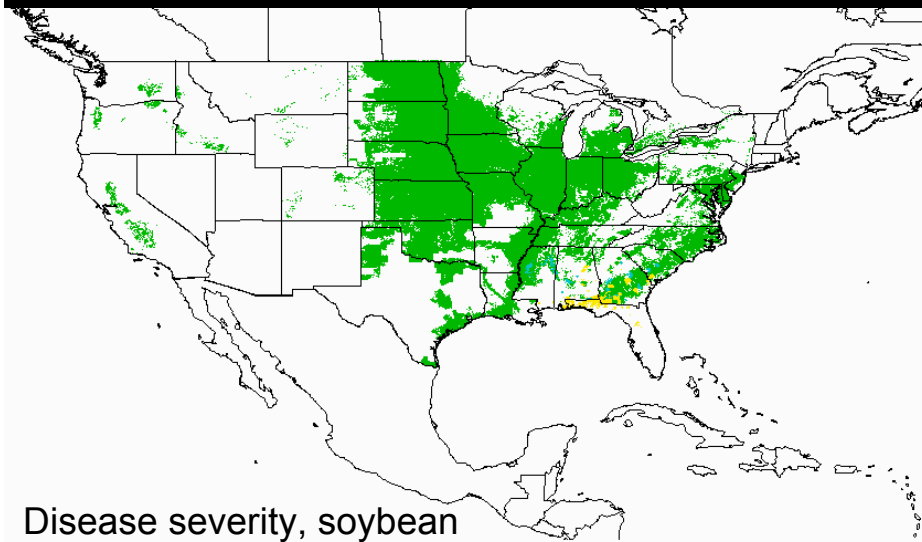
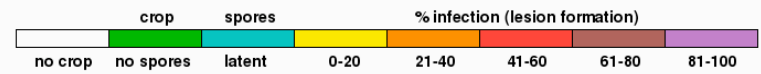
21 September 2005



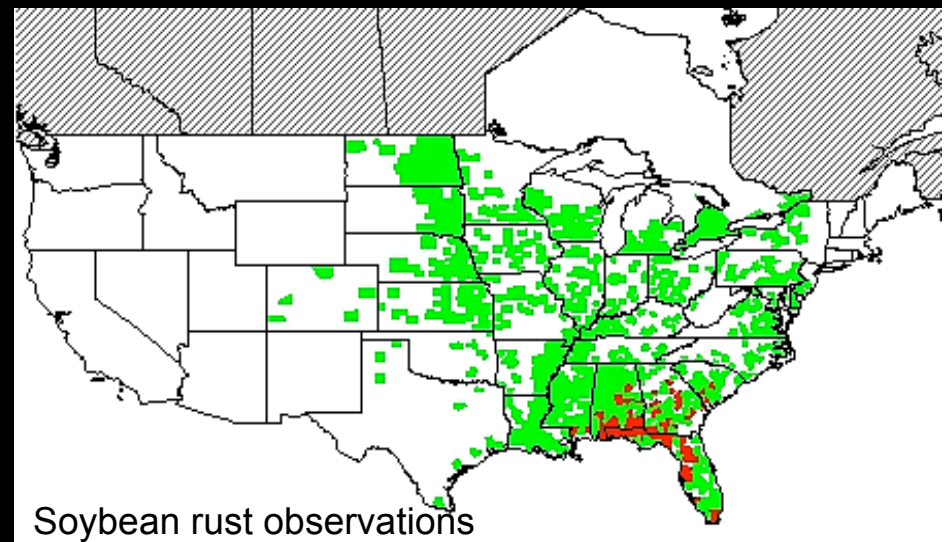
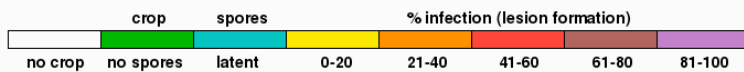
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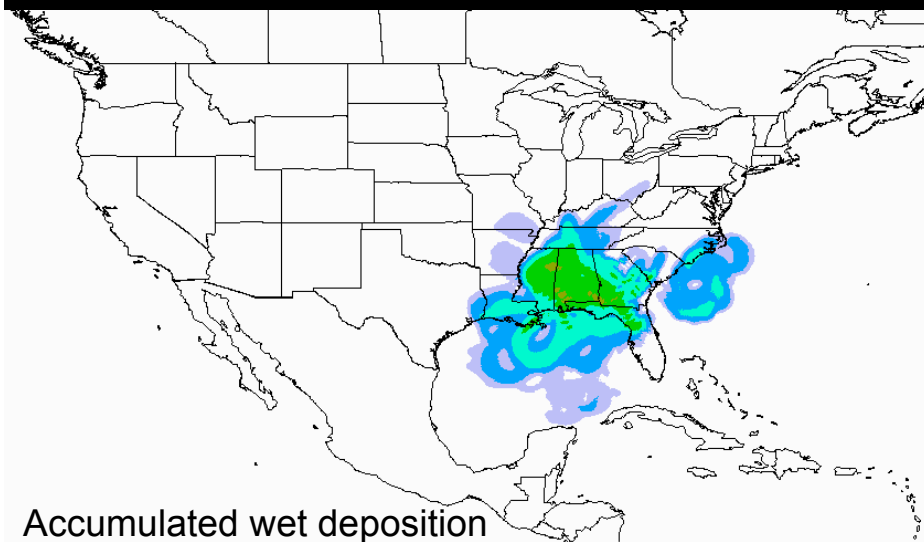
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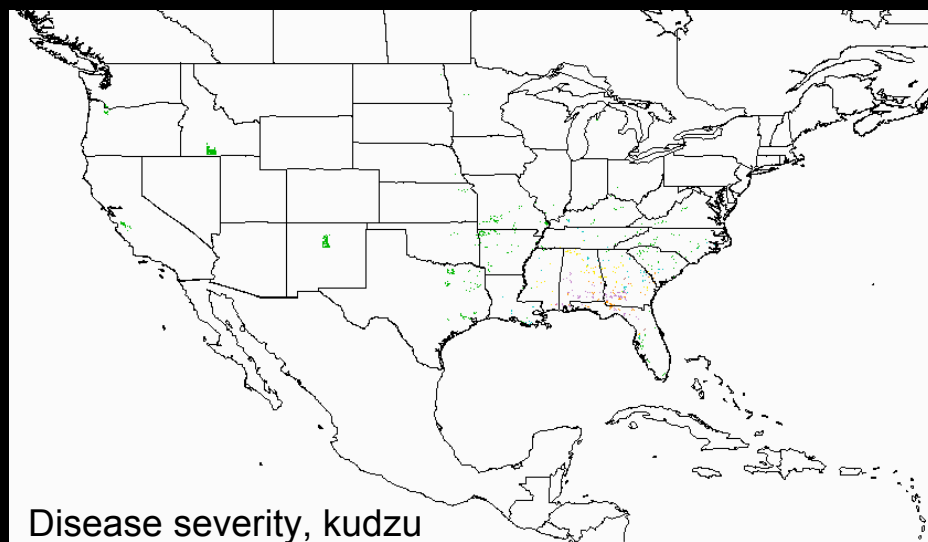
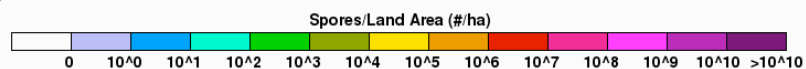
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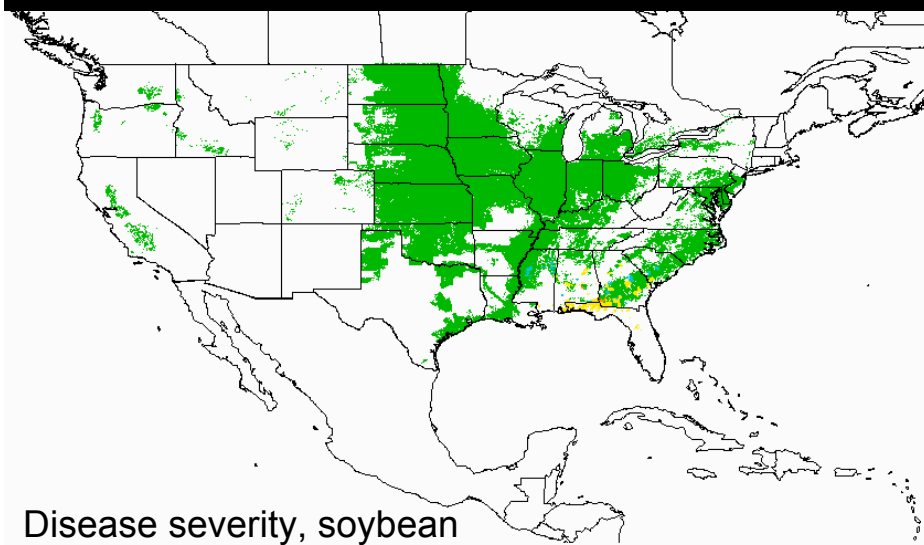
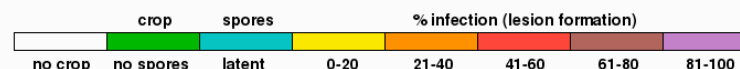
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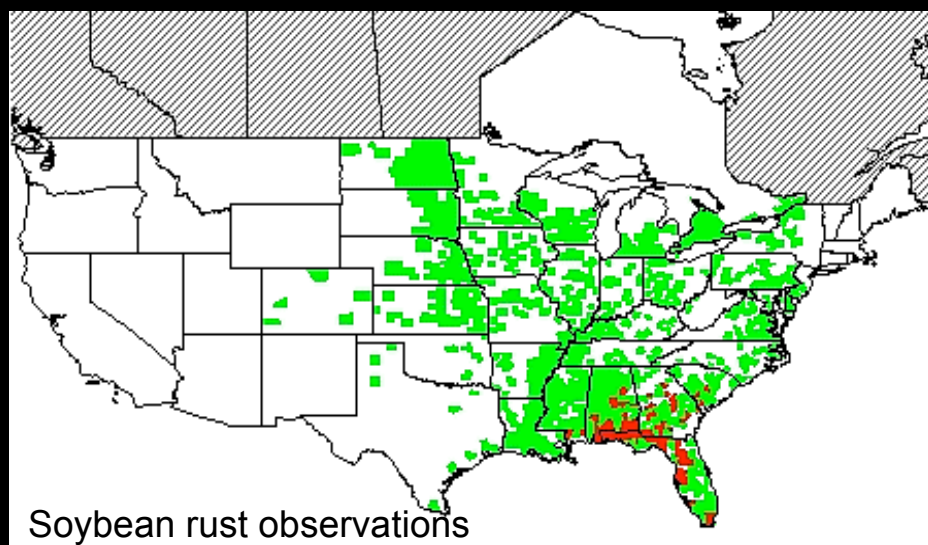
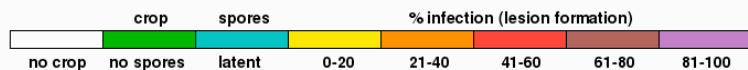
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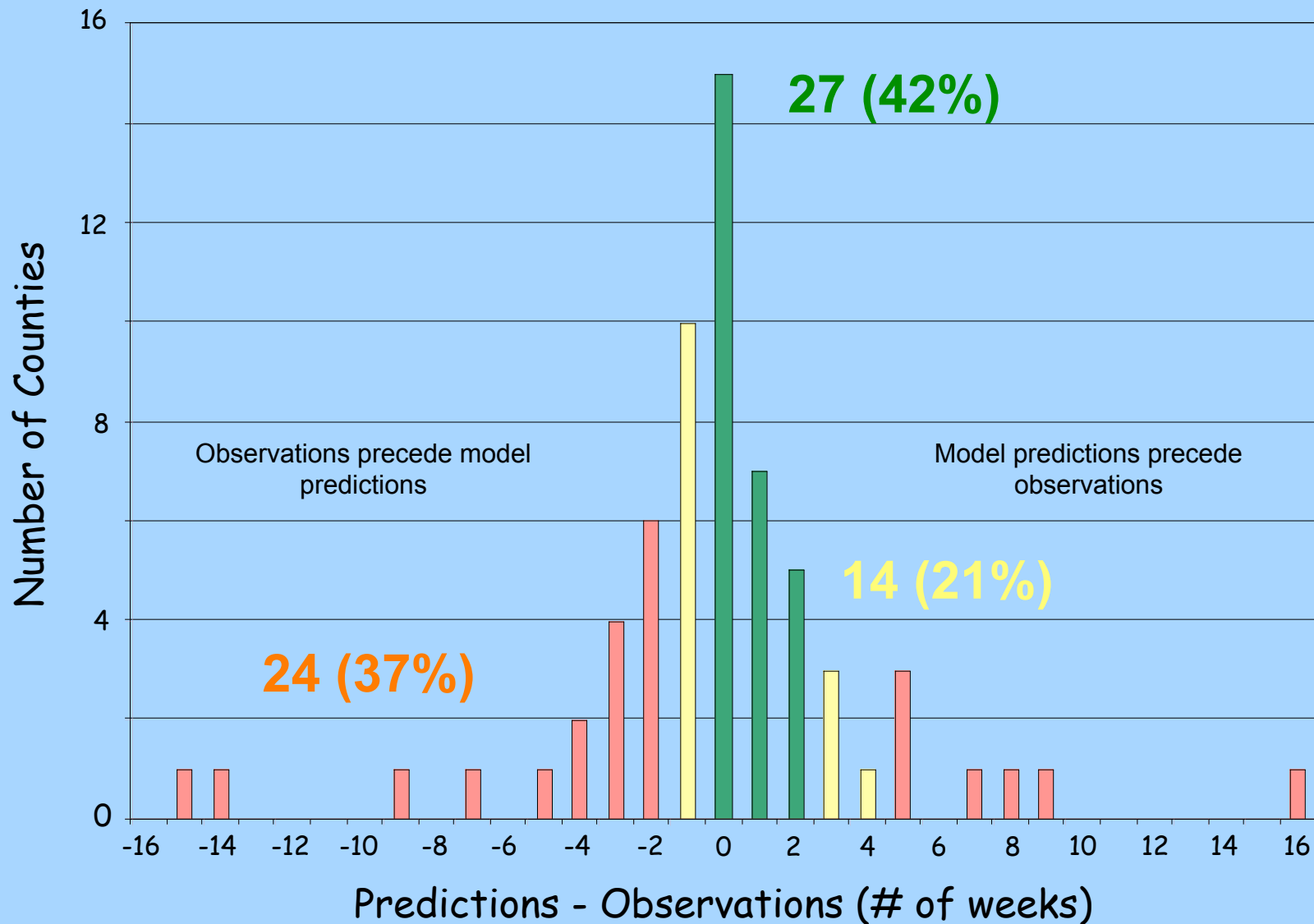
20050928



Soybean rust observations



Evaluation of Soybean Rust Aerobiology Model Using First Observations of Rust in Soybean & Kudzu Sentinel Plots: 2005



What Did We Learn

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

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 response in 2006. We need both sentinel and mobile scouting during late winter and throughout the growing season.

What Will We Improve for 2006

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Better protocols for collecting field observations

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Sub-grid cell parameterization of source areas for inoculum production

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Include dry deposition in model

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Ensemble approach to transport and local disease modeling

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Include dry deposition in model

Ensemble approach to transport and local disease modeling

Isard, S.A., S.H. Gage, P. Comtois, and J. Russo, 2005. Principles of aerobiology applied to soybean rust as an invasive species. *BioScience*, 55: 851-862.