

# **Predicting the 2005 Soybean Rust Epidemic: Methods and Results from the NAPDFC**

**North American Plant Disease Forecast Center  
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**APS National Soybean Rust Symposium  
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Nashville, TN**

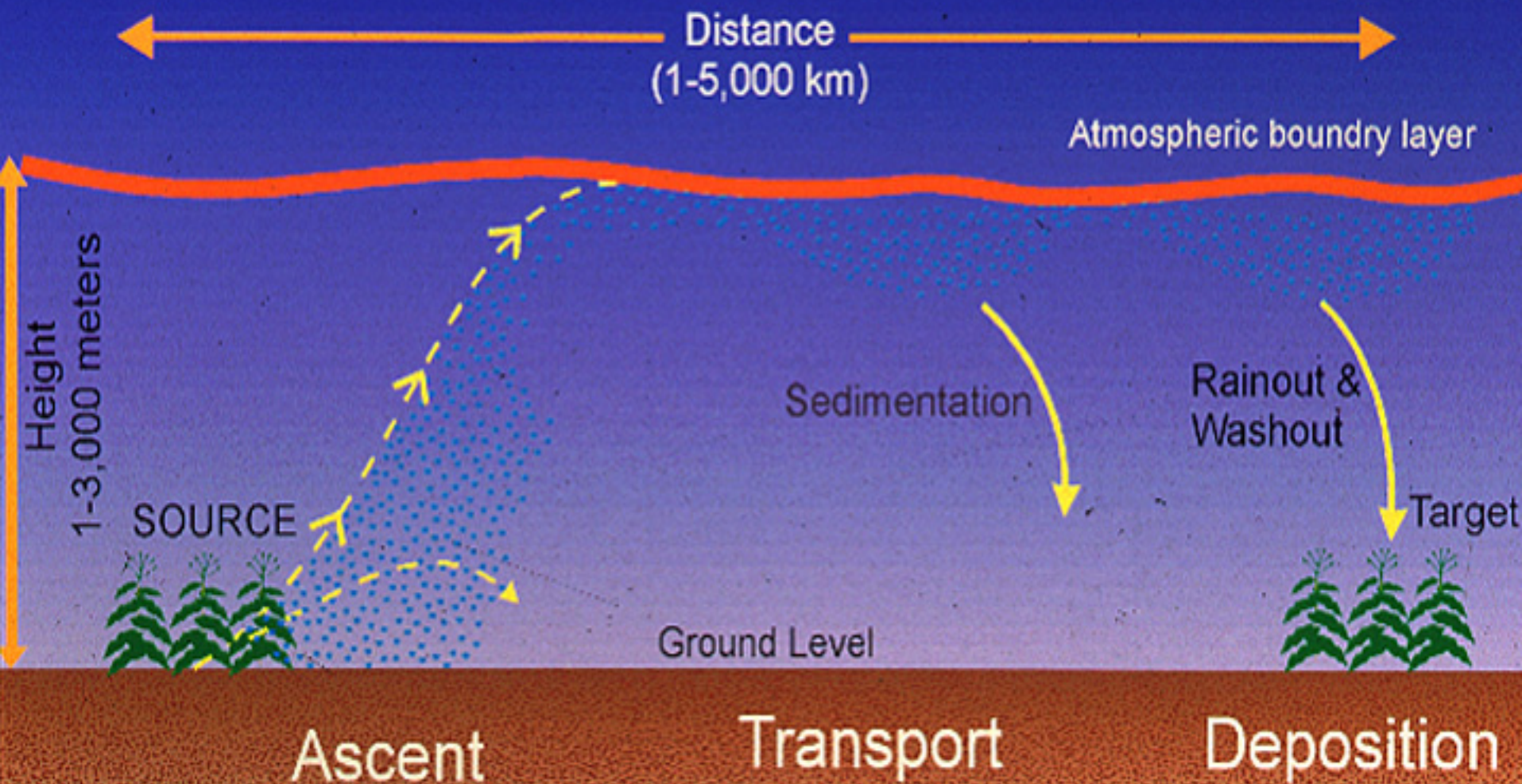
# The mission of the NAPDFC is to help manage plant disease epidemics

The **NAPDFC** has been operational for 10 years. During that period thousands of forecasts have been created and delivered to growers, industry, extension, and others dealing with downy mildew type diseases.

In 2005 we began continental forecasting of soybean rust (*Phakopsora pachyrhizi*). Our website became operational in January 2005.

We consider forecasting to be a vital component of any **Decision Support System** for soybean rust.

# Atmospheric Transport of Spores



# Information Origins

**Sources:** Reported through USDA

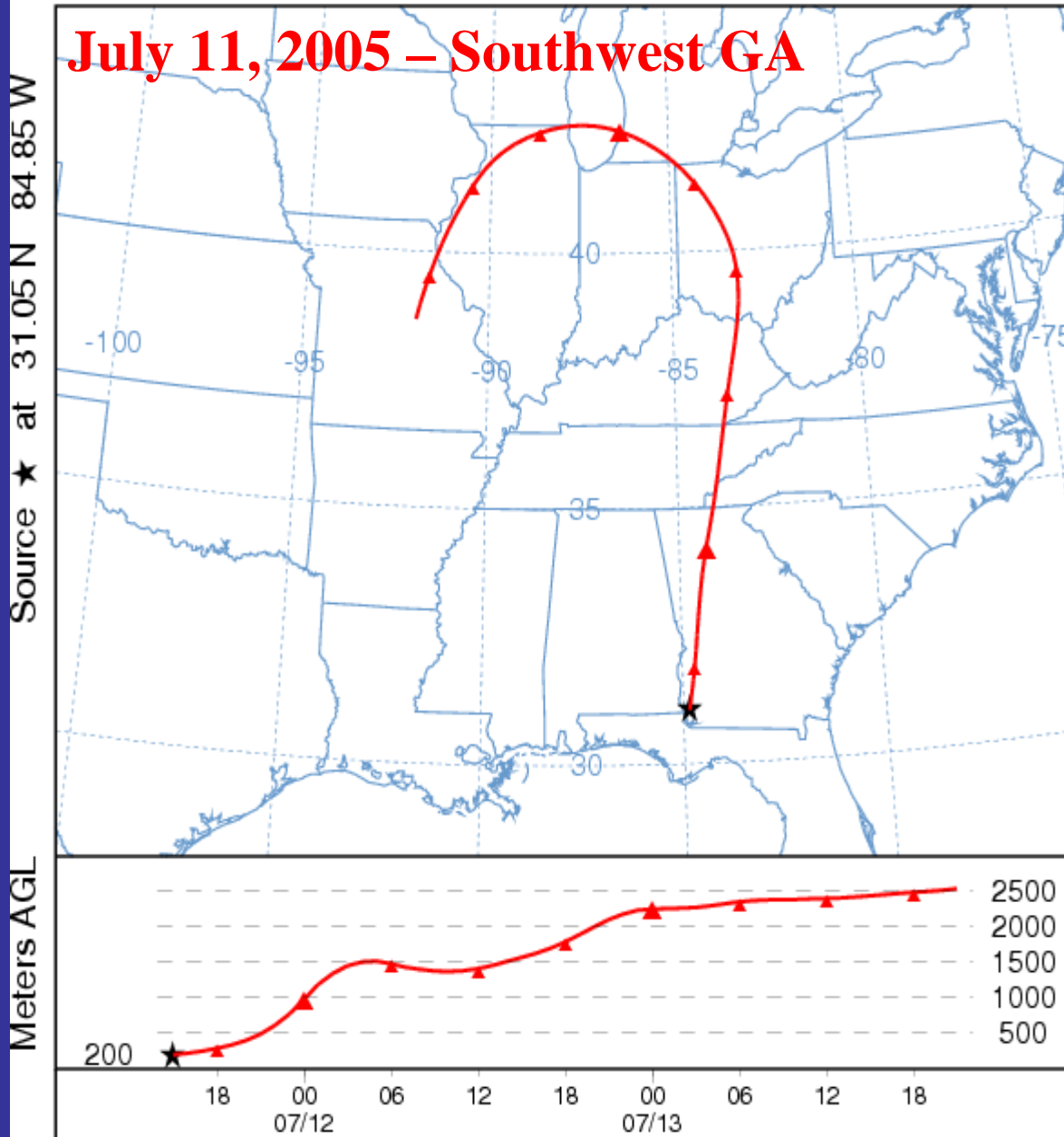
**Transport:** Future airborne rust spore movement was simulated with HYSPLIT4 model, from NOAA's Air Resources Laboratory

**Spore Survivability / Deposition / Infection:** Data gathered from variety of sources: Real-time radar and satellite images, graphical and text forecasts from NWS, Numerical Weather Prediction model output from NOAA NCEP, HYSPLIT dispersion simulations, etc.

**Analysis & Evaluation:** The Forecaster

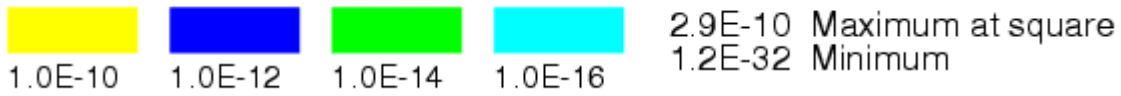
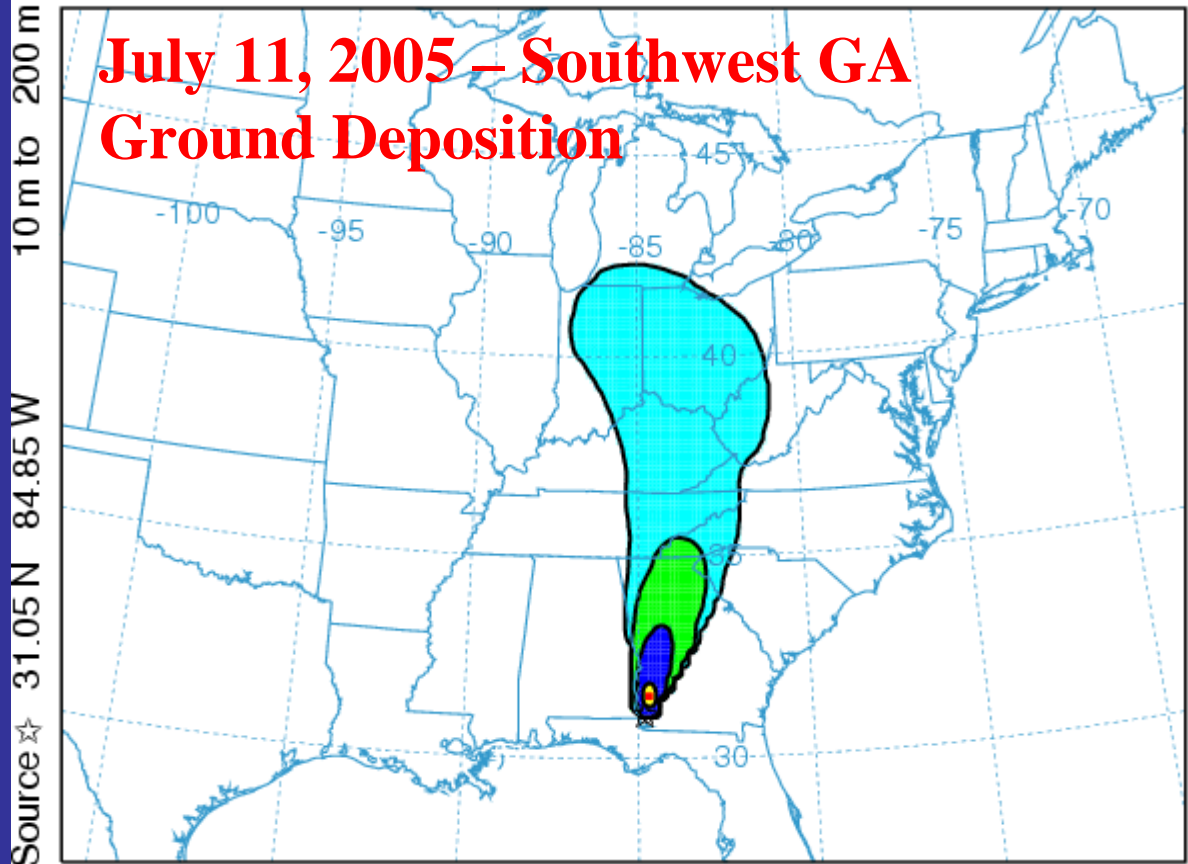
NOAA HYSPLIT MODEL  
Forward trajectory starting at 15 UTC 11 Jul 05  
FNL Meteorological Data

**July 11, 2005 – Southwest GA**



# NOAA HYSPLIT MODEL

Deposition (mass/m<sup>2</sup>) at ground-level  
Integrated from 1300 11 Jul to 1300 13 Jul 05 (UTC)  
Release started at 1300 11 Jul 05 (UTC)



Job ID: 453541    Job Start: Tue Jul 26 19:30:33 GMT 2005  
Source: lat.: 31.05 lon.: -84.85 Hgt: 10 to 200 m  
Release ID:    Rate: 2.0 unit/hr    Duration: 4.0 hrs  
Release Start (YY MM DD HH): 05 07 11 13  
Pollutant Averaging/Integration Period: 3 hrs  
Dry Deposition rate: 1 cm/s  
Wet Removal (below/in-cloud): 5.0E-05 / 3.2E+05  
Meteorological Data: FNL  
Produced with HYSPLIT from the NOAA ARL Website (<http://www.arl.noaa.gov/ready/>)

# RELATIONSHIP BETWEEN THREAT AND RISK

Source Threat	Associated Risk
Serious	HIGH
	Strongly Moderate
Moderate	Moderate
	Weakly Moderate
Low	Low

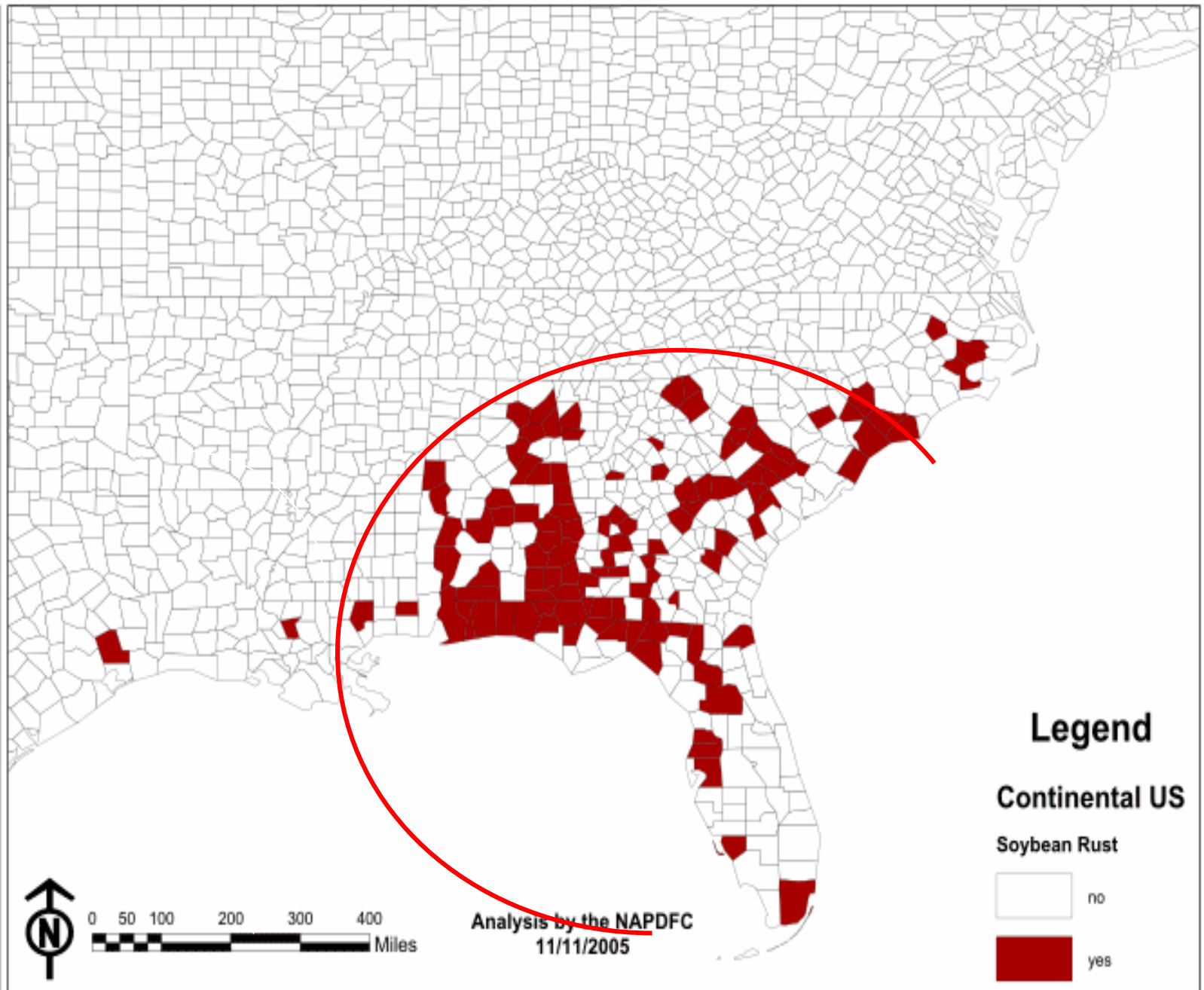
# Evaluation

- **Evolution of the SBR epidemic in time and space seemed well-associated with the risk assessments** taken as a whole; i.e., those areas that have reported SBR were also those that were flagged with the higher risks and/or the greatest frequency of elevated risk (Moderate or higher).
- **Website usage was high.** 200+ visits / day and 6000+ visits / month from March through July. Numbers dropped steadily during August and September. Over 500,000 hits since the inception.

# Evaluation

- In retrospect, **Risk assessments were probably overstated from March through June**, due to the weakness of the sources.
- Plants in some areas were at Moderate Risk at least several times, but no SBR has been reported (e.g., portions of Georgia, the Ohio Valley, etc.). However, other factors are likely involved.

# Soybean Rust Disease Locations



# **THANKS TO OUR SPONSORS**

**North Carolina Soybean Association**

**USDA / APHIS / CPHST**

**BASF**

**Syngenta**

**North Carolina Tobacco Foundation**

**Ontario Flue-cured Tobacco Foundation**



**We thank APS for inviting us to Nashville to share this information.**

**C.E. Main, Thomas Keever, Gerald Holmes,  
Steve Koenning, Roger Magarey  
July 28, 2005**

**Graphics by Thomas Keever and  
Air Resources Laboratory**

