

2006 Wisconsin Fertilizer, Aglime, and Pest Management Conference

Sorting Through the Soybean Leaf Disease Complex

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THE SOYBEAN LEAF DISEASE COMPLEX

BACKGROUND

- *Introduction of the soybean rust pathogen into the US in 2004*
- *Potential severity of the disease requires early and rapid detection*
- *Other soybean leaf diseases can look similar to soybean rust, but will not have the impact*
- *How can one best distinguish between soybean leaf diseases?*



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SOYBEAN RUST

- **Causes:**
 - *Phakopsora pachyrhizi*
 - *Phakopsora meibomia*
- **Environmental Triggers:**
 - Long periods of leaf wetness
 - Moderate temperatures (60 - 75°F)
 - High relative humidity (75 – 80%)



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DOWNY MILDEW

- **Cause:**
 - *Peronospora manshurica*
- **Environmental Triggers:**
 - High humidity
 - Moderate temperatures
(50 - 77°F, 68 - 72°F optimum)



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BROWN SPOT (SEPTORIA LEAF SPOT)

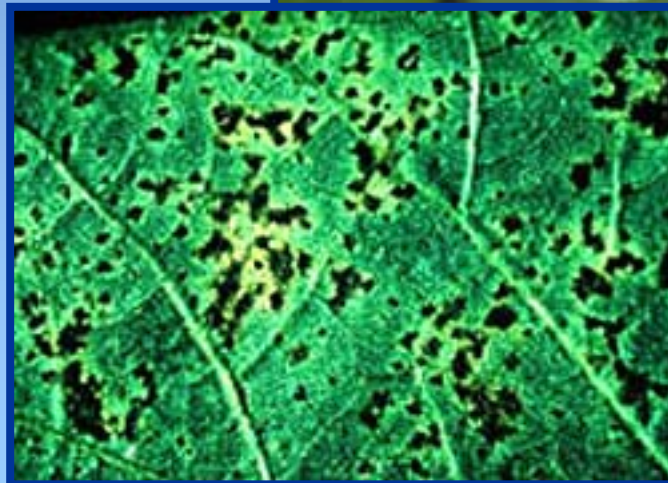
- ***Cause:***
 - *Septoria glycines*
- ***Environmental Triggers:***
 - *Long periods of leaf wetness (6 - 36 hrs)*
 - *Warm temperatures (59 - 86°F)*
 - *Other stresses*



THE SOYBEAN LEAF DISEASE COMPLEX

BACTERIAL BLIGHT

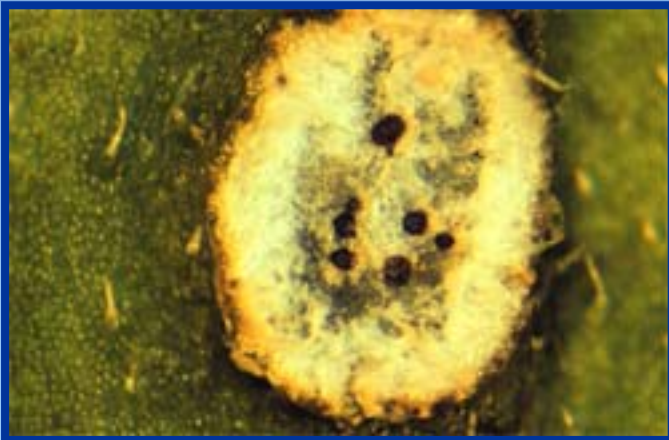
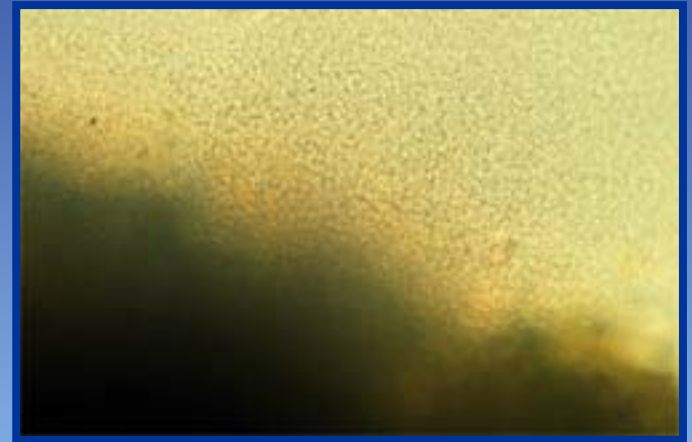
- **Cause:**
 - *Pseudomonas syringae* pv. *glycinea*
- **Environmental Triggers:**
 - Wind driven rain
 - Cool temperatures



THE SOYBEAN LEAF DISEASE COMPLEX

IN-LAB DIAGNOSIS

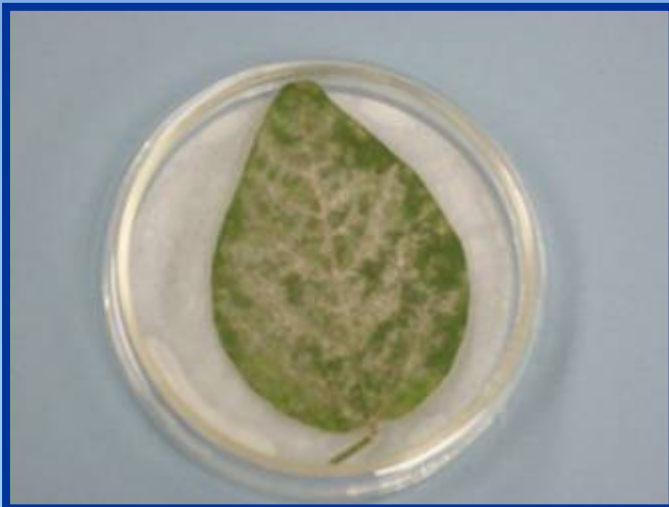
- ***Microscopic examination***
 - ***Dissecting microscope (up to 60X)***
 - ***Fungal fruiting bodies***
 - ***Fungal spores***
 - ***Compound microscope (up to 1000X)***
 - ***Fungal spores***
 - ***Bacterial cells***



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IN-LAB DIAGNOSIS

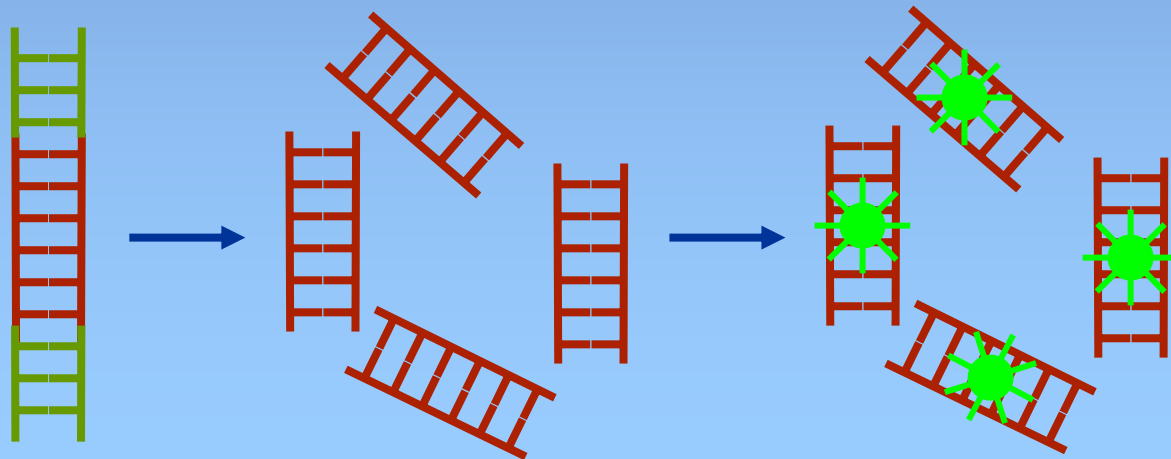
- ***Incubations and isolations***
 - *Moist chambers (fungi)*
 - *Humid chambers (fungi)*
 - *Isolations onto specialized media (bacteria)*



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IN-LAB DIAGNOSIS

- ***Polymerase chain reaction (PCR)***
 - *Identify DNA sequence unique to pathogen of interest (Phakopsora pachyrhizi)*
 - *Use cellular components that replicate DNA to make many additional copies of this unique DNA*
 - *Visualize these copies using special dyes*
 - *Initial occurrence of soybean rust must be confirmed by USDA-APHIS using PCR*



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LEARNING MORE ABOUT LEAF DISEASES

• Websites

- www.plantpath.wisc.edu/soyhealth (UW Soybean Health)
- <http://www.ent.iastate.edu/imagegal/plantpath/soybean> (ISU Plant Diseases and Damage)
- <http://www.psu.missouri.edu/soydoc> (US Soybean Diagnostic Guide)

• Training programs

- IPM Scout School
- CCA Training

• Publications

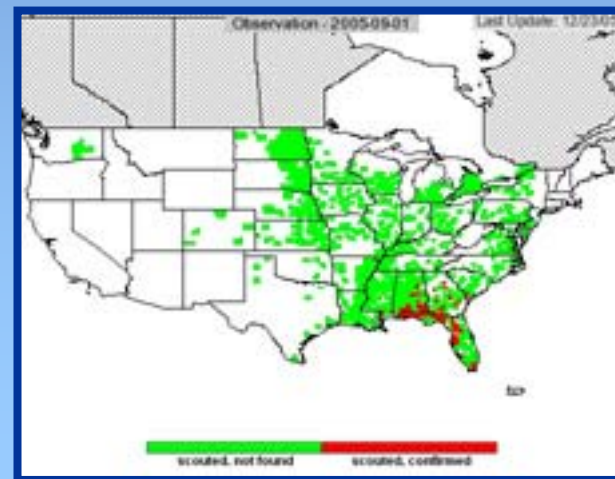
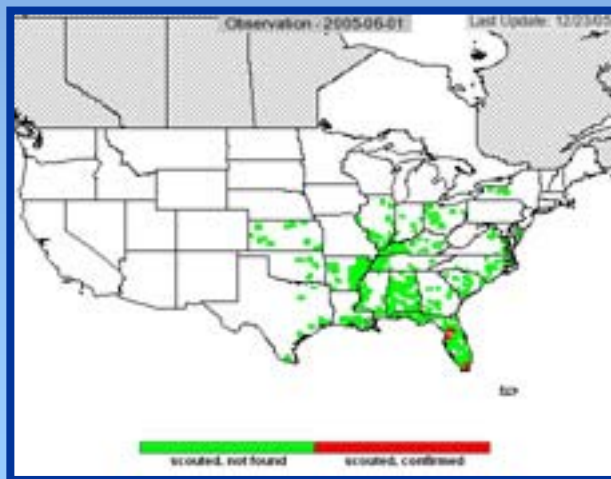
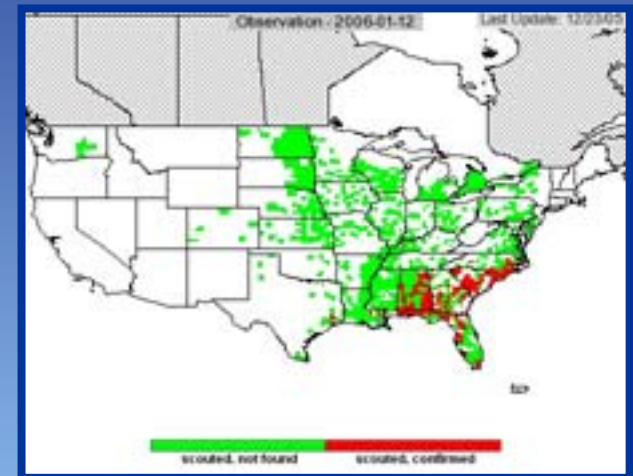
- “Identifying Soybean Rust”
- “2006 Soybean Rust Fungicide Use Guidelines”
- University of Wisconsin Farm Facts/Pest Alerts
 - “Soybean Rust”
 - “Brown Spot (Septoria Leaf Spot)”



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KEEPING INFORMED ABOUT SOYBEAN RUST

- ***Soybean rust websites***
 - www.usda.gov/soybeanrust
 - www.plantpath.wisc.edu/soyhealth
- ***Soybean rust hotline***
 - 1-866-RUST411 (1-866-787-8411)
 - *Updated daily*



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FINDING HELP

- ***UW-Extension***
 - *County agriculture agents/educators*
 - *State-based specialists*
- ***Plant Disease Diagnostics Clinic***
 - *Providing a wide range of diagnostic services*
 - *Offers FREE soybean rust testing in 2006*

