The Role of ICLN, NPDN, RIPM and PIPE in NPDRS

Kitty F. Cardwell
April 23, 2007
St Louis, MO

Homeland Security Presidential Directive - 9

...develop robust comprehensive, and fully coordinated surveillance and monitoring systems, ...for plant diseases...

...provides early detection and awareness of disease, pest or poison...

...establishes nationwide laboratory networks for food, veterinary, plant health, and water quality that integrate existing Federal and State laboratory resources, are interconnected, and utilize standardized diagnostic protocols and procedures...

Cooperative State Research, Education, and Extension Service
http://www.csrees.usda.gov

An Update on the Alphabet Soup

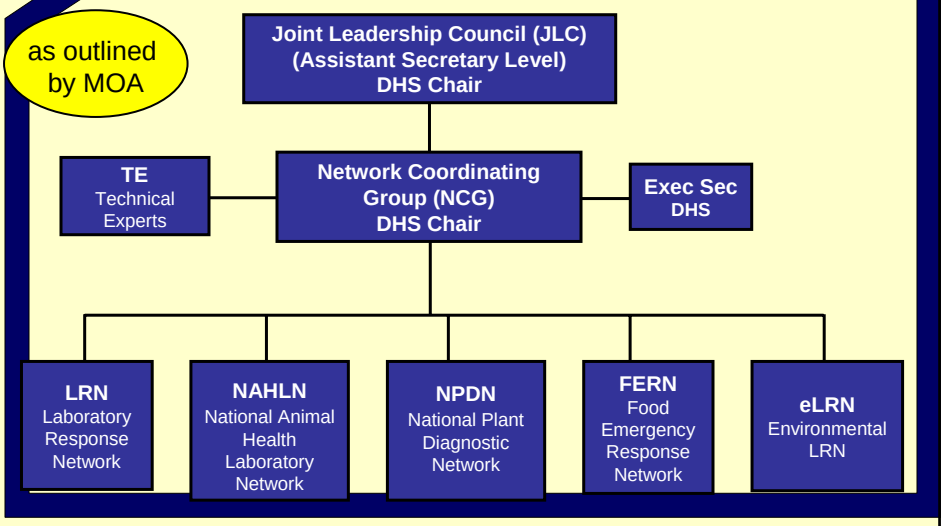
- ICLN = Integrated Consortium of Laboratory Networks
- NPDN = National Plant Diagnostic Network
- RIPM = Regional IPM Centers
- PIPE = Pest Information Platform for Education and Extension

ICLN History

- Homeland Security Council involvement began in November 2004
  - Gathered agencies involved, endorsed independent networks involvement, and recognized the benefits gained from creating a collaborative alliance.
- Vision: A U.S. homeland security infrastructure with a coordinated and operational system of laboratory networks that provide timely, high quality, and interpretable results for early detection and effective consequence management of acts of terrorism and other events requiring an integrated laboratory response.
- ICLN was established by a Memorandum of Agreement among ten Federal Departments/Agencies in June 2005.
  - Agriculture, Commerce, Defense, Energy (Pending), Health and Human Services, Homeland Security, Interior, Justice, State, Environmental Protection Agency

Cooperative State Research, Education, and Extension Service
http://www.csrees.usda.gov

ICLN Organizational Structure



Cooperative State Research, Education, and Extension Service
http://www.csrees.usda.gov

Summary Assessment

Case	Name	eLRN	FERN	LRN-B	LRN-	NAHLN	NPDN
A	CWA	E R					
B	TIC						
C1	Bio – Non-Contagious						
C2	Bio – Contagious						
D	Food – Bio						
E	Food – Chemical						
F	Radiological						
G	Foreign Animal Disease						
H	Foreign Plant Disease						

Legend: = assessment; = not primary

Insufficient/ Negligible capacity — Marginal capacity — Sufficient capacity

Cooperative State Research, Education, and Extension Service
http://www.csrees.usda.gov

Application of network resources to other scenarios may be substantially different!

The NPDN

- Diagnostician participation in ring tests
- Laboratory assay training
- First detector programs
- Exercises
- Diagnostic lab infrastructure enhancement
- Diagnostic and data upload support
- Development of monitoring tools

GPDN Great Plains Diagnostic Network | NCPDN North Central Plant Diagnostic Network | NEPDN Northeast Plant Diagnostic Network | SPDN Southern Plant Diagnostic Network | WPDN Western Plant Diagnostic Network

http://www.csrees.usda.gov

NPDN DIAGNOSTICS SUBCOMMITTEE: Picture Clues and SOP


Picture Clues for Plant Diagnostic Laboratories

Phakopsora pachyrhizi and P. meibomiae

Commonly known as:

Soybean Rust

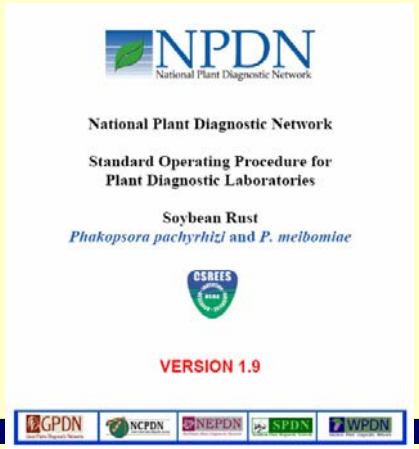
Host Range:

Soybean, Kudzu, yellow sweet clover, many members of Fabaceae (bean) family

Symptoms:

- Early symptoms may be confused with bacterial pustules, brown spot and bacterial blight.
- Infected plants initially develop symptoms on their lower leaves.
- The plants usually experience a yellowing of the leaves followed by defoliation.
- Early maturation of the plant may occur when the infection is severe.
- Lesions may be present on the leaves, petioles, pods, and stems (Figures 1-4).
- Lesions are typically small (2 to 5 mm²) and the color may appear to be dark red-brown or tan, but grey-green lesions are possible (Figures 3 & 4).
- Rare lesion contains multiple pinhole sized uredinia.
- Urediniospores (figure 5) are released through a round ostiole on the uredinia and are found throughout the season.
- Late in the season the less common telia and teliospores may be found. They are waxy, dark and emergent. Teliospores will germinate and produce basidiospores in the lab.
- *Phakopsora pachyrhizi* and *P. meibomiae* telia and teliospores are morphologically different. However, Real Time PCR must be used to determine the species. (United Soybean Board 2002, Miles et al. 2003, and Pelta 2004)

Images:


NPDN National Plant Diagnostic Network

National Plant Diagnostic Network

Standard Operating Procedure for Plant Diagnostic Laboratories

Soybean Rust

Phakopsora pachyrhizi and *P. meibomiae*

VERSION 1.9

GPDN | NCPDN | NEPDN | SPDN | WPDN

Cooperative State Research, Education, and Extension Service
http://www.csrees.usda.gov

Pest Information Platform for Education and Extension: Managing the Information Flow Via the Web

Overarching Goals:

- Provide useful information to US soybean growers to foster good farming practices; which includes:
  - Avoiding unnecessary applications or applications that are earlier than necessary
  - Using the proper tactic with the proper timing to manage crop loss risk
  - Documenting practices for crop insurance purposes
- Provide a "one stop shopping" center for timely, unbiased, national, and local soybean rust information

DATA

↓

MODELS

↓

INTEGRATION

↓

INTERPRETATION

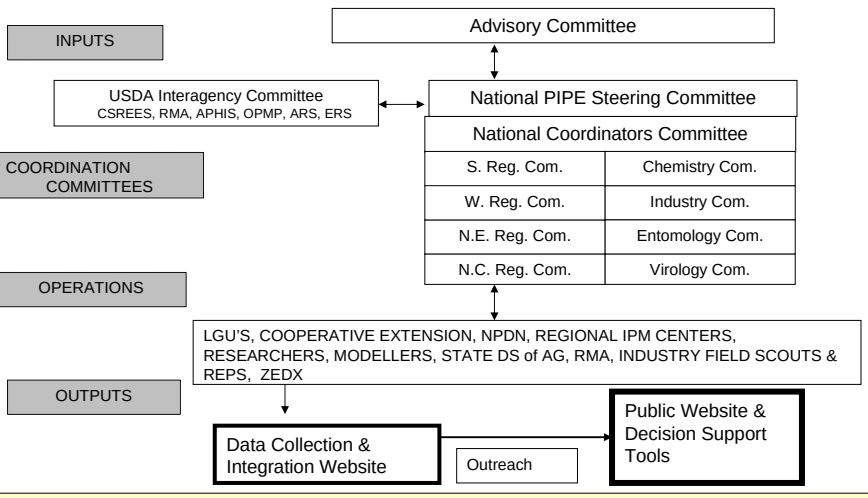
↓

DISSEMINATION

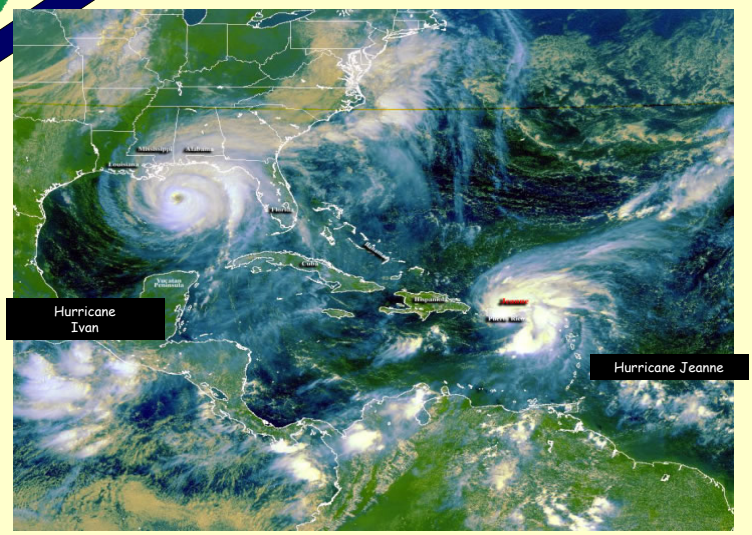
Cooperative State Research, Education, and
http://www.csrees.usda.g

USDA United States Department of Agriculture

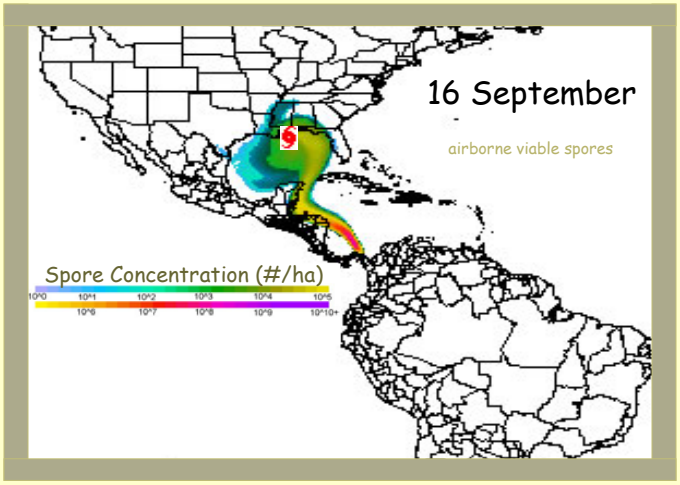
Pest Information Platform for Extension 2007 Legume Pest and Disease Management Coordinated Framework



Cooperative State Research, Education, and Extension Service
http://www.csrees.usda.gov

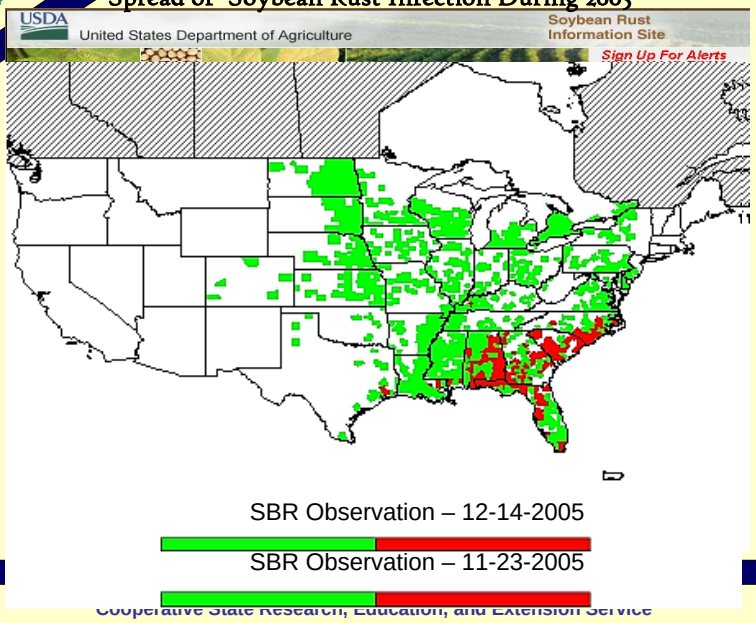


Cooperative State Research, Education, and Extension Service
http://www.csrees.usda.gov



Cooperative State Research, Education, and Extension Service
http://www.csrees.usda.gov

Spread of Soybean Rust Infection During 2005



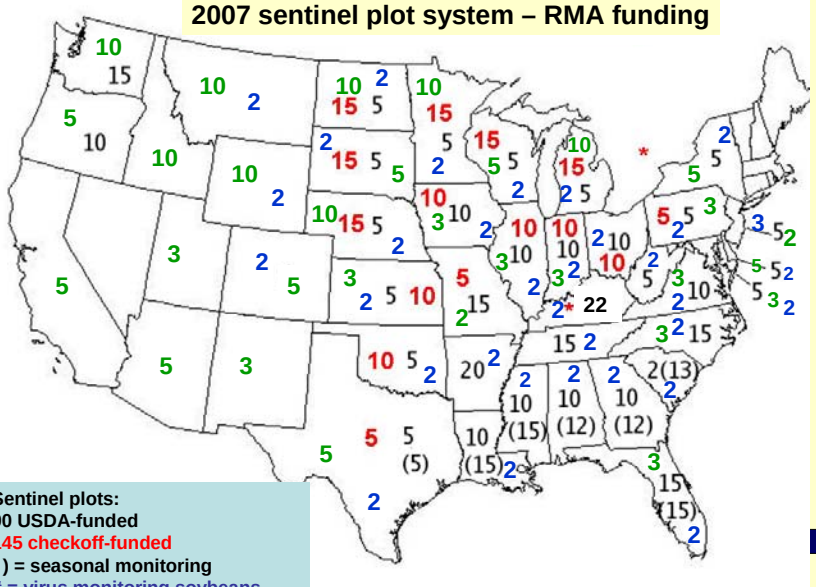
Regional IPM Centers

- Established in 2000 to respond to pest management challenges with coordinated regional and national efforts
  - Provide regional infrastructure
  - Focal point for regional team-building efforts, communication networks, and stakeholder participation
- Four regions
  - North Central, Northeastern, Southern, Western
- Funding from Center grant ~ $1 million per region annually
  - Competitively awarded every four years (next in FY 2007)

Potential expansion for PIPE tools

- Call for Concept Notes
  - Legume viruses and other pest/disease complexes
  - Sweet Corn lepidoptera
  - Barley head blight
- Other possible uses
  - Citrus diseases
  - Wheat stem rust and stripe rust
  - Any introduced or migratory pest including arthropods
  - Mapping function could be used for invasive and weedy species, as well.

2007 sentinel plot system – RMA funding



Sentinel plots:
90 USDA-funded
145 checkoff-funded
( ) = seasonal monitoring
= virus monitoring soybeans
= disease monitor legumes

Where the programs fit into any recovery plan

- Detection: NPDN, PIPE
- Diagnosis: NPDN as a part of NPPLAP
- Forensic attribution: APHIS/FBI
- Monitoring: NPDN, RIPM, PIPE
- Mitigation, Control, & Recovery: RIPM/ PIPE
- National Integration: ICLN