Wisconsin Department of Agriculture, Trade and Consumer Protection

2007 Wisconsin Crop Disease Survey

Anette Phibbs, Daniel Gerhardt

Plant Industry Laboratory
4702 University Ave
Madison WI 53702

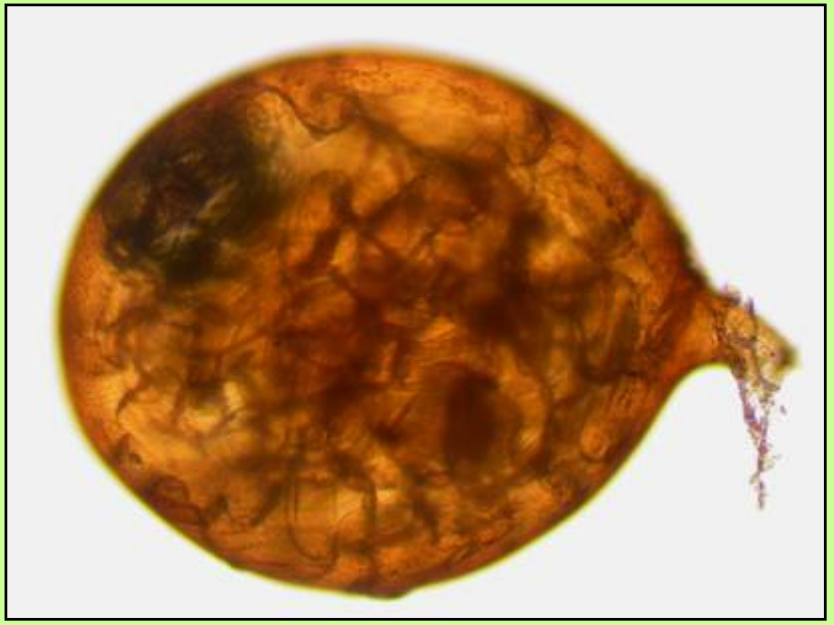
Wisconsin Department of Agriculture, Trade & Consumer Protection

Plant Industry Bureau
Pest Survey Section
Plant Industry Laboratory

- **Potato Cyst Nematode**
- **Soybean Viruses & Asian Soybean Rust**
- **Seed Certification**
- **Soybean Cyst Nematode**

Potato Cyst Nematode (PCN) Survey

- **Find of Pale potato cyst nematodes (Globodera pallida) in US in Idaho, April 2006.**
- **Immediate impact on international trade.**
- **USDA APHIS PPQ initiated a nationwide survey, to determine prevalence of pest and to reassure trading partners of PCN free status of potato growing areas.**



DATCP

Potato Cyst Nematodes

Golden nematode (*Globodera rostochiensis)*
Pale cyst nematode (*Globodera pallida)*

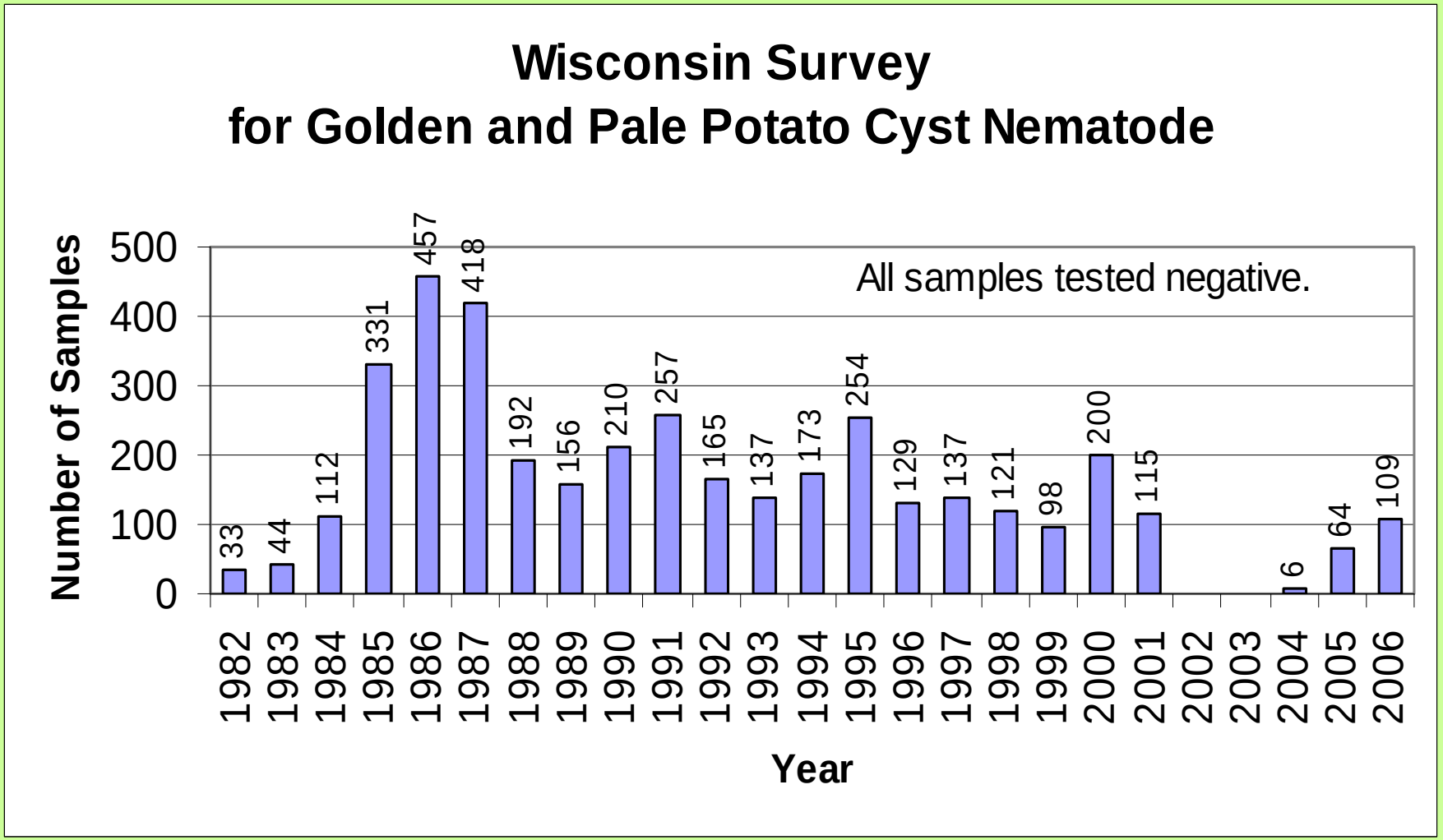
Females form cysts on true roots.

- Spread by infested potatoes, soil, contaminated equipment.
- Potato cyst nematodes are economically significant pests.
- Potato cyst nematodes feed on the roots of potatoes, tomatoes and eggplants.

Features of the potato cyst nematode. *(Photo by Jonathan D. Eisenback, Virginia Polytechnic Institute and State University.)*

White female potato cyst nematodes on the stolon of a potato. *(Photo by Christopher Hogger, Swiss Federal Research Station for Agroecology and Agriculture.)*

Wisconsin Department of Agriculture, Trade and Consumer Protection



Potato cyst nematodes have never been detected in Wisconsin.

Recent PCN Finds

- Potato cyst nematodes are regulated pests in 65 countries including US and Canada.
- Pale cyst nematode was found for the first time in the US in Idaho in April 19, 2006 .
- Golden nematode was found in Quebec, Canada in August 2006.
- Golden nematode was found in Alberta, Canada in November 2007.

Wisconsin Potato Cyst Nematode Survey

USDA APHIS PPQ National Survey Plan

- **Survey 100% of seed potato seed fields.**
- **8,500 acres in Wisconsin in 2006!**
- **Collect soil/piler dirt at potato storage facilities.**
- **1,800 five pound bags of soil ~ 4 tons!**

http://www.aphis.usda.gov/ppq/ ispm/potato/pcn.html

Wisconsin Potato Cyst Nematode Survey Results - 2007

Soil/Piler Dirt Source	Number of Samples Tested	Results
Seed Potatoes	1,520	Negative
Other Potatoes (tablestock etc)	288	Negative
Grand Total	1,808	No PCN Detected.

DATCP

Thank you!

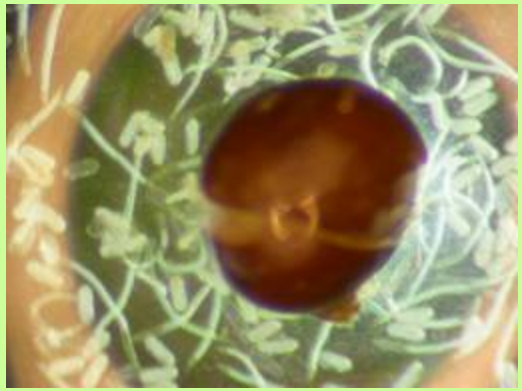
Wisconsin Potato Growers for participating in the survey.

DATCP Fruit & Vegetable Inspectors for collecting piler dirt & field soil

- **Tim Leege**
- **Jim Meyer**
- **Dan Baginski**
- **Mike Prasolowicz**
- **Steve Kolz**
- **James Spring**

USDA APHIS PPQ for $$$

- **Arthur Wagner**
- **Joann Cruse**



DATCP Plant Industry Bureau Inspectors

- **Sara Ott**
- **Christl Zillmer**

DATCP Plant Industry Laboratory

- **Daniel Gerhardt**
- **Amanda Zimmerman**
- **Kate Weaver**
- **Mohammed Asadullah**
- **Pat Reif**
- **Kay Kromm**

Soybean Survey 2007
Target Viruses

- AMV, Alfalfa mosaic virus
- BPMV, Bean pod mottle virus
- CMV, Cucumber mosaic virus
- Potyvirus group,
  common on soy- and snap beans:
  Bean common mosaic virus,
  Bean yellow mosaic virus,
  Soybean mosaic virus
- SbDV, Soybean dwarf virus

DATCP

Virus Vectors

- AMV: aphids, non-persistent
- BPMV: bean leaf beetles.
- CMV, aphids, non-persistent
- Potyvirus group: aphids, non-persistent
- SbDV: aphids, persistent.

http://www.plantpath.wisc.edu/soyhealth

DATCP

Soybean Virus Survey 2007

Field Survey Method

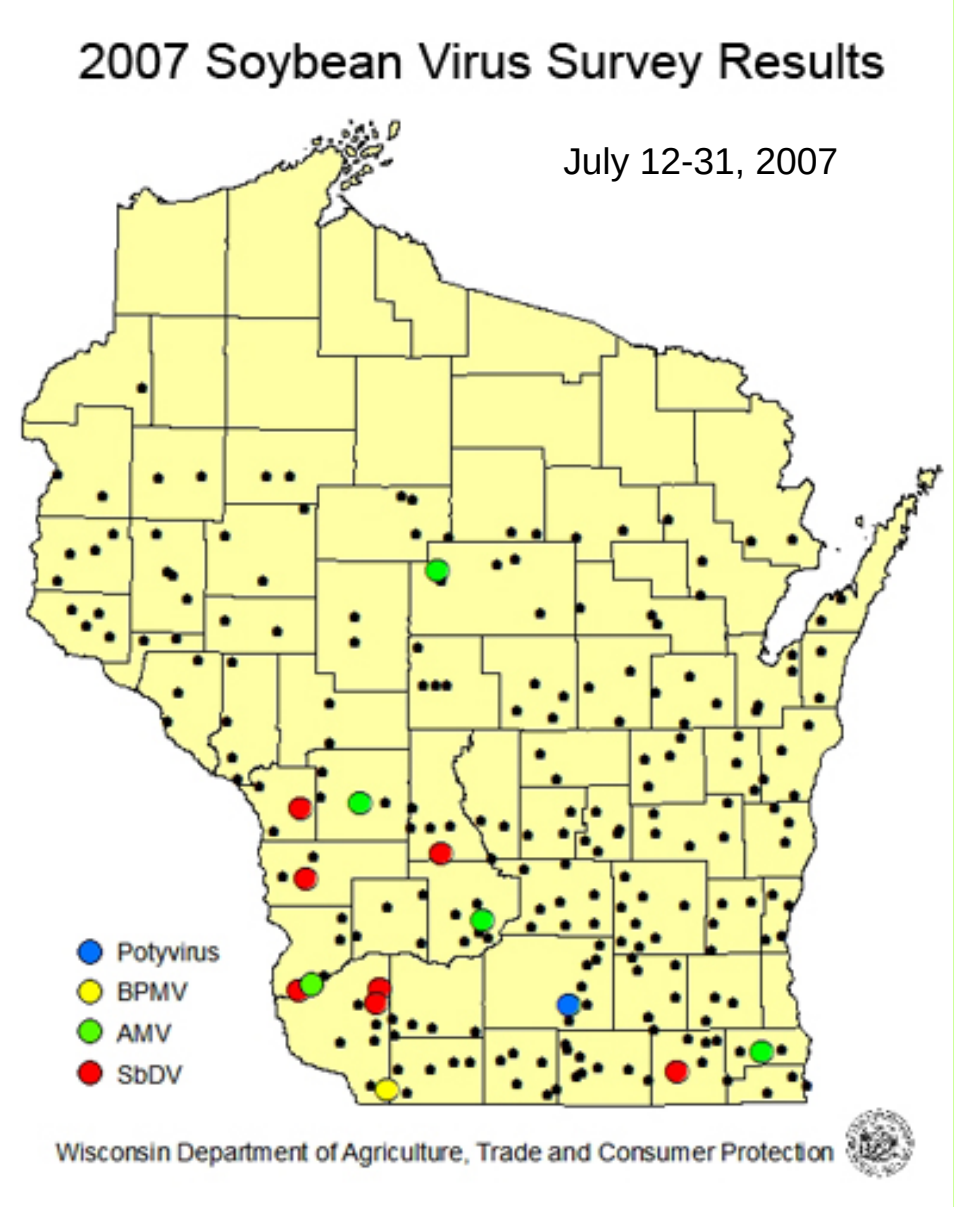
Soybean fields were surveyed from early to late July, when fields were at R2-R4 growth stages. Surveyors randomly collected leaves from five plants at four sites from each field without regard to symptom expression. Samples are stored on ice and transported to DATCP's Plant Industry Laboratory, where they were frozen at -80°C.

Laboratory Methods
RT-PCR and ELISA for Virus Detection

Foliar samples are tested by enzyme linked immunosorbent assay (ELISA), using Agdia reagents or reverse transcription polymerase chain reaction (RT-PCR).
AMV detection as described by Martinez-Priego et al., Plant Dis. 88:908, 2004; SbDV, Harrison et al. Plant Dis. 89:28-32, 2005.

DATCP
Plant Industry Bureau

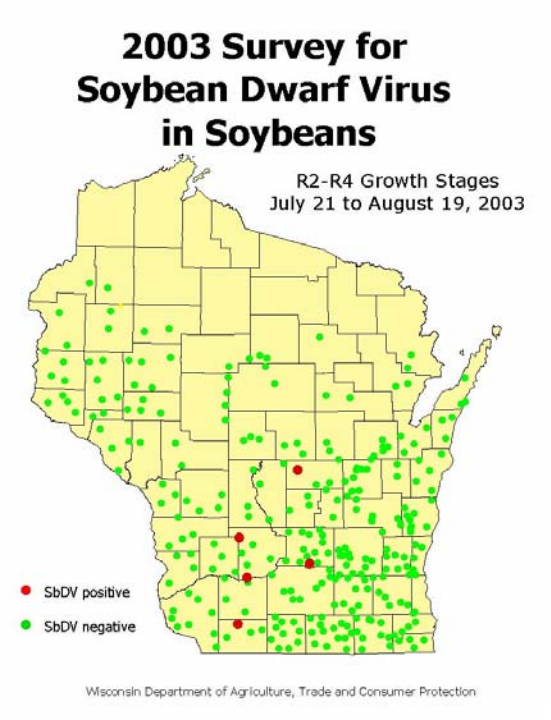
- **Total fields tested: 227**
- **Fields testing positive:**
- **5 *Alfalfa mosaic virus***
- **1 *Bean pod mottle virus***
- **No *Cucumber mosaic virus***
- **1 Potyvirus group:**
  Bean common mosaic virus,
  Bean yellow mosaic virus,
  Soybean mosaic virus…
- ***7 Soybean dwarf virus***

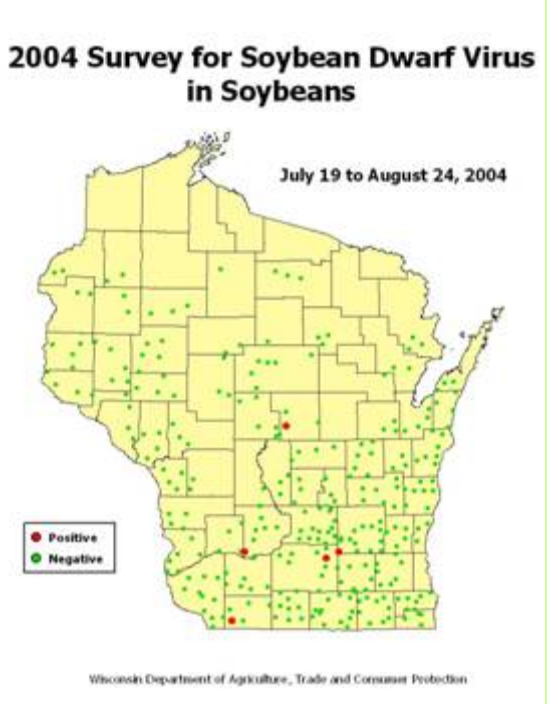


Soybean Virus Overview 2002-2007

Year	Total Fields Surveyed	AMV	BPMV	CMV	POTY	SbDV
2002	177	NA	29.9%	NA	NA	NA
2003	286	NA	4.2%	0.3%	0.3%	1.7%
2004	293	1.0%	0.0%	0.0%	0.0%	1.7%
2005	276	NA	0.0%	NA	0.0%	1.4%
2006	188	NA	0.0%	NA	0.0%	3.2%
2007	227	2.2%	0.4%	0.0%	0.4%	3.1%

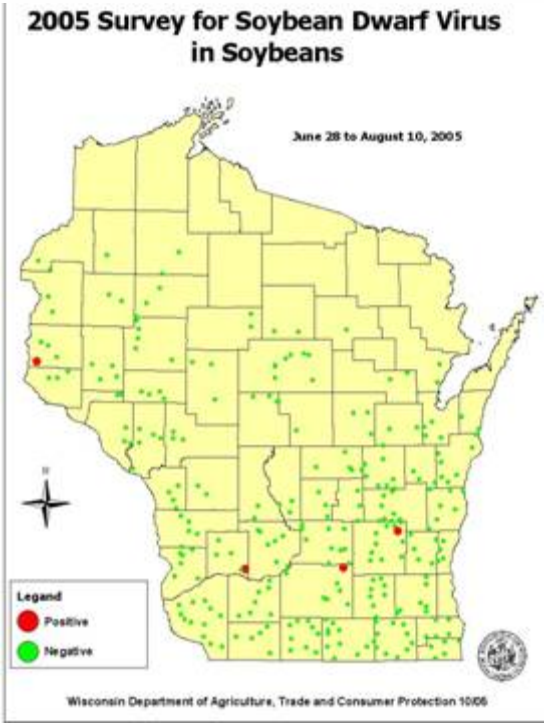
DATCP

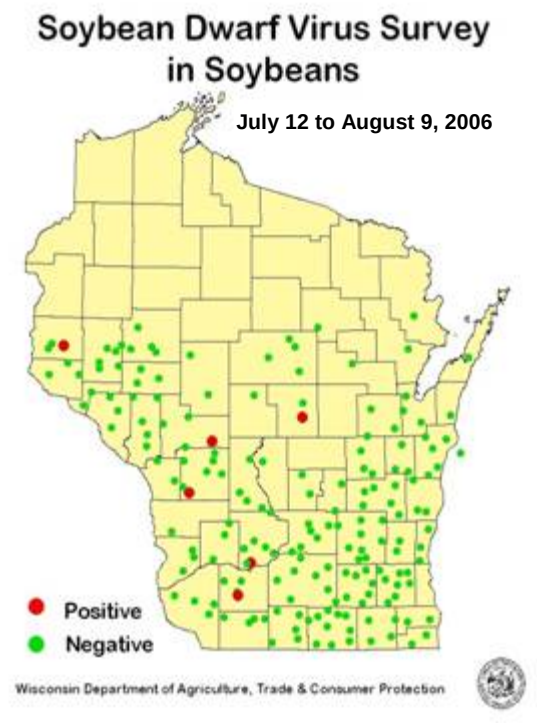


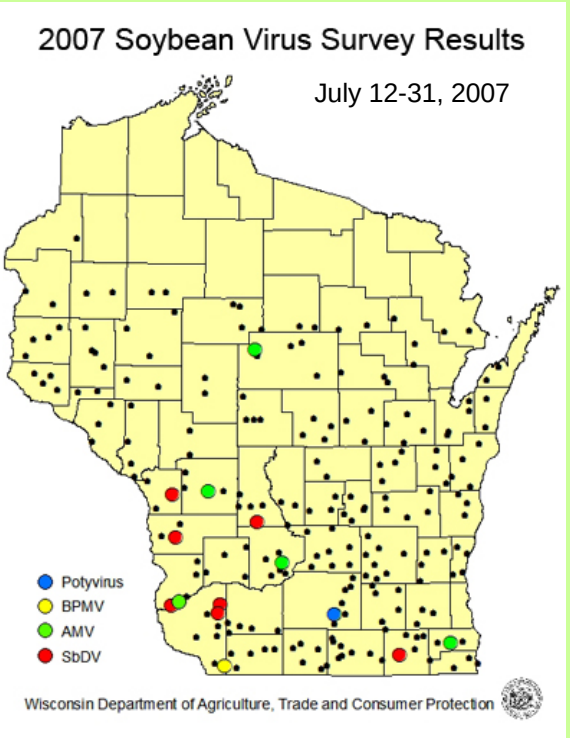


DATCP Plant Industry Bureau

Soybean Dwarf Virus has consistently been found in soybean fields for the last 5 years. SBDV was found in 7 fields in 5 counties in 2007.

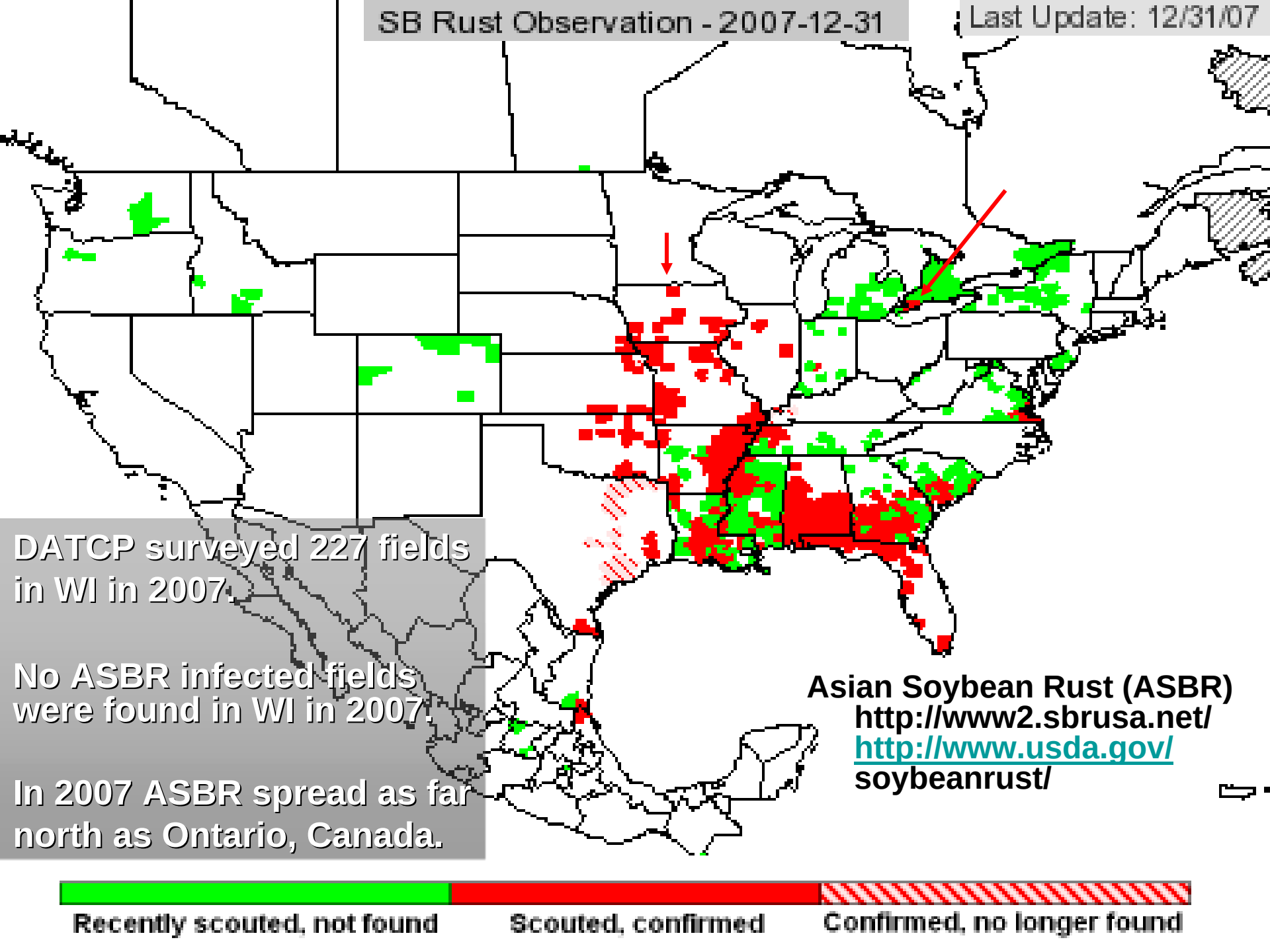






Soybean Dwarf Virus

- **Host range: more than 50 plants, including peas, beans, lupines, various clovers, beets, spinach….**
- SbDV causes severe yield losses on soybean in northern Japan.
- SbDV is endemic on forage legumes in US.
- Wisconsin clovers infected 43-66% (2004-2006).


SB Rust Observation - 2007-12-31
Last Update: 12/31/07
DATCP surveyed 227 fields in WI in 2007.
No ASBR infected fields were found in WI in 2007.
In 2007 ASBR spread as far north as Ontario, Canada.
Asian Soybean Rust (ASBR)
http://www2.sbrusa.net/
http://www.usda.gov/soybeanrust/
Recently scouted, not found
Scouted, confirmed
Confirmed, no longer found

Seed Certification

DATCP-Plant Industry Bureau and Laboratory provide seed field inspections, testing and phytosanitary certification.

- Corn: Stewart's Wilt, HPV, MDMV, WSMV
- Soybean: SCN, Fungal Diseases and Viruses
- Cucumbers: Fungal and Bacterial Diseases

Soybean Cyst Nematode
Heterodera glycines

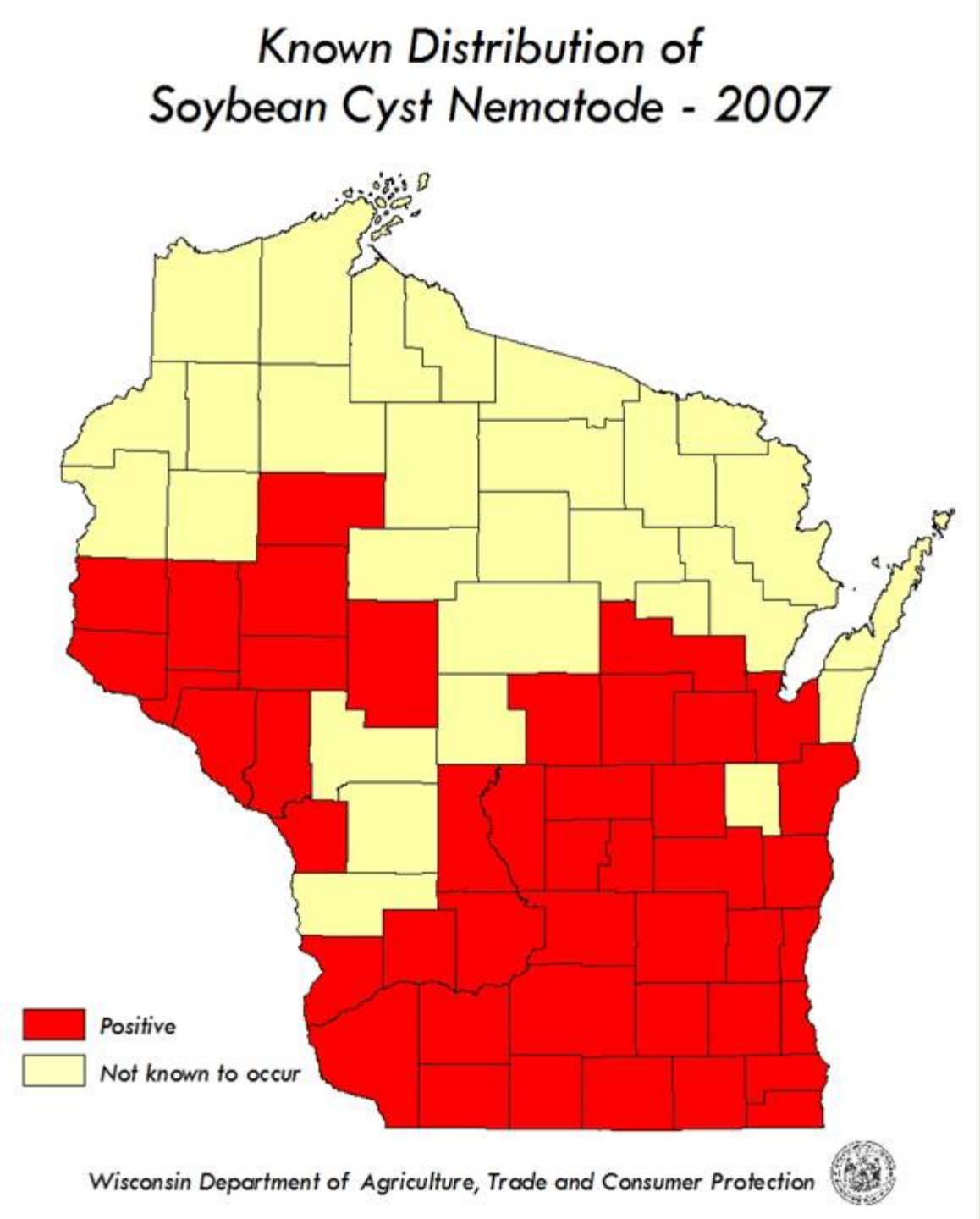
The greatest yield reducing pest of soybeans in the US. WI lost 3.6 million bushels in 2006 (United Soybean Board data).

Affected soybean field

Female cyst with eggs

Infective 2nd stage juvenile

DATCP



- **Soybean cyst nematode** (SCN), *Heterodera glycines*, have been confirmed in **44** Wisconsin counties as of October 2007. This includes a new county record for Fond du Lac County in 2007.
- SCN is the leading economic pest of soybeans in Wisconsin.
- UW-DATCP Consensus map.

Anette Phibbs
Daniel Gerhardt
Amanda Zimmerman
Kate Weaver
Mohammed Asadullah

Krista Hamilton
Clarissa Hammond
Brenda Dahm
Natalie Hernandez
Catie Cuellar