2006 Wisconsin Crop Disease Survey

Wisconsin Department of Agriculture, Trade and Consumer Protection

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Plant Industry Bureau
Pest Survey Section

- Soybean Virus & Asian Soybean Rust Survey
- Snap Bean Virus Survey
- Seed Corn Survey
- Soybean Cyst Nematode Survey
- Exotic Potato Nematode Survey

Soybean Survey
Target Viruses
2006

- 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
- TSV, Tobacco streak virus
- SbDV, Soybean dwarf virus

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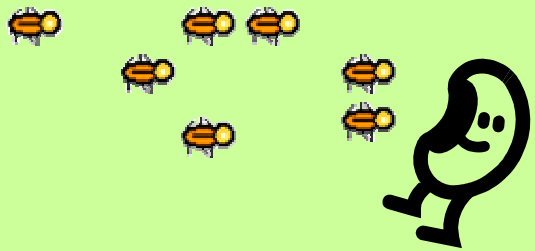
Virus Vectors



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

North Central Soybean Research Program
http://planthealth.info/

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Soybean Virus Survey
Field Sampling Method

For the last four years, from late July to early August, between 188 and 293 soybean fields were sampled and tested for viruses. Soybean fields were at the R2-R4 growth stage. Surveyors randomly collected the uppermost fully unfurled leaf from ten plants at five sites from each field without regard to symptom expression. Samples were stored on ice until frozen at -80°C. Then transported to PIB lab for testing.

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Laboratory Method Immunological Testing

DAS ELISA (double antibody sandwich enzyme-linked immunosorbent assay) testing was conducted with reagents from Agdia, Inc, Elkhart, IN following the manufacturer's protocol for alkaline phosphatase label. Absorbance was read at 405 nm with a Stat Fax 2100 microplate reader (Awareness Technology, Inc. Palm City, FL) or visually evaluated.

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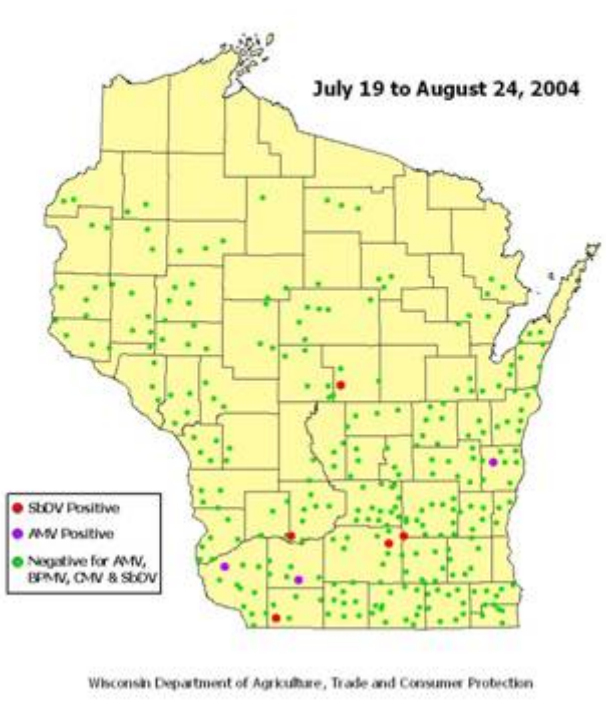
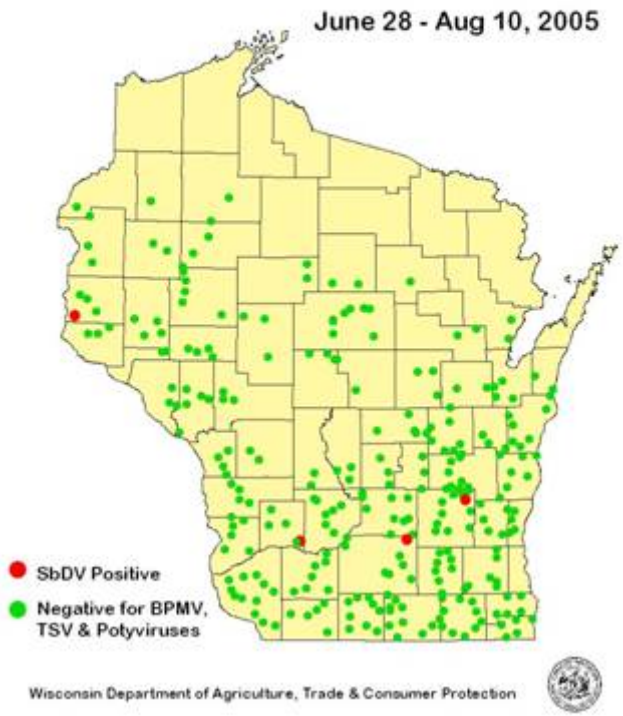
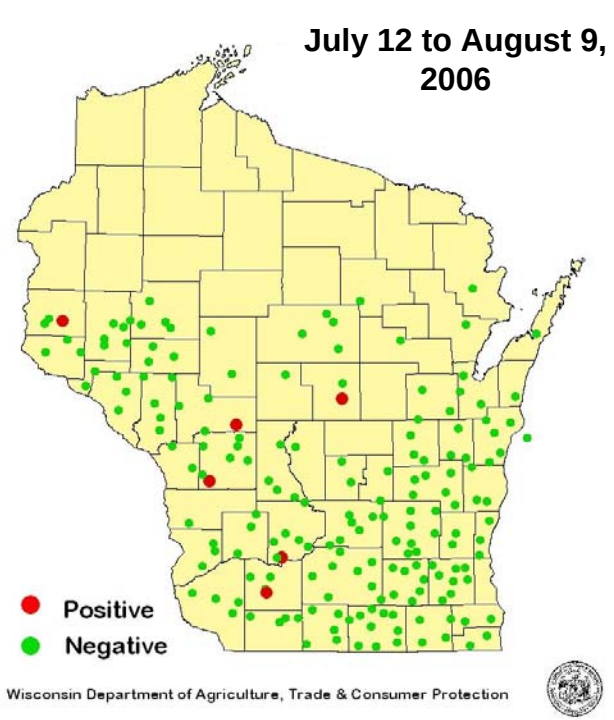
Soybean Virus Surveys







In 2006 all 188 fields sampled tested negative for:
BPMV, Potyviruses and TSV.
6 fields tested positive for SbDV.

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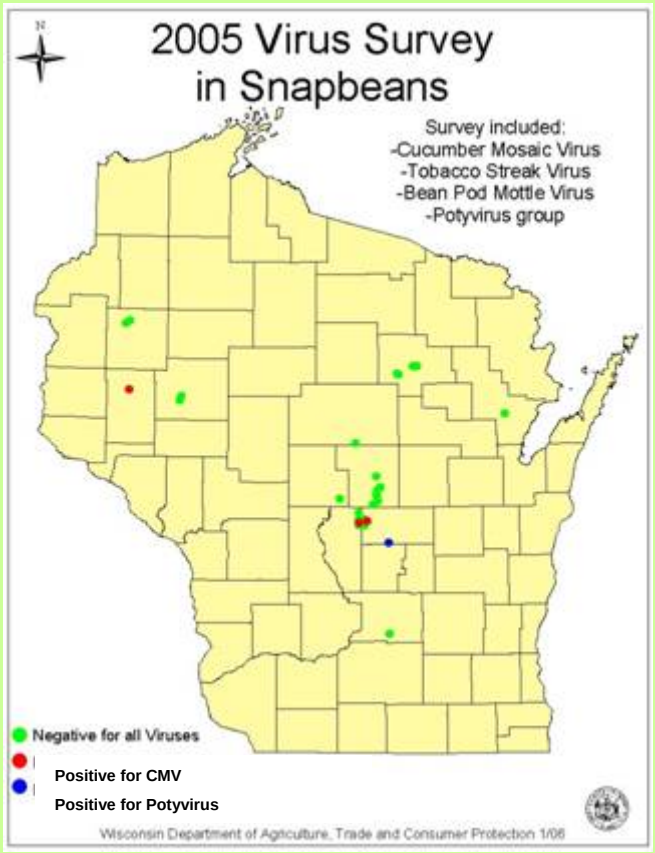
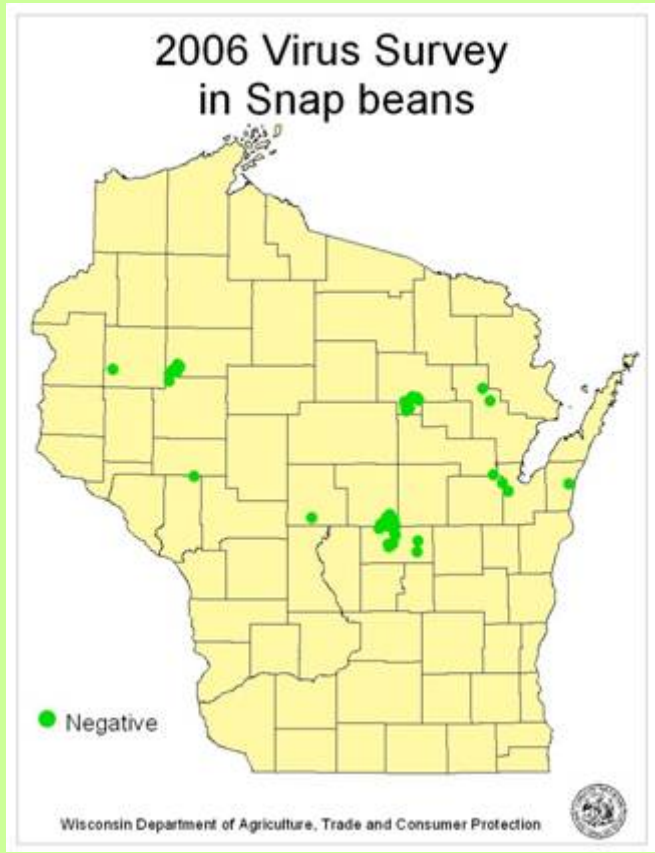
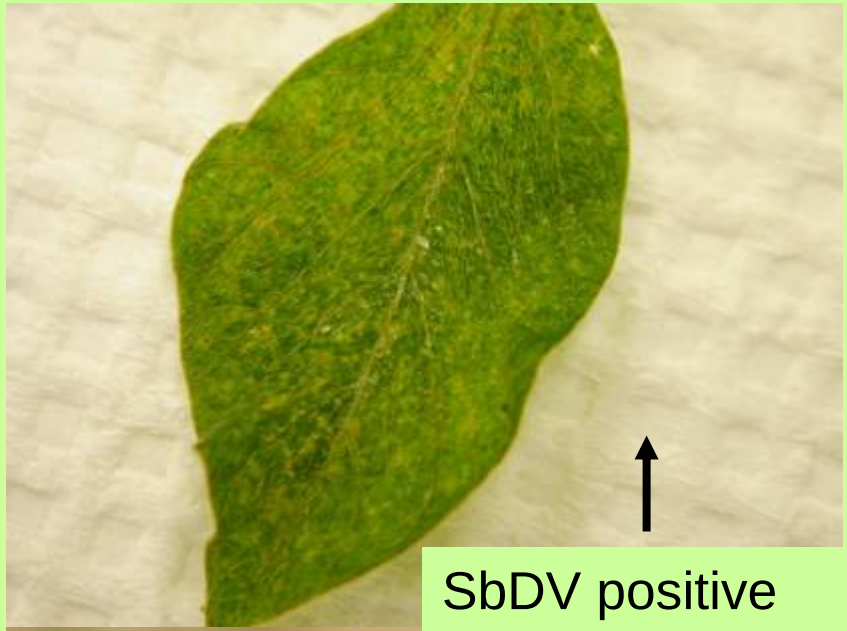
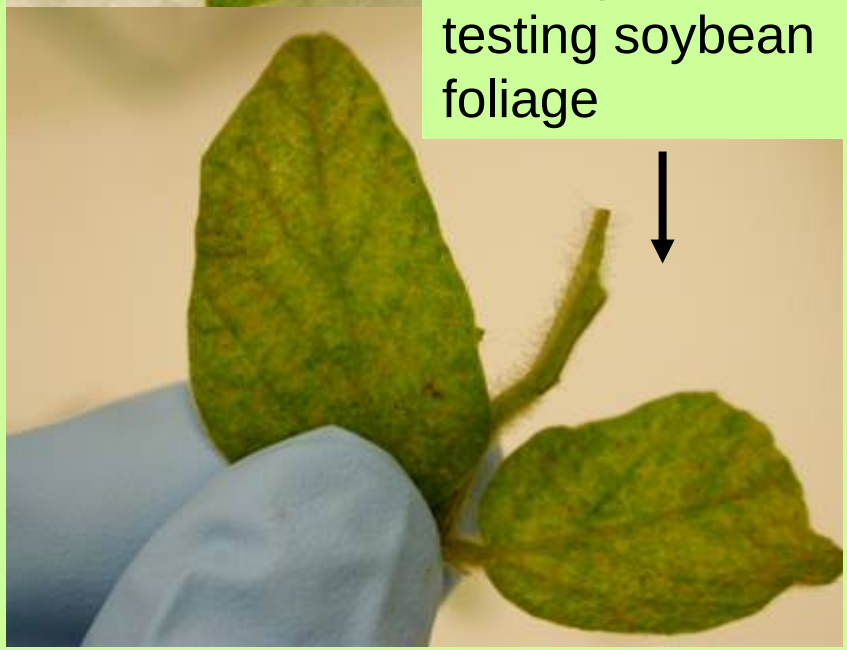




In 2006, 62 Snap bean fields in 8 counties were sampled for: Bean pod mottle virus, Cucumber mosaic virus, Potyvirus group, Tobacco streak virus. All samples tested negative by DAS ELISA.



SbDV positive testing soybean foliage



FIELD SYMPTOMS

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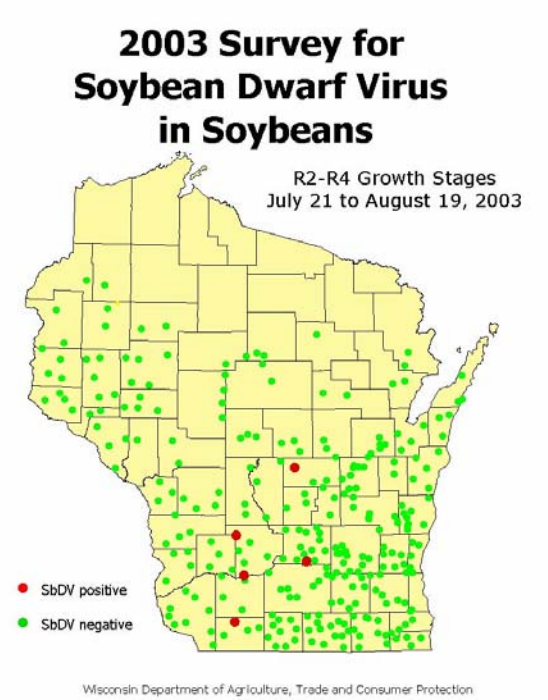

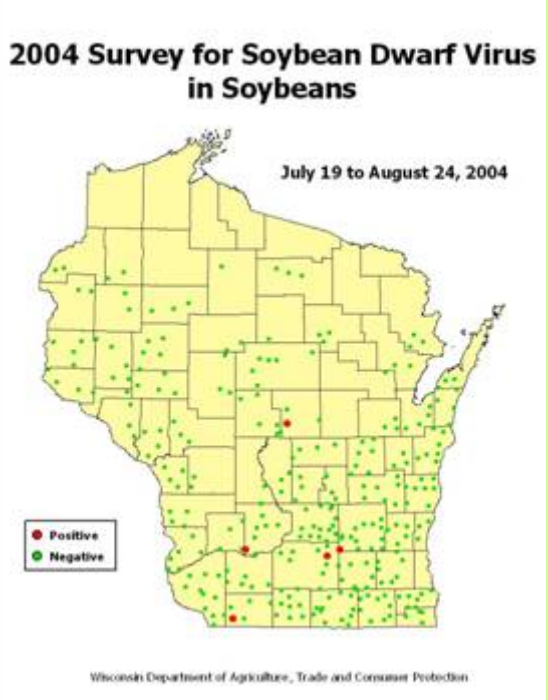

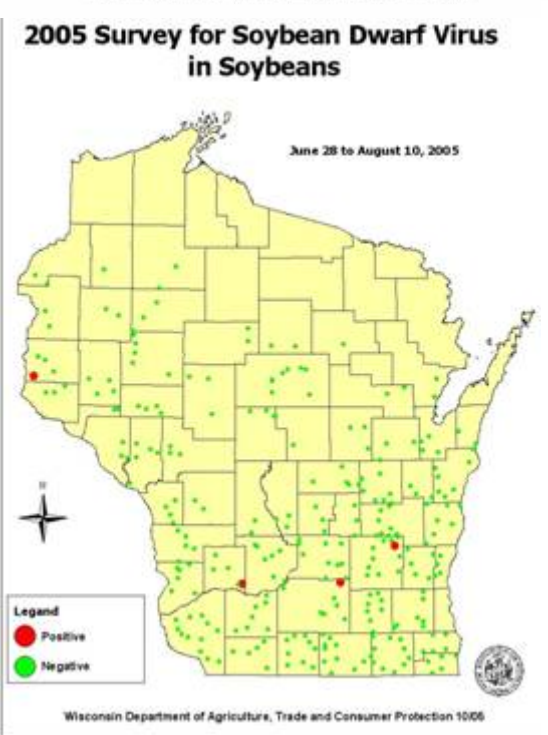

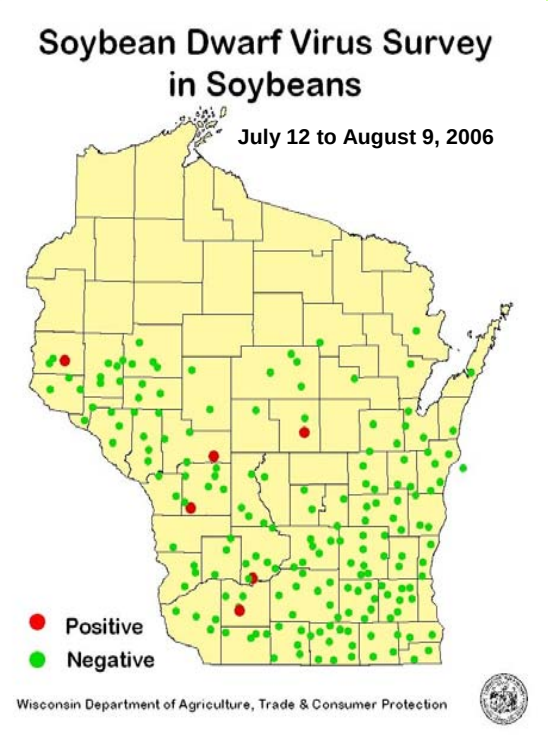

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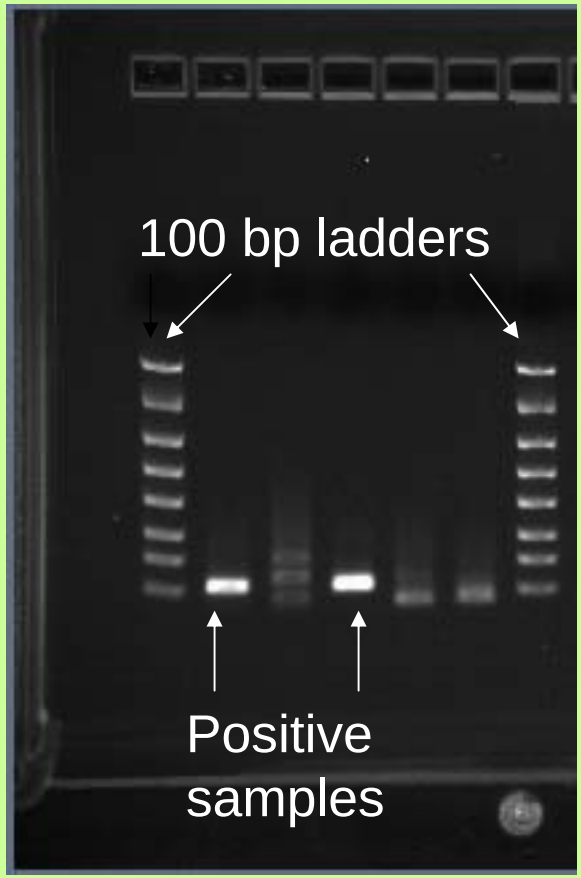
Soybean Dwarf Virus has consistently been found in soybean fields for the last 4 years. SBDV was found in 6 counties in 2006.

Screening performed with a DAS ELISA (Agdia). Suspect SBDV positives were confirmed by molecular methods, RT-PCR (reverse transcription polymerase chain reaction).

Confirmation by Molecular Methods

- The presence of SbDV in Wisconsin Soybean fields was confirmed by Leslie L. Domier, USDA-ARS, University of Illinois by reverse transcription-polymerase chain reaction (RT-PCR).
- The size of the RT-PCR products (110 bp) was consistent with the dwarfing strain.



Soybean Dwarf Virus

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).
- SbDV has been reported on soybeans in VA.
- SbDV was detected on soybeans in Wisconsin for the first time in 2003.
- Host range: more than 50 plants, including peas, beans, lupines, various clovers, beets, spinach….

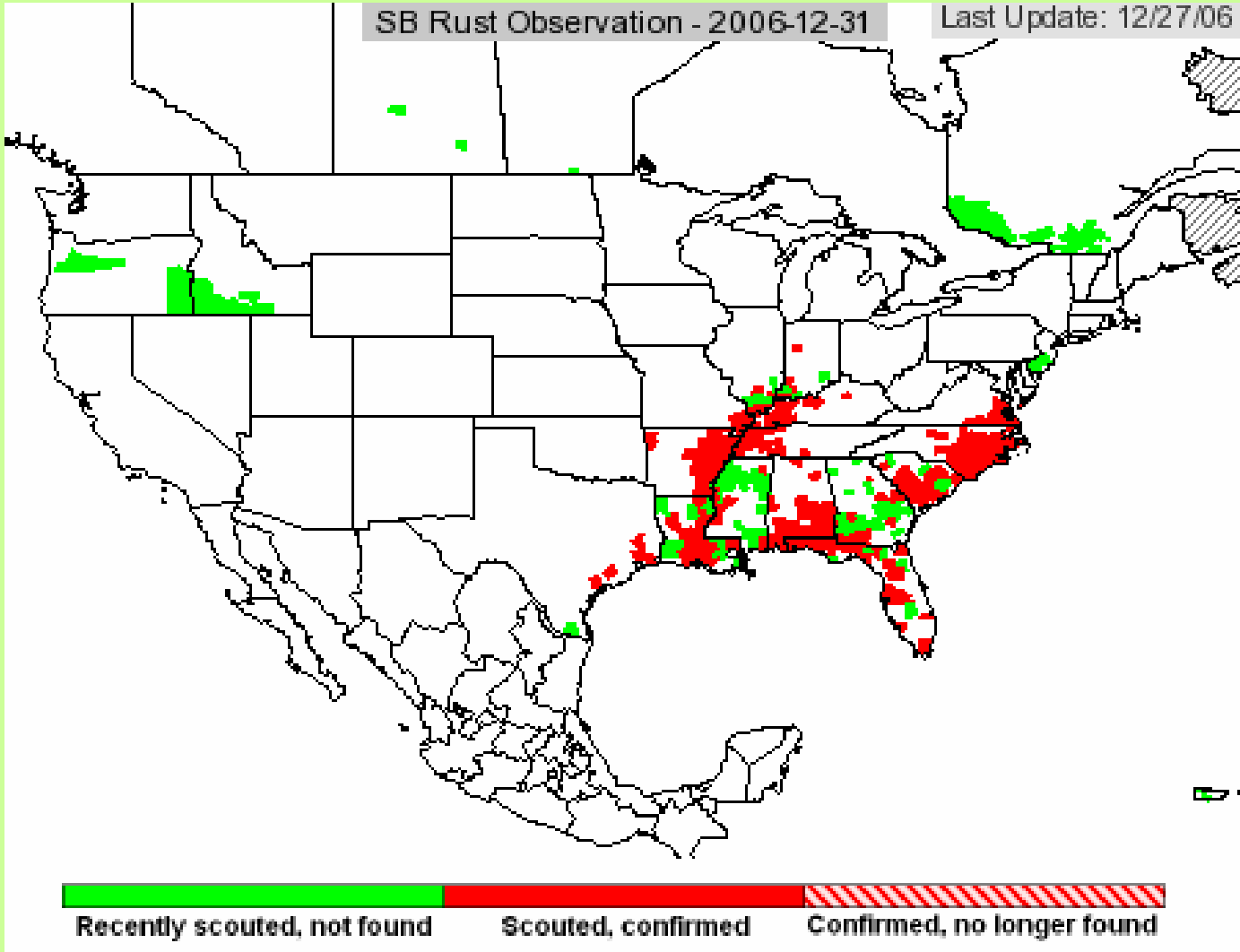
Asian Soybean Rust (ASBR)

http://www2.sbrusa.net/
http://www.usda.gov/soybeanrust/

DATCP surveyed 188 fields in Wis.

No ASBR infected fields were found in Wis. in 2006.

ASBR spread in late season as far north as northern Indiana.



Stewart's Wilt (*Pantoea stewartii*)

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Inbred Corn

1999:
first re-appearance in 56 years in Wisconsin.

2006:
3 fields in Grant County.

Vectored by the corn flea beetle (*Chaetocnema pulicaria*), which is also the wintering reservoir.

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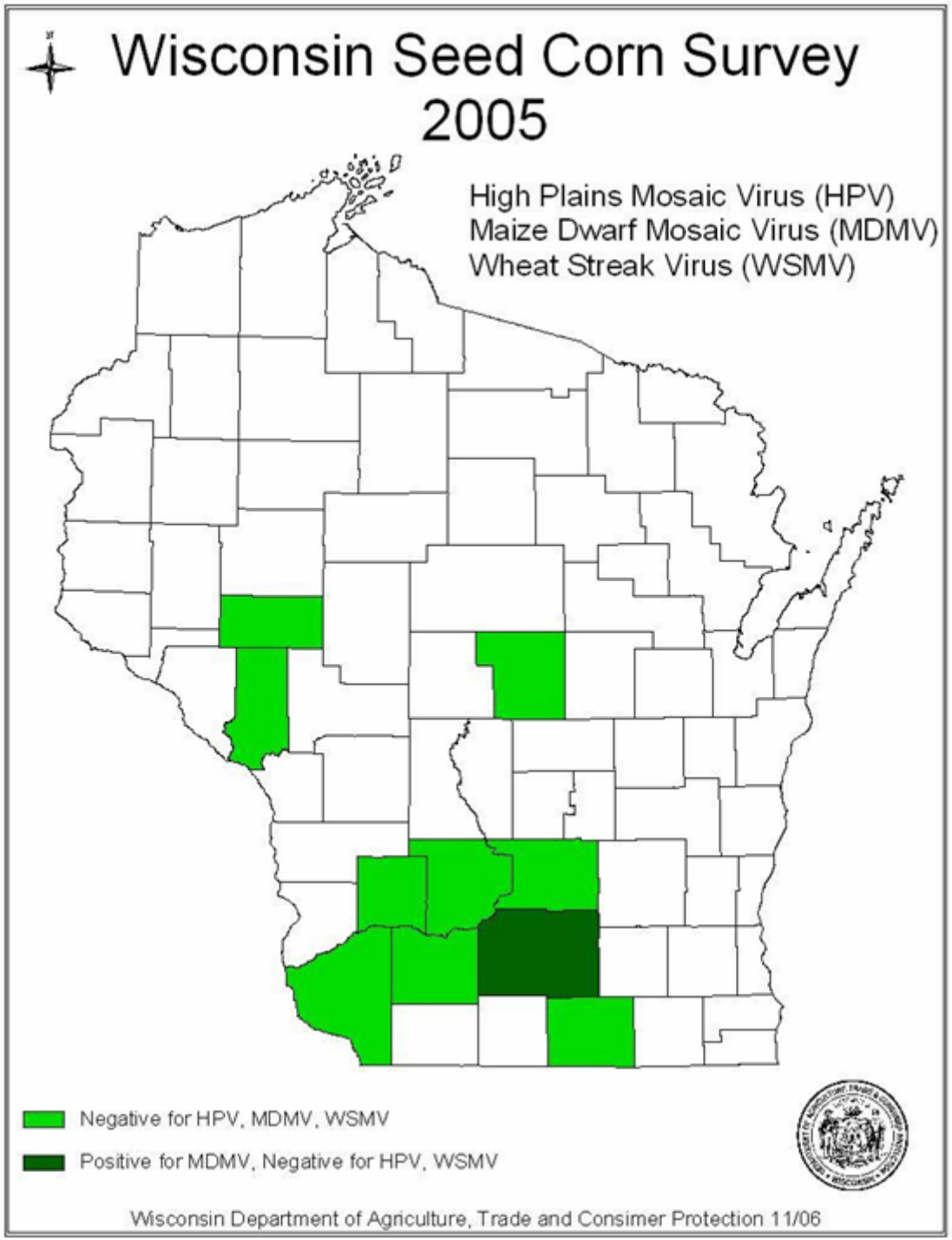

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All 44 inbred corn fields sampled tested negative for HPV and WSMV. One field in Dane Co tested positive for MDMV in 2005.

In 2006, 53 fields were sampled.

Four fields in Dane Co. tested positive for MDMV.

All fields tested negative for HPV and WSMV.

Soybean Cyst Nematode
Heterodera glycines

Female cyst
with eggs

2nd stage juvenile

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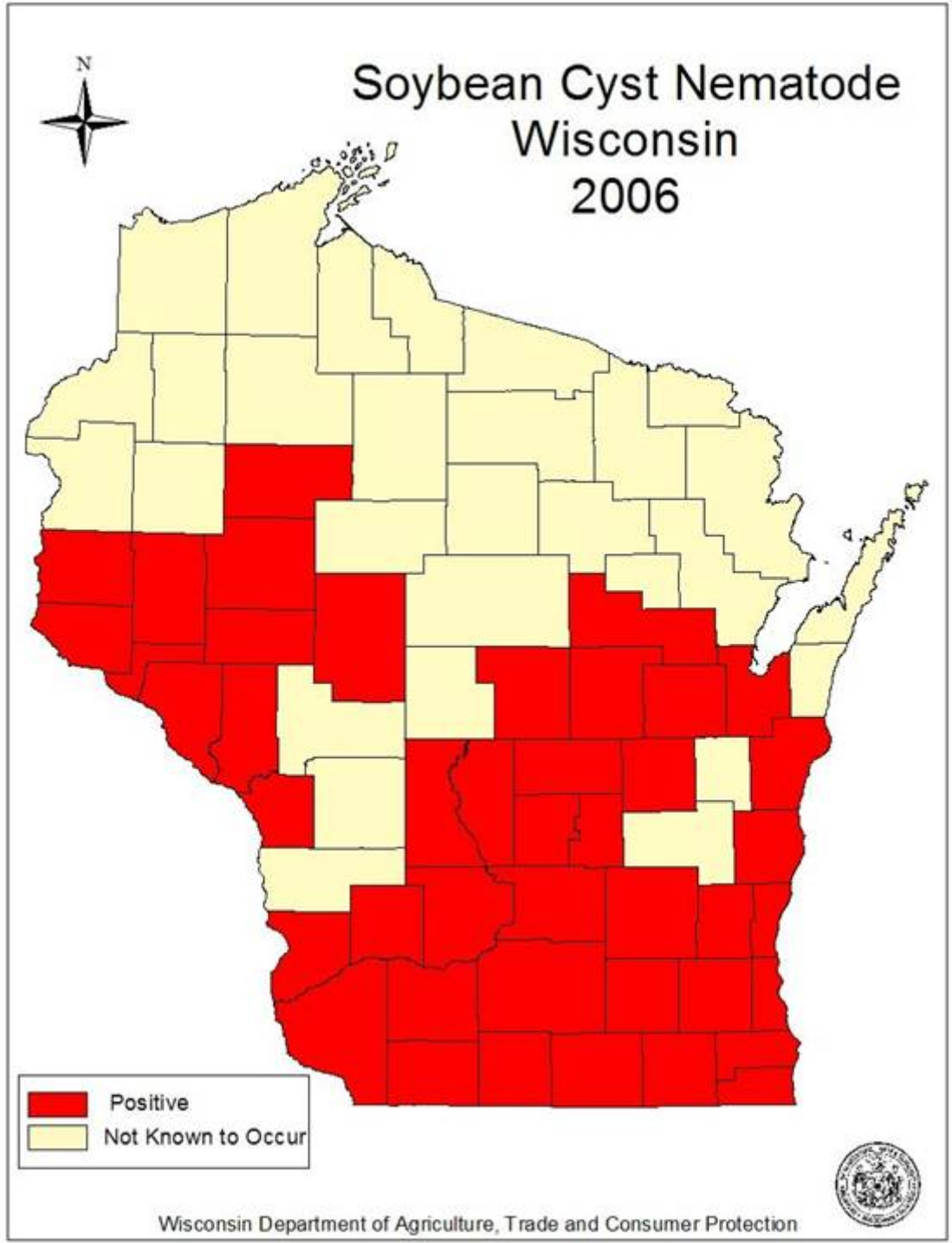

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Prevalence of Soybean cyst nematode (SCN), (*Heterodera glycines*) based on cumulative UW/DATCP consensus data from an annual soil survey of soybean fields since 1981.

SCN is the number one economic pest problem in soybean production in the US!

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2006 Wisconsin Survey for Exotic Nematodes in Potato Fields

Soil Sampling Method

- Walk and sample fields in W pattern.
- Collect 20 cores into one sample bag.
- Write GIS coordinates, sample no. and county on the bag, double bag.
- Sanitation - Clean digging tool with soapy water and 10% clorox or 70% alcohol then rinse with water.
- Use disposable gloves and plastic boot covers.

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Potato Cyst Nematodes

- *Golden nematode, Globodera rostochiensis*
- Pale cyst nematode *Globodera pallida*

Potato cyst nematodes feed on the roots of potatoes, tomatoes and eggplants. Females form cysts on true roots.
Introduced by infested potatoes, soil, contaminated equipment.

Potato Cyst Nematodes

- Pale cyst nematode was found for the first time in the US in Idaho on April 19, 2006 .
- Golden nematode was found in Quebec, Canada in August 2006.
- Both potato cyst nematodes are economically significant pests and regulated quarantine pests in many countries including US.

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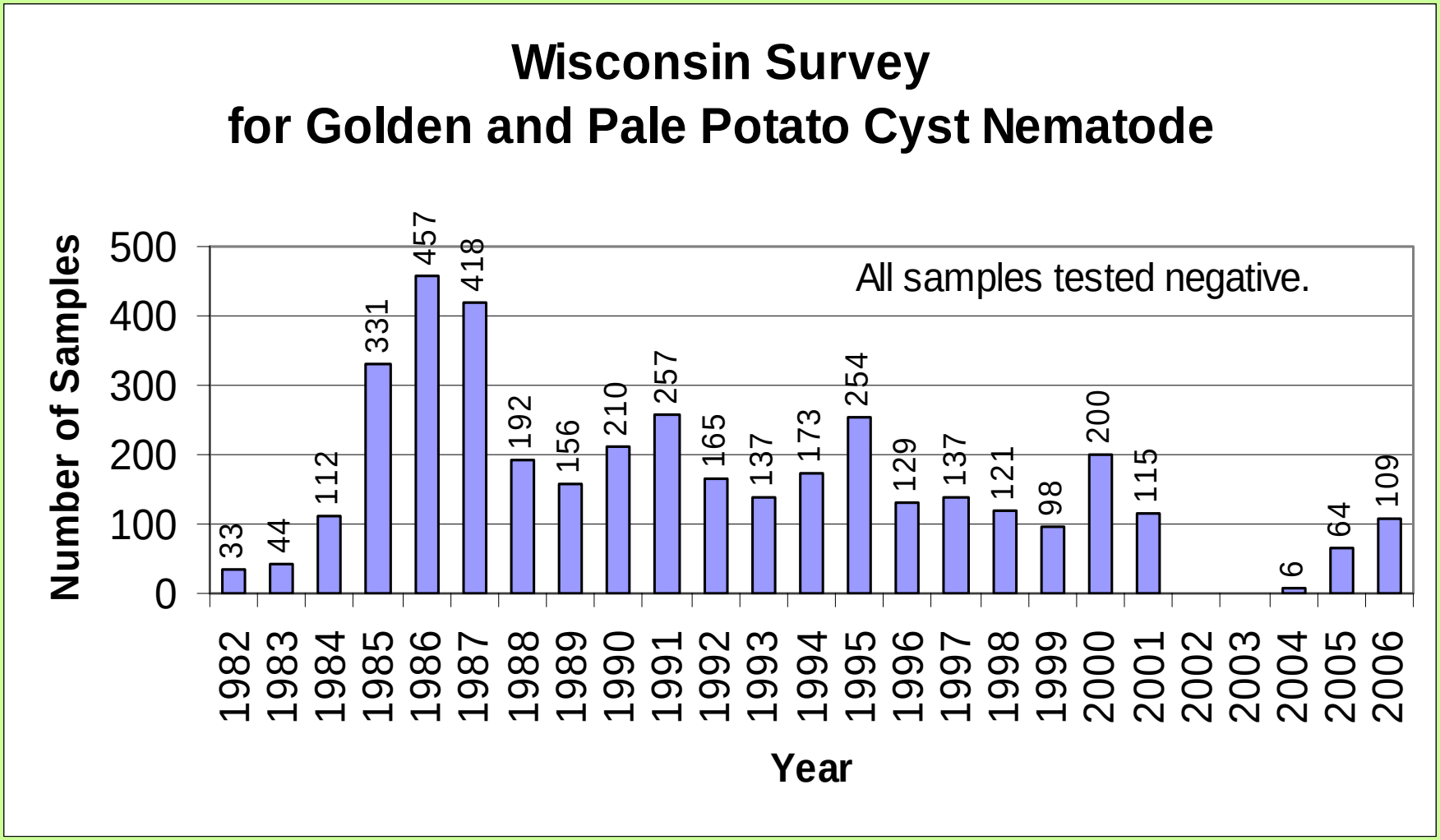

Potato cyst nematodes have never been detected in Wisconsin.

Exotic Root-Knot Nematodes

- Columbia root-knot nematode, *Meloidogyne chitwoodi*
- False Columbia root-knot nematode, *Meloidogyne chitwoodi*

Root-knot nematodes form galls on roots that interfere with normal plant growth.

Columbia root knot nematode has been found in the western U.S. but not known to occur in Wisconsin.

Northern root-knot nematode *(M. hapla)* on carots.

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Laboratory Methods

Classic Nematology and Molecular Techniques (PCR)

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Molecular techniques (polymerase chain reaction, "PCR") are able to detect a single juvenile in a soil sample.

Real time PCR

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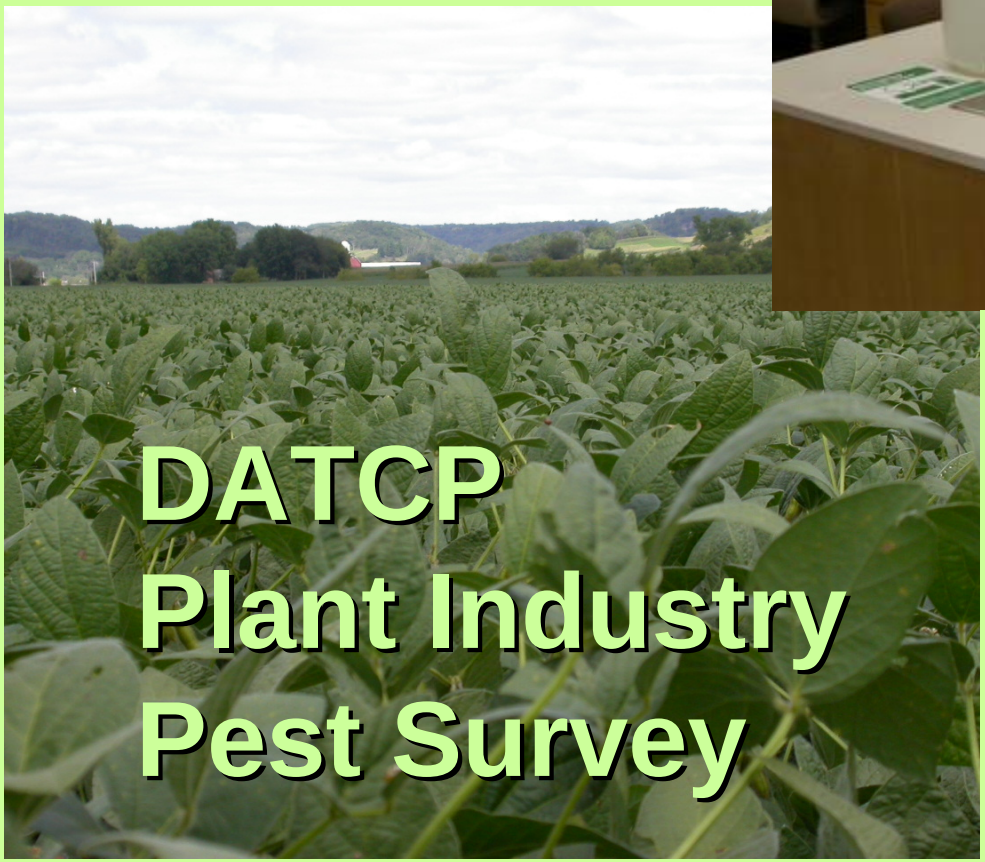
Anette Phibbs
Daniel Gerhardt
Amanda Zimmerman



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