

2008 WISCONSIN CROP DISEASE SURVEY

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Plant Pathologists at the Department of Agriculture, Trade & Consumer Protection (DATCP) survey Wisconsin's agricultural crops for plant diseases and nematodes. They check for newly introduced problem organisms and monitor levels of known diseases and nematodes. Samples are tested at DATCP's Plant Industry Laboratory, providing diagnostic services to facilitate export certification, inspections and surveys. In 2008, field surveys focused on the following crops and diseases: Early Season Diseases of Soybeans and Winter Wheat; Soybean Viruses; Potato Cyst Nematode; Soybean Cyst Nematode and Viruses and Stewart's wilt of Seed Corn.

Spring Soybean Disease Survey

In response to flooding and unusual weather conditions, a spring survey of 50 soybean fields in the V2 and V3 stages was conducted from June 23rd to July 7, 2008. Fields were randomly chosen but surveyors targeted and collected whole plants that exhibited symptoms such as wilting, chlorosis and stem lesions. Samples were tested at Plant Industry Laboratory for early season fungal pathogens and nematodes (Fig. 1).

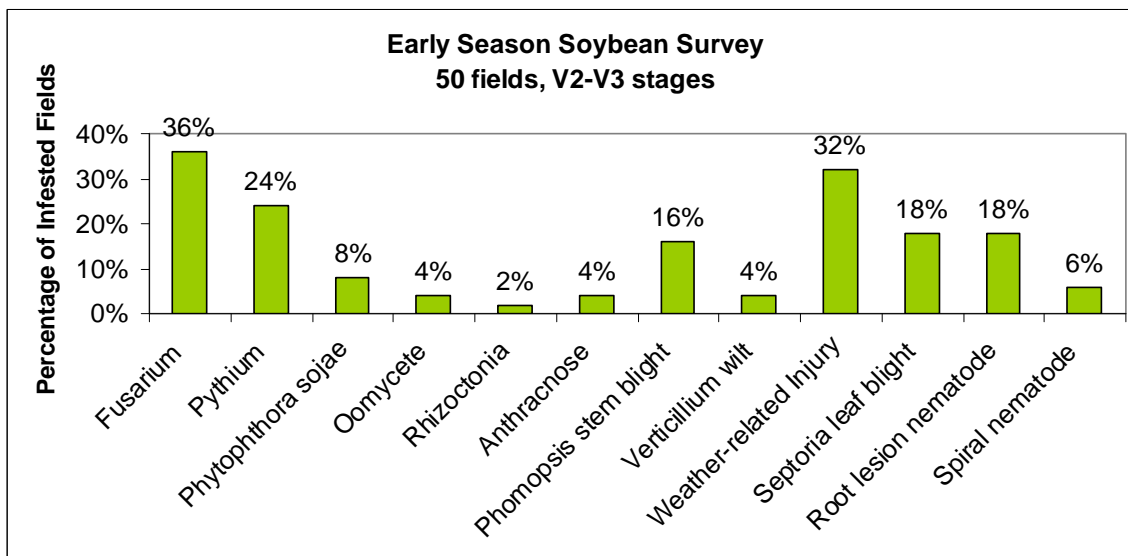


Figure 1

Seedlings from 37 of 50 fields (74%) tested positive for a variety of root diseases. The following root rot diseases were diagnosed from total 50 samples: *Fusarium* sp.: 36%, *Phytophthora sojae*: 8%, *Pythium* sp.: 24%, unspecified Oomycetes 4%, *Rhizoctonia* sp.: 2%. Some isolates of *Fusarium* and *Pythium* probably represent secondary infections. Soybean plants from 12 of 50 sites (24%) exhibited diseases of the lower stem. Based on the total 50 fields sampled, *Phomopsis* sp. accounted for 16%; *Anthracnose* and *Verticillium* wilt each infected 4% of declining plants. Weather related injuries (flooding, frost, high winds) injured soybean

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seedlings at 32% of surveyed sites. Root lesion nematodes (*Pratylenchus* spp.) directly were infesting 18% and spiral nematodes (*Helicotylenchus* spp.) 6% of root samples. Nematodes were observed emerging from root lesions of fine roots. Soil testing for soybean cyst nematode (SCN) was deferred to summer and fall.

Soybean disease survey continued through the growing season and early fall with an emphasis on collection of foliar samples for virus testing and a survey for Asian Soybean Rust (*Phakopsora pachyrhizi*). Two hundred and thirty-eight foliar samples were collected for laboratory analysis. Root rot and suspect foliar symptoms were observed at 36 surveyed sites. These plants were sampled and tested for pathogens at the laboratory. Two additional fields tested positive for *Phytophthora sojae* and 4 fields each tested positive for *Phomopsis*, *Anthrachnose* and *Fusarium*. Asian Soybean Rust was not observed in Wisconsin in 2008. The most common foliar disease was Brown spot (*Septoria glycines*).

Soybean Dwarf Virus of Soybeans

Soybean fields for sampling were chosen using Visual Sample Plan statistical software designed by the US Department of Energy and Arc Map. Sample numbers were based on relative soybean acreage by county with a desired actual sample size of 230 fields visited. The latter number of fields would allow for 90% confidence of detection with a 1% detection threshold. In each field, plant pathologists stopped at 4 sites and took 5 leaflets from plants in the R2 to R6 life stage. The leaves were kept on ice until delivered to Plant Industry Laboratory for testing. Foliage

was tested using a molecular method, reverse transcription (RT) - polymerase chain reaction (PCR) (1). Figure 2 shows the location of 16 fields throughout the state that tested positive for Soybean dwarf virus (SbDV). 6.7% of visited fields were infected with SbDV in 2008 compared to 3.1% in 2007.

SbDV was found for the first time in soybeans in Wisconsin in 2003 (2). Since then the number of infected fields has been slowly increasing. To the best of our knowledge symptoms of dwarfing or chlorosis attributable to SbDV have not been observed in Wisconsin soybean fields.

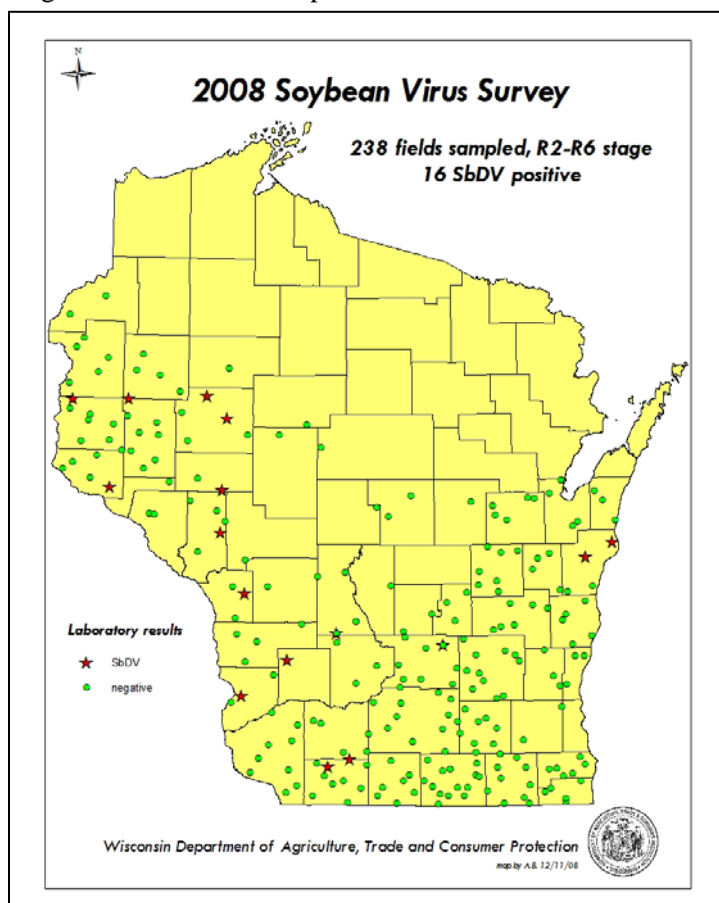
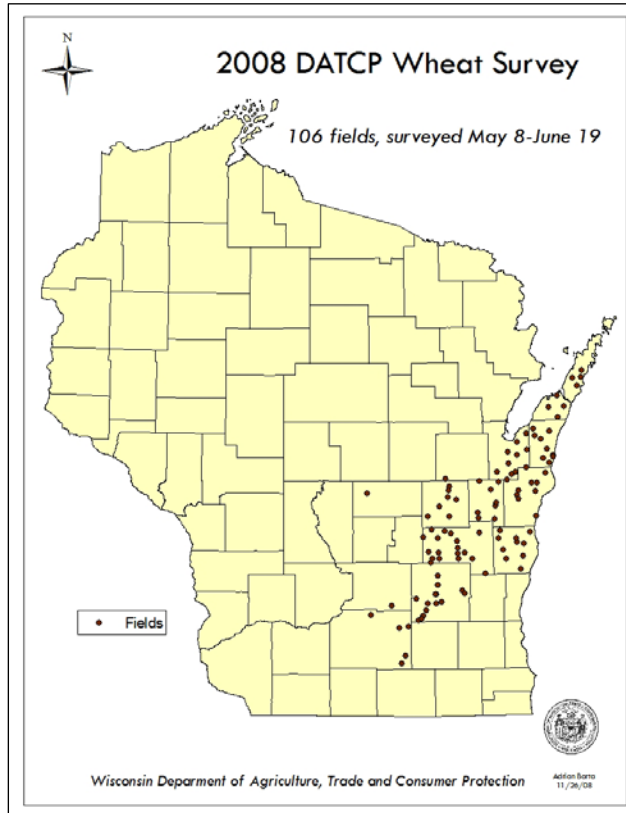


Figure 2

Early Season Winter Wheat Survey

DATCP Pest Survey specialists conducted a disease survey of winter wheat fields in the state between 5/8/2008 and 6/19/2008, sampling 106 fields in 11 counties, comprising 50 % of the wheat acreage in the state. Figure 3



shows the location of sampled fields. Wheat fields ranged in maturity from Feekes Stage 8.0 (flag leaf visible) to Feekes Stage 10.5.3 (flowering complete to base of spike). Leaf samples were collected for laboratory confirmation of diagnosis (Fig. 4).

Powdery mildew (*Blumeria graminis*) was the most widespread disease encountered, occurring in 79 of the 106 fields surveyed or 75%. Incidence (the percentage of plants with symptoms in a field) ranged from 1 -100%. Severity (the average percentage of leaf area affected) ranged from a trace to 20%. Generally, severity was low.

Sooty molds (caused by a range of mostly saprophytic fungi) were widespread throughout the sampled fields, always confined to the lowest leaves buried in the canopy. Sooty molds are rarely a problem for wheat in Wisconsin, unless harvest is delayed and the

Figure 3

infections move to the heads. 26% of all fields checked, tested positive for Septoria leaf blotch (*Septoria tritici* and *S. nodorum*). Incidence and severity are difficult to estimate in the field because of the similarity of field symptoms with other foliar diseases. Septoria leaf blotch can be troublesome during wet growing seasons. Fond du Lac (6) and Door (5) had the highest number of infected fields.

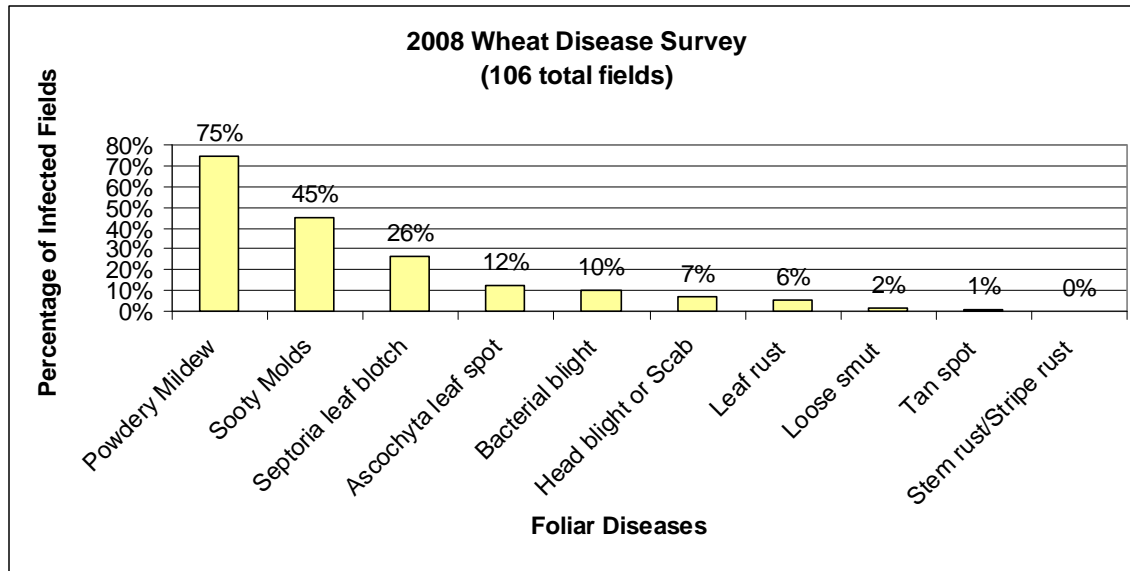


Figure 4

Ascochyta leaf spot (*Ascochyta tritici*) was laboratory-confirmed in 12% of fields. No control measures are generally required for this minor disease. Wheat leaves from 10% of fields tested positive for *Pseudomonas* leaf blight (*Pseudomonas syringae*) in the laboratory. 7% of fields displayed the bleached-head symptoms of Scab or Head Blight, caused by *Fusarium* spp. The incidence in fields was low.

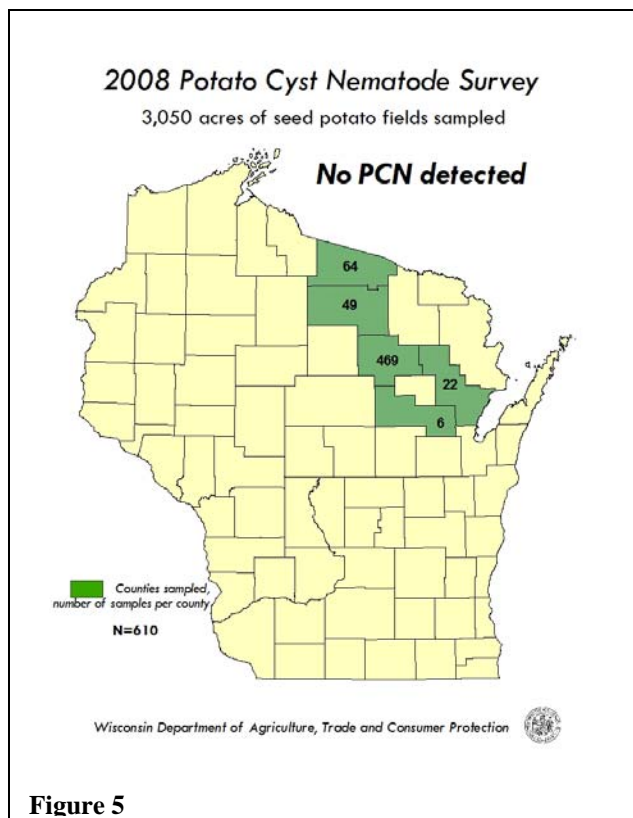


Figure 5

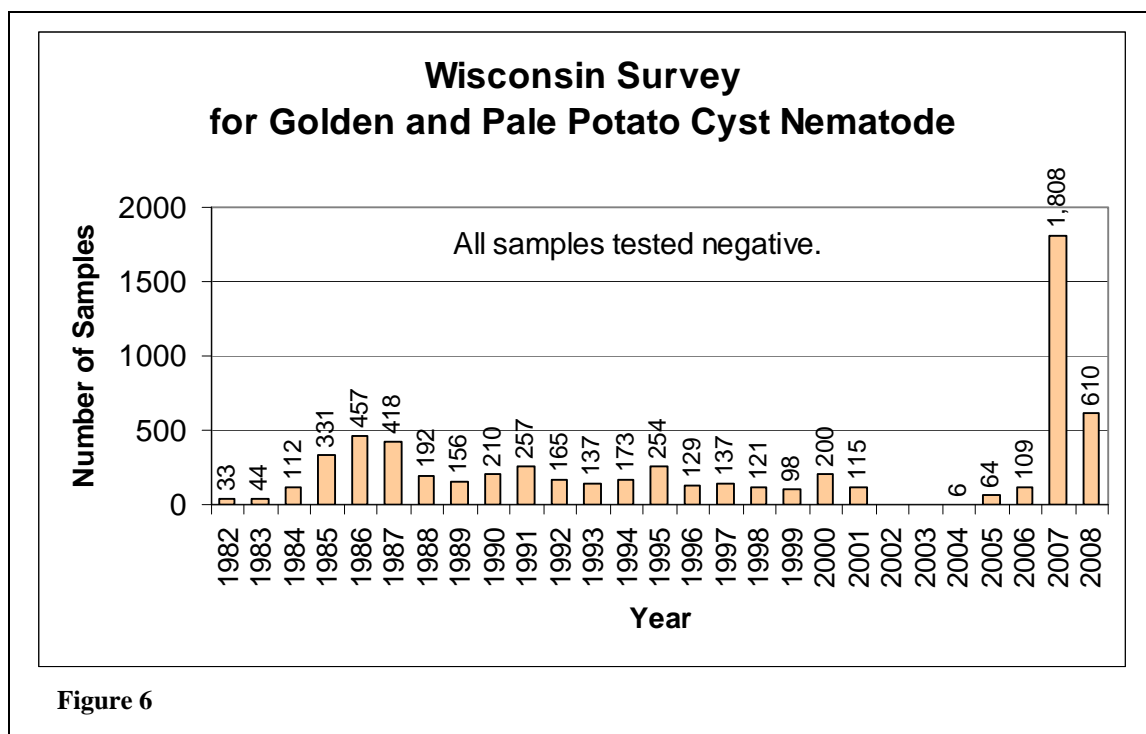
Leaf rust (*Puccinia triticina*) was found in 6% of fields at trace levels. Loose smut (*Ustilago tritici*) was found in 2% of fields which was less than expected in most Wisconsin wheat seasons. The incidence within fields was far below 1%. No stem rust or stripe rust was detected by DATCP personnel. One sample from a field in Dodge County was determined to have Tan spot, caused by *Pyrenophora tritici-repentis*. The severity was below 2%, with infection limited to the lowest leaves.

Potato Cyst Nematode Survey

An intensive soil testing effort of Wisconsin seed potato fields in 2008 continues to show that fields are free from potato cyst nematodes (*Globodera rostochiensis* and *G. pallida*) (Fig. 5). These microscopically small worm-like creatures can cause significant damage to potato production. Female nematodes form durable pinhead sized resting stages

called cysts that can survive in the soil for decades and still infect potatoes. Potato cyst nematodes (PCN) have never been found in Wisconsin.

In 2008, a total of 610 soil samples were collected from 3050 acres of potato fields; see Figure 5. This represents over 1.3 tons of soil screened for cysts by Plant Industry Laboratory staff. Field sampling and testing focused on seed potato fields to facilitate export of seed potatoes to Canada. Potato cyst nematodes would be a serious threat to potato production and trade if found in this state. 2008 was the second year of a very intensive nation wide survey funded by USDA Animal and Plant Health Inspection Service (APHIS). In Wisconsin DATCP staff has been collecting soil samples from fields and potato storage facilities since 1982. These surveys varied in scope and were funded by the USDA's Cooperative Agricultural Pest Survey Program. A total of 6336 samples have been screened for PCN over the course of 27 years, see Figure 6. No suspect cyst nematodes have been found in Wisconsin.



Soybean Cyst Nematode Survey

The year 2008 marks 30 years of annual state-wide survey for Soybean Cyst Nematode (SCN) by DATCP and University of Wisconsin staff (Fig. 7). Soybean cyst nematode (*Heterodera glycines*) was first detected in the U.S. in 1954, in Hanover County, North Carolina. Survey efforts in 1957, 1958 and 1962 did not find the nematode in Wisconsin; the first report in the state was made in 1981, in Racine County. In 2008 SCN was detected in two new Wisconsin counties (Monroe and Calumet), bringing the total number of counties where the nematode has been found to 46 (Figure 8). Soybean acreage in the counties where SCN has been detected comprises 85.5% of the soybean crop in the state.

SCN is the greatest yield reducing pest and disease problem in the U.S. In 2007 SCN reduced yields in the U.S. by an estimated 94 million bushels (Wrather & Koenning). This is three times the loss attributed all seedling diseases combined, or Phytophthora root rot, or Sudden

Death Syndrome. Soybean growers in all parts of the state are urged to sample their fields for SCN. Testing is available through the UW Plant Disease Diagnostics Laboratory at <http://www.plantpath.wisc.edu/soyhealth/scnsamp.htm> or private laboratories. Fields may be sampled at any time that the soil is not frozen.

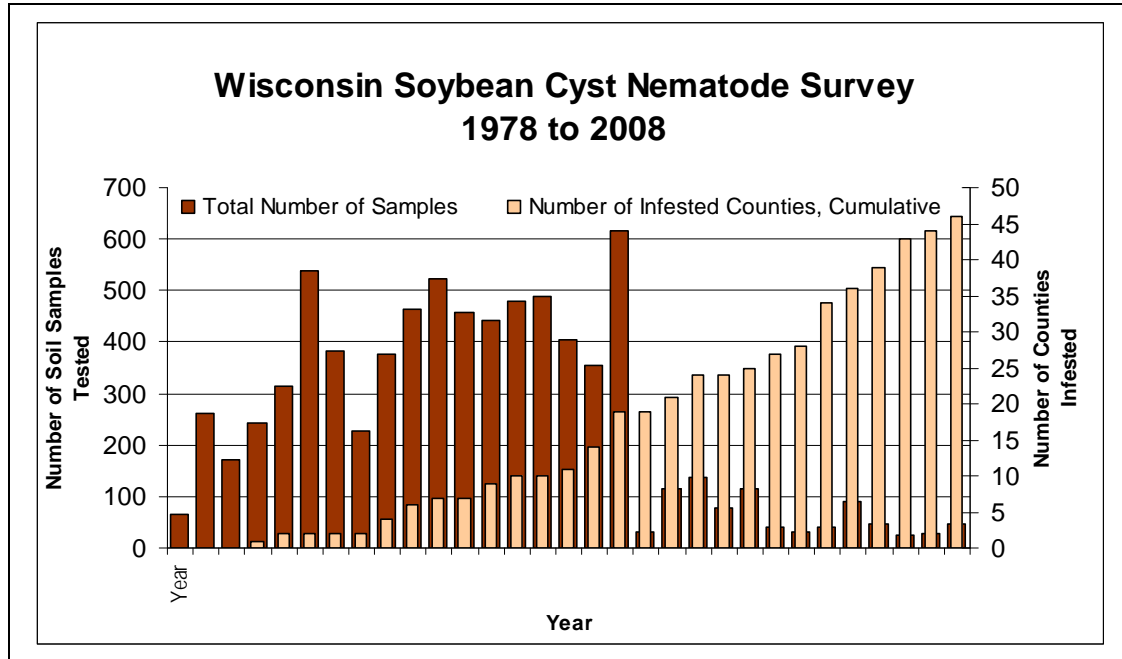


Figure 7

Seed Corn Survey

In 2008 DATCP personnel inspected 95 seed corn fields in 9 counties (2,416 acres) and tested foliage samples from 84 of the sites for *Pantoea stewartii*, the causal agent of Stewart's wilt. Stewart's wilt has been documented in various locations throughout the state over the last 8 years. The Plant Industry Laboratory confirmed 2 positive cases of Stewart's wilt in Rock County. To meet the import requirements of foreign trading partners, all samples were also tested for three viruses: High plains virus (HPV), maize dwarf mosaic virus (MDMV) and wheat streak mosaic virus (WSMV). No HPV or WSMV were detected. HPV, WSMV, and their vector the wheat leaf curl mite (*Aceria tosichella*) are not known to occur in Wisconsin. Two samples from Columbia County tested positive for MDMV which is known to occur in Wisconsin.

References

1. Harrison et al. Plant Dis. 89:28-32, 2005.
2. Phibbs et al. Plant Dis. 88:1285, 2004.
3. J.A. Wrather, University of Missouri-Delta Center, P.O. Box 160, Portageville, MO 63873, and Steve Koenning, North Carolina State University, "Soybean Disease Loss Estimates for the United States, 1996-2007".

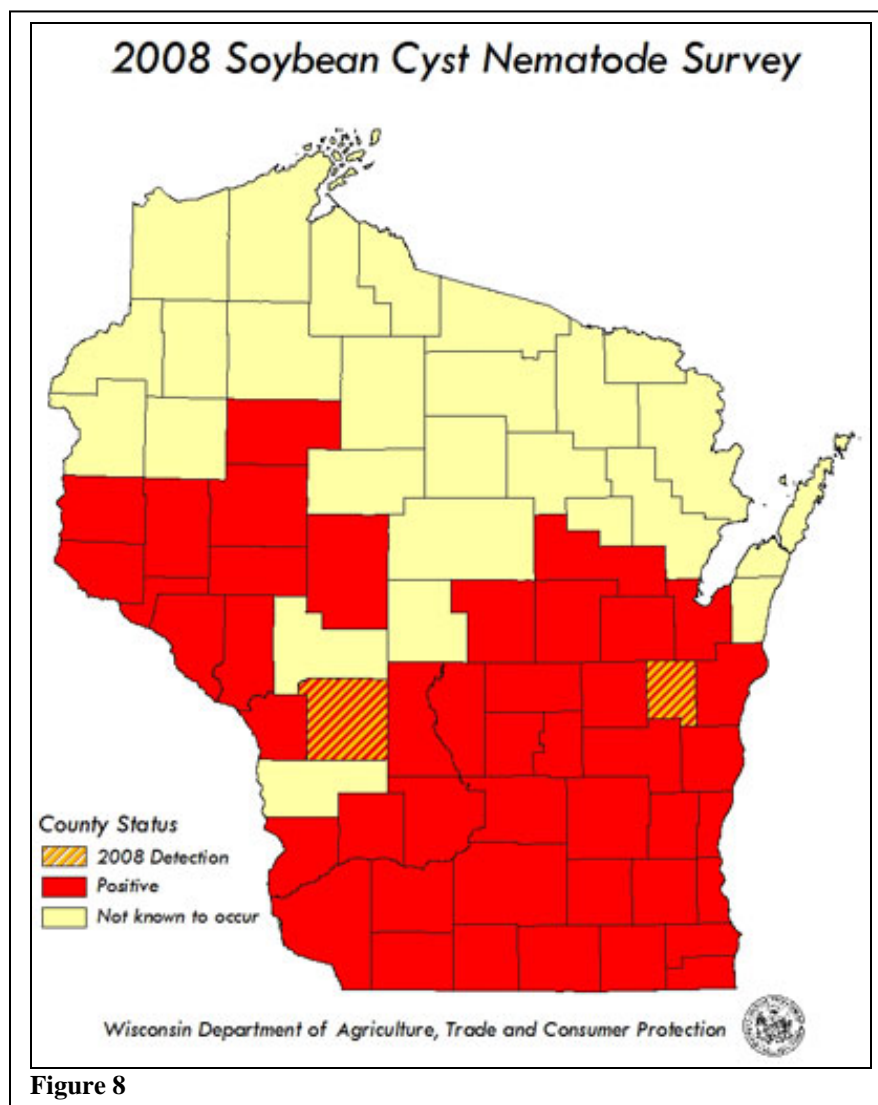


Figure 8