

## 2007 WISCONSIN CROP DISEASE SURVEY

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Plant Industry Laboratory staff diagnoses plant diseases and nematodes of agricultural crops and ornamentals supporting Plant Industry bureau's duties with regard to inspection, survey, disease detection and export certification. 2007 crop highlights are:

Potato Cyst Nematode Survey – No suspects so far.

Soybean Viruses & Asian Soybean Rust – More Soybean dwarf virus but no rust.

Seed Corn – Stewart's wilt in one county.

Soybean Cyst Nematode Map – Still number one economic pest of soybeans!

### Potato Cyst Nematode Survey

During winter of 2006 USDA APHIS initiated an exhaustive nation-wide survey of potato fields for potato cyst nematodes, after Pale potato cyst nematode (PCN) had been detected in Idaho and Golden nematode in Quebec, CD earlier that year. The two cyst nematodes, pale potato cyst nematode (*Globodera pallida*) and the Golden nematode (*Globodera rostochiensis*) are both economically significant quarantine pests. Nematodes are microscopic, worm-like creatures, whose females form an egg-filled resting stage called a cyst. They feed on the roots of solanaceous crops like potatoes, tomatoes and eggplants. Potato Cyst Nematodes are widespread throughout Europe and South America, but are only known to occur in few locations in North America. The Pale potato cyst nematode, in Newfoundland, CD and the Golden nematode in parts of British Columbia, Newfoundland, CD and New York.

The survey was initiated to determine if PCN had spread beyond the newly detected locations and to reassure trading partners of the PCN free status of the majority of potato growing areas in the U.S. The continued export of seed potatoes relies on the certification of potato fields and tubers as being free from these regulated pests. Wisconsin's potato industry contributes \$229 million to the state and it the third largest producer in the U.S. Wisconsin's survey focused on the 8625 acres of seed potato fields plus a small subsample from 68,000 acres of potatoes grown for consumption. DATCP's Fruit & Vegetable Inspectors sampled piler dirt from warehouses in the spring before seed potatoes were shipped. Piler dirt is soil that falls off the potatoes as they travel across conveyor belts for loading. Inspectors collected one five pound bag of piler dirt for each five acres of seed potato field. During the fall harvest, fields growing seed potatoes for export were sampled at a rate of one pound of soil per acres. The samples were taken to DATCP's Plant Industry Laboratory in Madison, where the soil was washed thru screens and examined for nematode cysts under microscopes. Further laboratory analysis was required to differentiate the closely resembling cyst nematodes and any PCN suspects would be sent off for confirmation by the USDA.

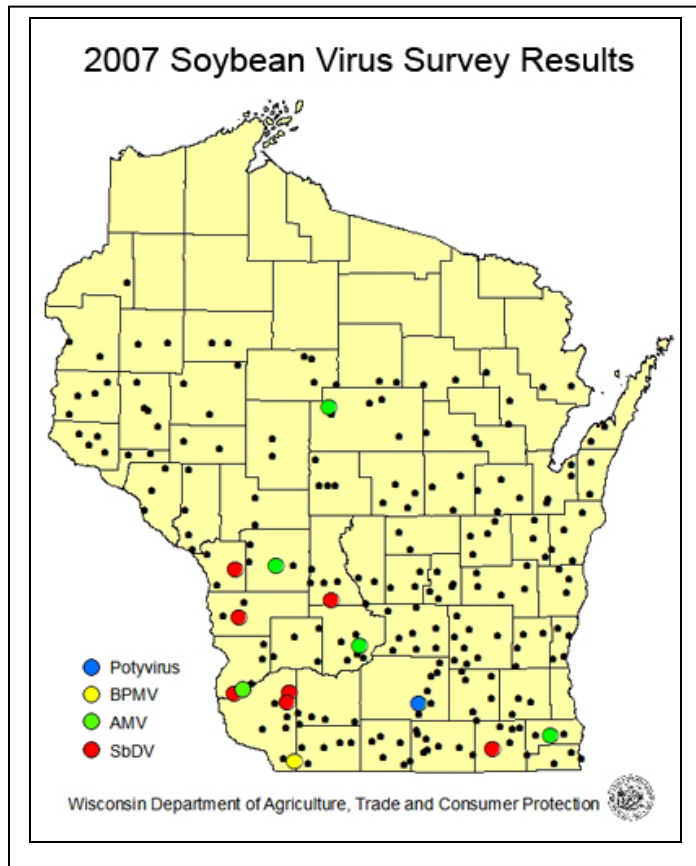
As of December 10, 1700 samples have been screened for PCN and no suspect cysts have been found. This completes 94% of our goal of 1,800 samples representing over 4 tons of piler dirt and soil. The survey is anticipated to be completed before the target date in April 2008. Thank you to the Wisconsin seed potato growers, our dedicated field staff at the Fruit and

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Vegetable Inspection Service in Antigo, a determined crew at the Madison Plant Industry Laboratory, and USDA APHIS for providing generous funding.

### Soybean Virus and Asian Soybean Rust Survey



The introduction of soybean aphids raised concern about aphid-vectored viruses such as Alfalfa mosaic virus (AMV), cucumber mosaic virus (CMV), and the potyviruses: bean common mosaic virus (BCMV), bean yellow mosaic virus (BYMV) and soybean mosaic virus (SMV). Starting in 2002, the pest survey crew has been randomly sampling soybean fields in the R2-R4 growth stage (late July to early August).

The percentage of virus infected fields from 2002 to 2007 is shown in Table 1. In 2007 soybean foliage was tested for BPMV, CMV, and viruses in the potyvirus group using DAS ELISA. AMV and Soybean dwarf viruses, were tested for the first time using a molecular method, reverse transcription (RT) - polymerase chain reaction

(PCR) (1, 2), which can detect lower levels of viral infections than DAS ELISA. SbDV was found for the first time in soybeans in Wisconsin in 2003 (3). In 2007 five fields tested positive for AMV, one for BPMV, one for CMV, one for potyviruses, and seven fields tested positive for soybean dwarf virus (SbDV). One field was positive for both SbDV and AMV. Soybean fields were also scouted for Asian soybean rust (*Phakopsora pachyrhizi*). No Asian soybean rust was observed in any of the 227 fields checked in 2007 in Wisconsin.

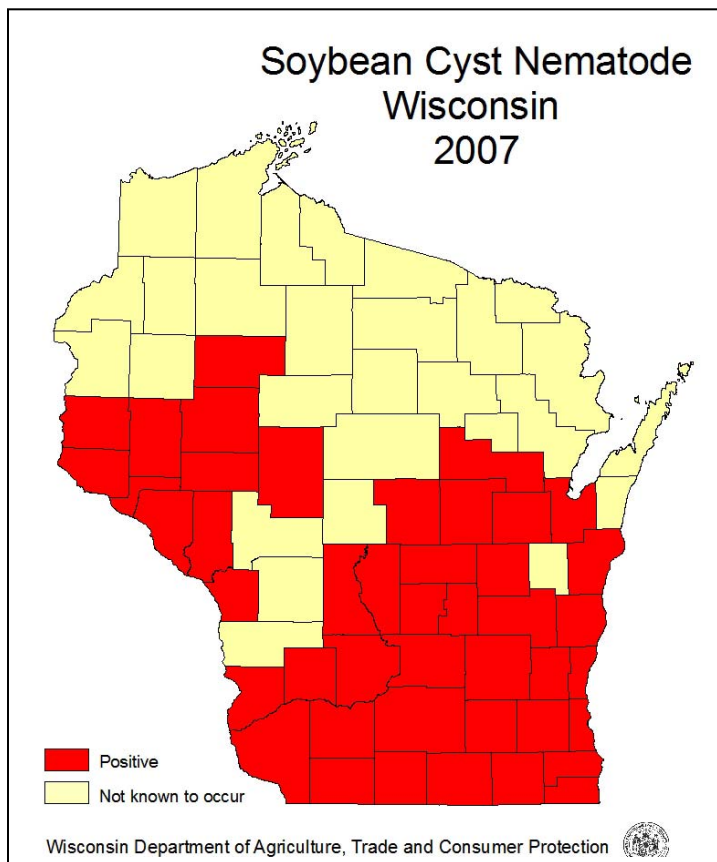
| Fig. 1<br>Year | Total<br>Fields<br>Surveyed | AMV  | BPMV  | CMV  | POTY | SbDV |
|----------------|-----------------------------|------|-------|------|------|------|
| 2002           | 177                         | NA   | 29.9% | NA   | NA   | NA   |
| 2003           | 286                         | 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% |

## Seed Corn Survey

In 2007, 75 seed corn fields were inspected for export certification. Foliar samples were tested for Stewart's wilt (*Pantoea stewartii*) and three viruses. Stewart's wilt infected seed is prohibited from export by 23 countries worldwide. This bacterial disease affects susceptible sweet corn varieties and inbred lines, while most hybrid corn is resistant. In 2006 the disease was detected in Grant Co, in 2007 it was detected in Rock Co. Stewart's wilt has been documented in various locations throughout the state over the last 7 years. 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. One location in Dane Co. tested positive for MDMV, which can be transmitted by more than 20 species of aphids. MDMV is known to occur in Wisconsin.

## Soybean Cyst Nematode Survey

Soybean cyst nematode (*Heterodera glycines*), SCN, is by far the greatest yield reducing pest and disease problem in the U.S. In 2006 SCN reduced yields in the U.S. by 124 million bushels including 3.6 million bushels in Wisconsin. At \$6.50 per bushel, the estimated loss in value adds up to over \$23 million in Wisconsin (United Soybean Bd. data [www.unitedsoybean.org/Library/RecentLibraryItems.aspx](http://www.unitedsoybean.org/Library/RecentLibraryItems.aspx)). SCN was first detected in Racine County Wisconsin in 1981. Soybean fields have been surveyed and field soils screened annually ever since. In 2007 established populations of SCN were confirmed in 44 Wisconsin counties, adding Fond du Lac to the list of infected counties. The current map is based on cumulative data collected by WDATCP and the University of Wisconsin. For information about soil testing and SCN management please check the following websites <http://planthealth.info/scnguide/> and <http://www.plantpath.wisc.edu/soyhealth/index.htm>.



## References

1. Martinez-Priego et al. Plant Dis. 88:908, 2004.
2. Harrison et al. Plant Dis. 89:28-32, 2005.
3. Phibbs et al. Plant Dis. 88:1285, 2004.