Wisconsin Department of Agriculture, Trade and Consumer Protection

# Wisconsin Pest Survey Report

## 2008 SOYBEAN VIRUS SURVEY

http://pestsurvey.wi.gov/

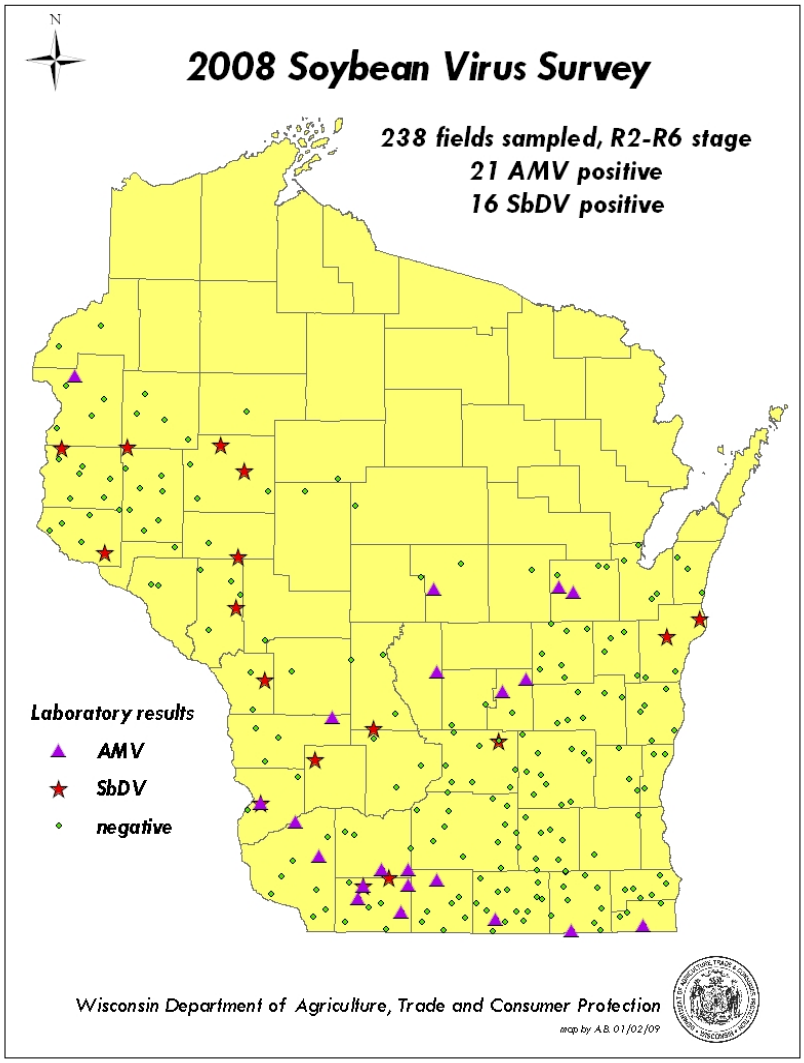


Figure 1. Soybean field locations sampled and tested for AMV and SbDV.

In 2008, the annual state-wide survey of soybean fields for viruses focused on alfalfa mosaic virus (AMV) and soybean dwarf virus (SbDV). AMV is a common virus with many hosts such as alfalfa, peas, clover, potatoes and tomatoes. AMV infested soybeans may be stunted, with distorted or mottled leaves, and have reduced pod number and show seed discoloration. AMV affects seed quality and marketability. AMV can be transmitted by probing aphids, such as the soybean aphid, as well as by seed.

SbDV was found for the first time in soybeans in Wisconsin in 2003 (3). It has a host range of more than 50 plants, including peas, beans, lupines, clovers, beets and spinach. SbDV is present in forage legumes in the eastern U.S. More recent finds document SbDV in soybeans and clovers in the Midwest. SbDV causes severe yield losses of soybeans in northern Japan, where it has effective aphid vectors. SbDV requires persistently feeding, colonizing aphids to spread from host to host and plant to plant. SbDV is not known to be transmitted by seed. How SbDV is transmitted to soybeans in the United States is not really understood at this point. The only known colonizing aphid in soybeans is the soybean aphid. Aphid transmission is the focus of intense research by USDA ARS virologists.

Since 2003, soybean fields have been surveyed annually for SbDV to document the prevalence of this new virus. 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 allows 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, 2).

**Figure 1** shows the locations of all fields sampled and tested for AMV and SbDV, and indicates positive sites. Sixteen fields throughout the state tested positive for SbDV. PCR testing revealed that all positive fields were infected with the dwarfing strain of SbDV. The number of infested fields increased from 3.1% in 2007 to 6.7% in 2008 (**Figure 2**). To our knowledge, no visual symptoms such as dwarfing or chlorosis attributable to SbDV have been observed in Wisconsin soybean fields. Twenty-one fields tested positive for AMV. This is a considerable increase, from 2.2% in 2007 to 8.8% in 2008.

| Year | Total No. of Fields Surveyed | AMV | BPMV | CMV | Potyvirus group | 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% |
| 2008 | 238 | 8.8% | NA | NA | NA | 6.7% |

**Figure 2.** Percentage of virus infected fields in Wisconsin from 2002 to 2008.

*References*

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

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