2014 WISCONSIN CROP DISEASE SURVEY

Anette Phibbs[1], Susan Lueloff[1] and Adrian Barta[2]

http://pestsurvey.wi.gov/

DATCP's 2014 early soybean disease survey found the highest level of **Phytophthora root rot** since the beginning of this survey in 2008 and identified four different species of Phytophthora on Wisconsin soybean. Besides the well-known cause of seedling root rot *Phytophthora sojae*, DNA based testing also determined *P. sansomeana* that was first detected in Wisconsin soybeans in 2012, and two additional new species *P. pini* and P. sp. "*personii*".

Forty-six percent (26 of 57) of all fields that were sampled from June 6 to July 16 during early vegetative stages were infected with ***Phytophthora sojae*** (Fig.1). Twenty plants per field were pooled into a single sample. Samples were collected from 57 fields in 35 counties and tested in the laboratory. Ninety-eight percent (56 of 57) of the fields tested showed mixed infections with Pythium, another water mold that causes damping-off.

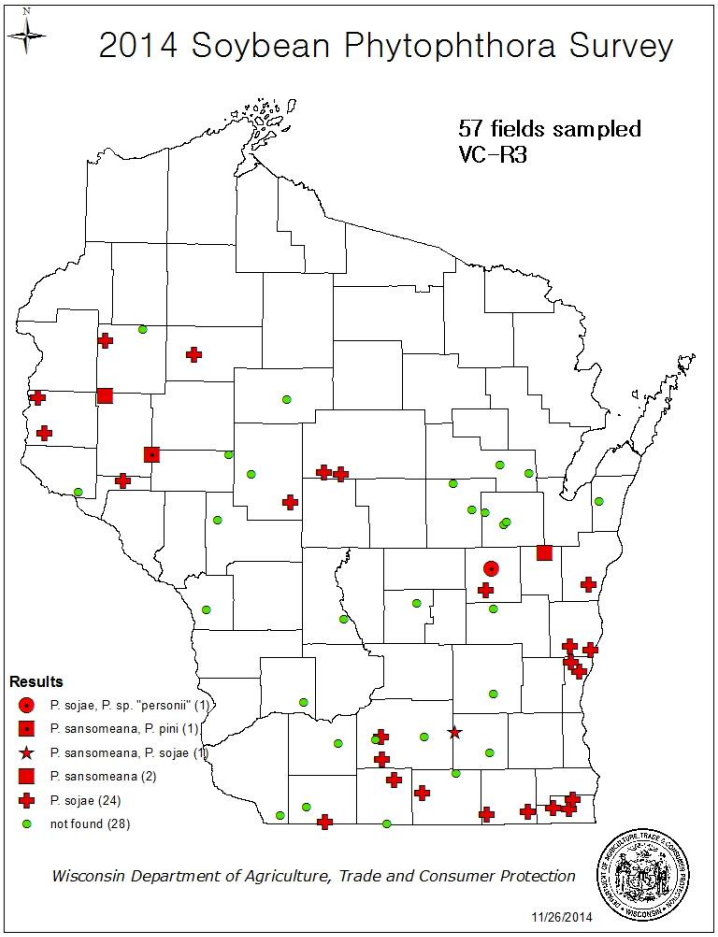


Figure 1

Phytophthora sansomeana was found in four soybean fields in 2014 in Calumet, Dunn, Eau Claire and Jefferson Counties. This pathogen was first detected in Wisconsin soybeans in 2012. *P. sansomeana* has now been documented in soybean fields in nine Wisconsin counties (Dane, Dunn, Calumet, Eau Claire, Green, Jefferson, Marathon, Outagamie and Sheboygan). Unlike *P. sojae* which is specific to soybeans, *P. sansomeana* can infect both soybean and corn, which could lead to a build-up of this pathogen in the soil in a corn-soybean crop rotation. *P. sansomeana* was reported to cause losses on soybean in China (Tang et al 2010). Isolates are being tested on both corn and soybeans at UW-Madison to evaluate pathogenicity under Wisconsin growing conditions.

P. sansomeana has also been detected in Christmas tree plantation on Fraser and Balsam fir in six Wisconsin counties (Clark, Jackson, Lincoln, Manitowoc, Marathon and Price).

[1] Plant Industry Laboratory, DATCP, 2601 Agriculture Dr., Madison WI 53718, anette.phibbs@wisconsin.gov.
[2] Pest Survey Program, DATCP, 2811 Agriculture Dr., Madison WI 53718.

Two additional new species of Phytophthora were isolated from soybean fields in 2014. *P. pini* in Eau Claire Co. and *P. sp. "personii"* in Winnebago Co. In both soybean fields multiple infections were determined, *P. pini and P. sansomeana* in one; *P. sp.* "*personii*" and *P. sojae* in another field. *P. pini* (formerly included in *P. citricola*) is generally considered to be a pathogen of shrubs and trees. The organism survives well in surface waters and could be of concern to nursery production. It probably has been reported as *P. citricola* in this state before. P. sp. "*personii*" is new to science and has yet to be formally described. Almost nothing is known about its host range. To the best of our knowledge it has never been found in Wisconsin. Neither species has previously been found on soybeans and their significance for soybean production remains to be determined.

In 2014, soybean root rot reached the highest prevalence since the start of this survey in 2008, finding *P. sojae* in nearly half the fields tested. During the flood-prone spring of 2010 the pest survey team found 38% of fields infected. The high level of *P. sojae* and the greater pathogen diversity with four different species detected may be due to heavy rainfalls causing saturated soils and relatively low spring temperatures that created favorable conditions for water molds.

Soybean virus survey. During the 2014 soybean virus survey from July 28 to August 28, 155 fields were sampled and tested for three viruses: alfalfa mosaic virus (**AMV**), soybean dwarf virus (**SbDV**) and soybean vein necrosis virus (**SVNV**) (Fig 2 and 3). 37 of 155 (23.87%) fields tested positive for SbDV. That is more than a two-fold increase for SbDV from 2013 (9.27%). It is consistent with the upward trend of this virus since the beginning of the survey in 2003, when SBDV was first detected in Wisconsin (Phibbs 2004). This luteovirus causes significant damage in Japan, but has not been observed to have the same damaging effect on soybeans in the US. The dwarfing strain is the predominant strain in Wisconsin, with few yellowing strain isolates reported. Virus transmission relies on persistently feeding colonizing aphids, such as the soybean aphid in the Midwest. High levels of SBDV infection have been documented in clovers in Wisconsin, making it a possible reservoir for this virus. So far no significant damage to soybean has been associated with SbDV in Wisconsin.

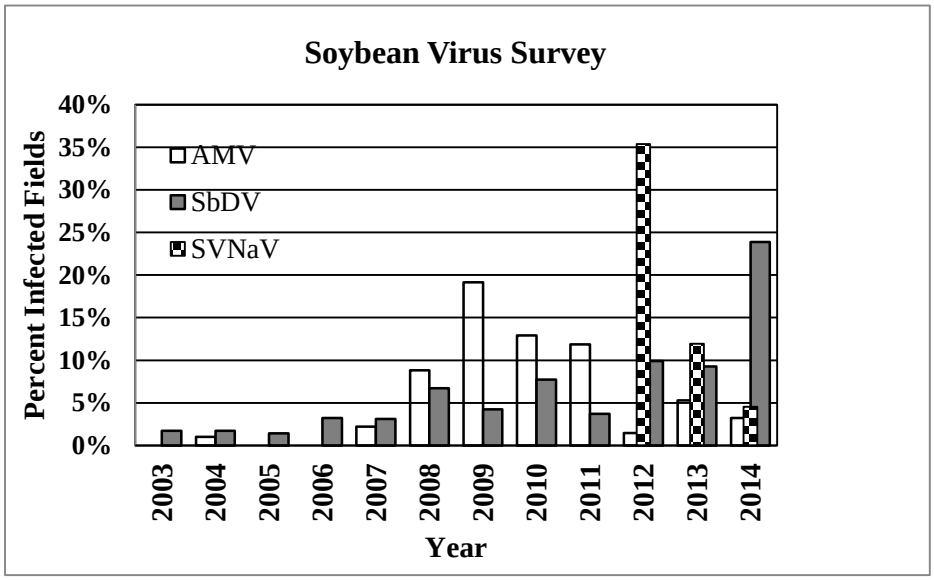


Figure 2

Recent research has proven that **SVNV**, the causal agent for Soybean vein necrosis disease (Zhou & Tzanetakis 2013) is transmitted by soybean thrips. SVNV was detected in seven (4.52%) samples in 2014, which is less than half the number of fields that tested positive in 2013 (11.92%). The highest level with 35.40% fields infected was in 2012, the year SVNV was first detected in Wisconsin (Smith 2013). The arrival of soybean thrips in Wisconsin depends on wind patterns blowing them in from the south. While the hot and dry weather in 2012 was very conducive to thrips reproduction, cold and wet conditions in 2014 kept thrips populations low. First detected in Tennessee in 2008, SVNV has quickly spread throughout the

country's soybean production areas. Other susceptible hosts of SVNV are cowpea, mung beans and ivy-leaved morning glory, a common weed in soybean fields. Control treatment for SbDV or SVNV are not recommended at this time.

Alfalfa mosaic virus has decreased to 3.23% of infected soybean fields in 2014. Several aphid species including soybean aphid can transmit AMV from infected reservoirs such as alfalfa and clovers. AMV can also be introduced by infected seed.

The summer survey of soybean fields did not detect any **Asian soybean rust** (*Phakopsora pachyrhizi)* in Wisconsin in 2014. This rust disease, which has never been found in Wisconsin, was limited to eight states in the southern United States (AR, AL, GA, FL, OK, LA, MS, TX).

Frogeye leaf spot (*Cercospora sojina*), a fungal disease that was first detected in Wisconsin in 2000 (Mengistu 2002), has not been detected during the past two years of survey. In 2010 the disease was found in a record 68% of surveyed fields.

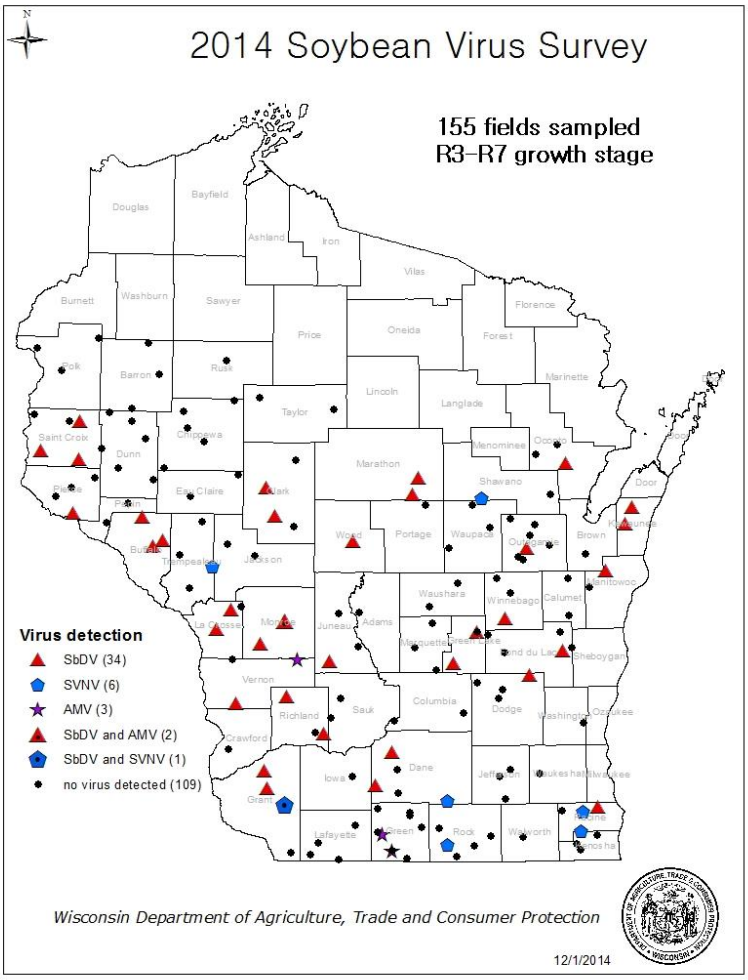


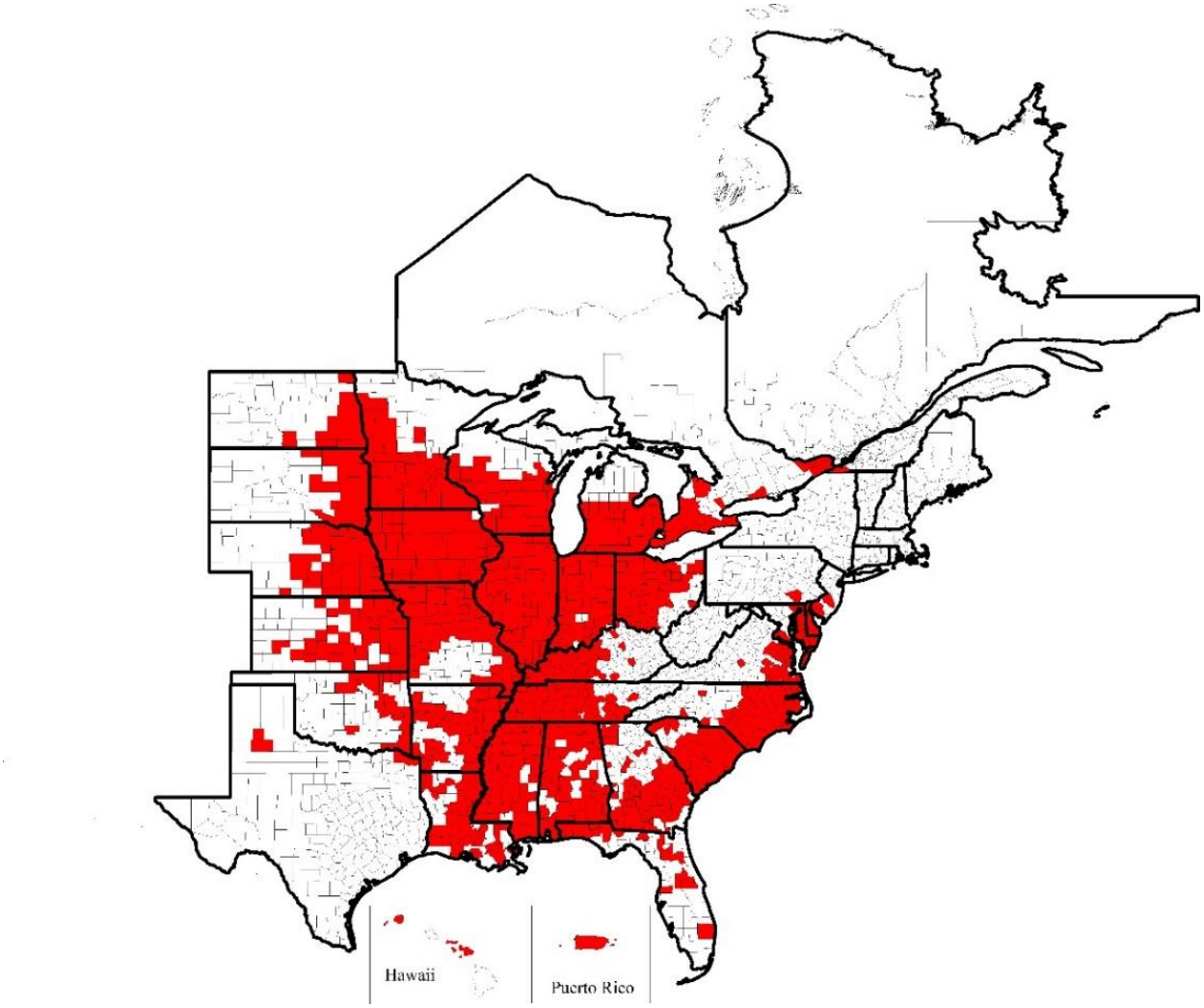
Figure 3

Corn diseases. Field inspections of seed corn and subsequent laboratory testing of corn leaves showed no **Stewart's wilt** in 2014. Ninety-three field plots from eleven Wisconsin counties were tested for two bacterial diseases, Stewart's wilt (*Pantoea stewartii*) and Goss's wilt (*Clavibacter michiganensis nebraskensis*). **Goss's wilt** was found in 11 of 93 (11.8%) leaf samples. Goss's wilt has been found more frequently since 2010. Unlike Stewart's wilt that relies on the corn flea beetle (*Chaetocnema pulicaria*) to spread to new fields and plants, Goss's wilt infection occurs when leaves are injured by heavy winds, rain or hail storms and bacteria splash onto leaves from infected overwintered corn debris. Certain weeds (green foxtail and shattercane) can serve as reservoirs. Important management practices are rotation with non-host crops such as alfalfa, soybean and wheat, also encouraging decomposition of corn stalks and debris.

In 2014 Canada dropped all requirement for imported seed corn to be tested. Other trading partners such as Argentina, Brazil, Mexico, the European Union, Japan and New Zealand still require seed corn testing for a variety of diseases and pests including sugar cane mosaic virus, wheat streak mosaic virus, and high plains virus. None of these viruses were detected in seed fields from eleven Wisconsin counties.

Soybean cyst nematode (*Heterodera glycines*) is widely distributed in soybean growing areas of the United States and Canada. The distribution map in Figure 4 (Tylka 2014) includes Wisconsin's survey data. The current Wisconsin counties where soybean cyst is known to occur include 92% of the state's soybean acres. Soybean cyst nematode **(**SCN) remains the most damaging pest on soybeans and growers in all counties are urged to test fields to assess nematode pressure. Soil testing is offered thru the University of Wisconsin. Since Canada rescinded the requirement for phytosanitary certification for SCN on Nov 25, 2013, testing for export certification is no longer a requirement for soybeans, potatoes, root crops, nursery stock, soil and any other commodity shipping to Canada. DATCP will continue to offer testing for companies that trade with countries that require SCN certification.

Figure 4. Soybean cyst nematode distribution in the US and Canada. (Tylka & Marett 2014)



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