



WISCONSIN DATCP

REPORT TO THE CENTRAL PLANT BOARD

2012

EXOTIC PEST UPDATE

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HIGHLIGHTS OF 2011

- *Gypsy moth trap counts increase by 39%...pg 3*
- *Viruses increasingly common in Wisconsin nurseries...pg 4*
- *Soybean aphid populations decline to lowest levels since 2004...pg 6*
- *Two new *Phytophthora* species found in Christmas tree fields...pg 10*

Emerald Ash Borer

Detection trapping in 64 Wisconsin counties found beetles on four separate traps in Racine County and on one trap in La Crosse County. An infestation affecting six ash trees was also discovered in the City of Kenosha in July 2011. Established populations of the emerald ash borer have now been confirmed in Brown, Crawford, Kenosha, La Crosse, Milwaukee, Ozaukee, Racine, Vernon and Washington counties. Figure 1 illustrates the approximate detection sites since 2008 and the quarantined areas of the state.

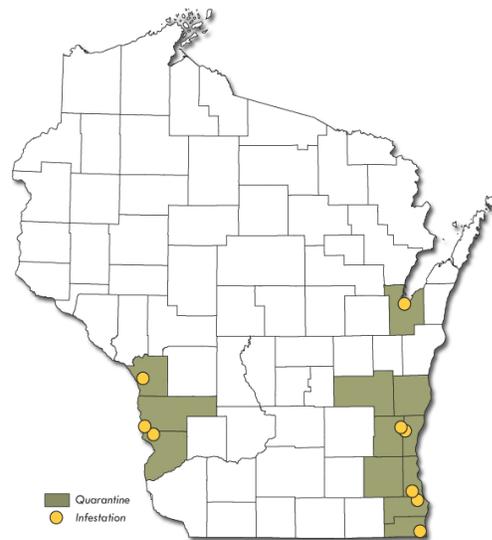


Figure 1. Emerald ash borer detection sites 2008-2011 and quarantined counties.

Spotted Wing Drosophila

A late-season trapping survey in October yielded two new county records. Six specimens were captured in an orchard near Gays Mills in Crawford County, 12 were collected at Stoughton in Dane County, and another two were trapped at McFarland in Dane County. The list of Wisconsin counties in which spotted wing drosophila has been found since 2010 also includes Racine County.

Gypsy Moth

Aerial surveys found no apparent gypsy moth defoliation last year, despite a considerable increase in larval populations. In 2010, larvae defoliated 346,749 acres, greatly surpassing the previous record of 65,000 acres set in 2003. Forested areas that suffered heavy defoliation in 2010 showed little or no tree mortality due in part to adequate rain late in the season, which helped alleviate tree stress. Severe defoliation is predicted for oak forests in northern Bayfield County in 2012.

Cephalosporium Stripe on Wheat

The first confirmed case of *Cephalosporium stripe* on wheat in Wisconsin was found in 2011, in Rock County. Samples collected from the positive field were conclusively identified at the DATCP Plant Industry Laboratory and verified by the UW-Madison. Infections of this disease have been suspected over the years but never confirmed by laboratory analysis. Symptoms were found in only one of 42 fields surveyed.

Japanese Beetle

Populations in the southeastern, south-central and northwestern counties were higher than normal last season. Reports of extensive damage to fruit and shade trees, field crops and ornamental plants were common in July and August. Above-average rainfall in 2010, which favored the larval stages, and absence of sufficient natural control organisms appear to have been the principal reasons for the abundance of beetles in 2011.

Sirex noctilio

Lindgren funnel traps placed at 124 sites, including the ports of entry in Green Bay, Milwaukee and Superior, were negative last year. The European woodwasp has not been detected in Wisconsin in the six-year history of the trapping survey.

EMERALD ASH BORER



Emerald ash borer galleries

Emerald ash borer (EAB) was identified in the state on August 1, 2008 and now occurs in portions of Brown, Crawford, Kenosha, Milwaukee, Ozaukee, Vernon and Washington counties. Infestations have been verified in six locations in southeastern Wisconsin, one location in east-central Wisconsin, and two locations in southwestern Wisconsin, for a total of nine sites. A quarantine remains in effect in the seven counties listed above, and in the counties of Fond du Lac, Racine, Sheboygan and Waukesha, which border the infested areas.

The Department of Agriculture, Trade and Consumer Protection (DATCP) conducted EAB detection work in 64 counties of the state in 2011 using a combination of purple panel traps and visual surveys. New infestations were discovered near Medary in La Crosse County and Caledonia in Racine County, an area already impacted by the EAB quarantine.

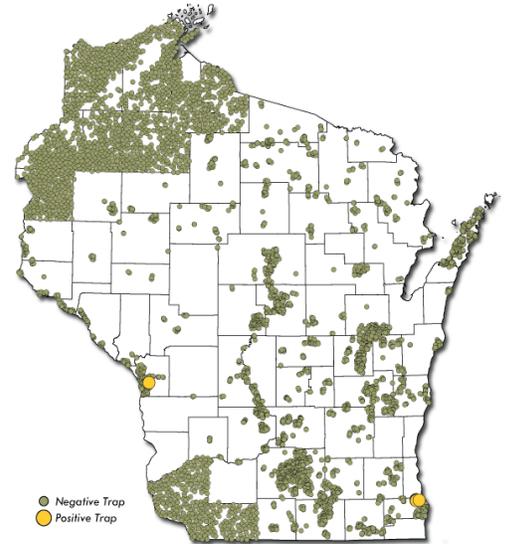


Figure 2. Emerald ash borer trapping survey, 2011.

Trapping by 22 forestry technicians resulted in the capture of 17 specimens, six in La Crosse County and 11 in Racine County. A total of 5,346 panel traps were deployed. To date, the program has set 23,722 panel traps, peeled 2,405 ash trees, and inspected 451 sites for EAB (Figure 2). Cumulative results over the last five years include 22 positive traps and 120 sites with infested ash trees.

Emerald ash borer has killed over 50 million ash trees since it was first detected near Detroit, Michigan in 2002 and currently infests 15 states and two Canadian provinces. It is one of the most serious environmental threats facing forests in Wisconsin and throughout North America. The USDA Forest Service estimates the economic costs associated with treatment, removal, and replacement of millions of ash trees could affect 25 states and exceed \$10.7 billion by 2019.

Emerald ash borer was detected in two new locations in 2011, in La Crosse and Racine counties.

GYPSY MOTH

The Cooperative Gypsy Moth Program consists of field surveys to trap male moths and locate egg masses, and aerial treatments to kill young larvae or disrupt mating. Annual trapping survey results indicate population densities close to the leading edge of the gypsy moth's advancing front and are used to prioritize future treatment sites in western Wisconsin. Program statistics documented a marked rise in moth counts in 2011, but a decrease in the rate of gypsy moth spread.



Gypsy moth larva

Slow-the-Spread Treatments

The Slow-the-Spread (STS) Program's strategy is to eradicate isolated or low-level populations west of the "STS Action Zone" and delay spread of the gypsy moth within the zone to 10 km per year. In 2011, the program treated 233,857 acres (82 sites) in 23 counties. Aerial treatments of Btk totaled 53,852 acres, Gypchek applications totaled 2,577 acres, and mating disruption totaled 181,920 acres. Applications began on May 23 and were completed by July 19. The average rate of spread across Wisconsin in 2011 was 10.64 km, a decrease from 12.36 km in 2010 (Table 1).

GYPSY MOTH *continued...*

Although moth counts and larval populations were significantly higher in 2011, no part of the state suffered severe defoliation. The STS Program has successfully reduced the rate of natural spread in the last decade to an average of 14.6 km per year, a nearly 50% reduction from 28 km in the years prior to its implementation in 2000.

Table 1. Rate of gypsy moth spread in Wisconsin (km), 2007-2011.

Year	Northern WI	Central WI	Southern WI	State Average
2007	63.85	10.46	16.30	30.20
2008	68.46	46.48	38.82	51.25
2009	-15.71	-26.69	-15.27	-19.01
2010	21.34	18.55	-2.87	12.36
2011	20.63	-1.23	12.51	10.64



Gypsy moth defoliation

Suppression Treatments

The Suppression Program is a voluntary, cost-shared aerial treatment program directed by the Wisconsin Department of Natural Resources in the quarantined eastern areas of the state. Objectives of the program are to suppress larval populations and limit severe defoliation in targeted areas. During the 2011 season, a total of 2,885 acres (37 spray blocks) in eight counties were treated. Of these acres, approximately 2,285 were treated with Btk and 600 were treated with Gypchek. Suppression activities were conducted from May 24 to June 2. Subsequent evaluation of the sprayed areas found treatments were 100% effective against defoliation.

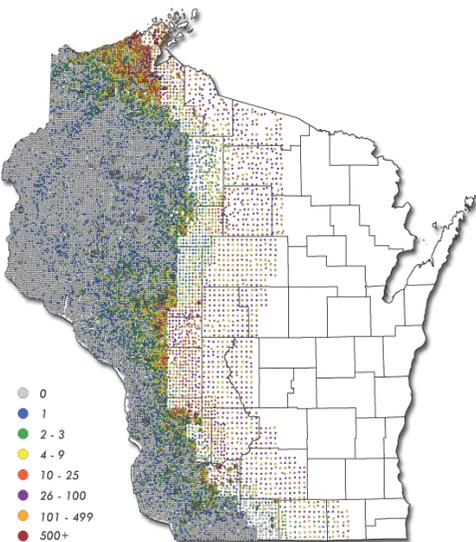


Figure 3. Male gypsy moth trap counts, 2011.

Trapping Results

The annual trapping survey in 48 counties revealed a 39% increase in the number of male gypsy moths captured, from 142,409 moths in 2010 to 233,990 in 2011. The largest increases occurred in the central counties of Clark and Jackson, and in the northern counties of Ashland and Bayfield. Decreases were documented in a few northwestern and southern counties. Most of the 25,001 pheromone traps were distributed throughout western Wisconsin to identify low-level populations and to measure the advance of the gypsy moth (Figure 3).

Defoliation

Aerial surveys found no visible defoliation in 2011. This result was unexpected and a sharp contrast from the previous year when a record 346,749 acres of defoliation were observed in northeastern, central and south-central Wisconsin. Reports from DNR Forest Health Specialists indicate that tree recovery was excellent in areas of the state heavily defoliated by gypsy moth larvae in 2010. Based on the results of DATCP's 2011 fall egg mass surveys, serious defoliation is anticipated in portions of northern Bayfield County in 2012.

Gypsy moth traps registered 233,990 moths in 2011, a substantial increase from 142,409 moths in 2010.



Gypsy moth spray plane

NURSERY INSPECTION

The Nursery Stock Dealer and Grower Inspection Program provides regulatory inspection of licensed retail and wholesale nurseries to ensure the production and sale of healthy, insect- and disease-free plants. Inspectors enforce licensing requirements and issue certificates needed to facilitate movement of nursery stock in trade.



Japanese beetles

Program personnel inspected 396 fields of the 679 licensed nursery growers in the state last season, a decrease from 470 in 2010. A total of 442 of the 1,761 licensed nursery dealers were inspected compared to 574 in the previous year. No new or exotic pests were found in association with Wisconsin nursery stock in 2011.

Japanese Beetle

Beetle counts in Wisconsin nurseries increased sharply after a two-year decline. The nursery trapping survey yielded an average of 238 beetles per trap, a 47% increase from 127 per trap in 2010. High counts of 201 or more beetles per trap were registered in Grant, Kenosha, Pierce, Racine, Rock, Sauk, Walworth and Waukesha counties. Moderate counts of 51-200 beetles were found in Columbia, Dane, Dodge, Eau Claire, Iowa, Jefferson, Manitowoc, Marquette and St. Croix counties. Twenty of the 37 counties trapped averaged fewer than 50 beetles per trap and eight counties reported no beetles.

Oriental Beetle

The number of Oriental beetles collected at garden centers also increased significantly, from 19 in 2010 to 55 in 2011. Twenty one were trapped in Racine County, 16 in Dane County, 10 in Milwaukee County, 6 in Ozaukee County and 2 in Kenosha County. Surveys in 15 additional counties were negative.

Viruses

Plant viruses have become an increasing problem in the Wisconsin nursery trade. Nearly half (101 of 224) of the nursery stock samples confiscated by DATCP inspectors last season were diagnosed with viruses. Hosta virus X and tobacco rattle virus were again encountered most frequently. Other viruses found were Arabis mosaic virus, cucumber mosaic virus, impatiens necrotic spot virus, rose mosaic virus and tomato spotted wilt virus. All nursery stock expressing viral symptoms was removed from sale and destroyed.

Japanese beetle counts in Wisconsin nurseries increased sharply after a two-year decline.

PHYTOSANITARY CERTIFICATION



Corn gluten meal

The Phytosanitary Certification Program serves Wisconsin exporters of plants and plant commodities by certifying their shipments as free from regulated pests. Last year the program was responsible for the export of over \$615,102,572 in plants and plant products. Demand for phytosanitary certification declined from record levels in 2010, but remained comparatively high in 2011. The number of certificates issued was 6,892, a 17% decrease from 8,290 in 2010. Southeast Asia (Indonesia, Malaysia, Philippines, Thailand, Vietnam), Taiwan and China were the destination countries for more than 72% of the phytos issued (Figure 4). Soybean grain accounted for the largest percentages of phytos (33%), followed by corn grain (18%), kiln dried lumber (17%), corn distillers dried grain (9%), and corn gluten meal (6%). No Wisconsin commodities were rejected or destroyed at destination ports in 2011, an indication of the accuracy and efficiency of the Certification Program.

PHYTOSANITARY CERTIFICATION *continued...*

Annual summary of certificates issued

A total of 6,892 certificates were issued in 2011

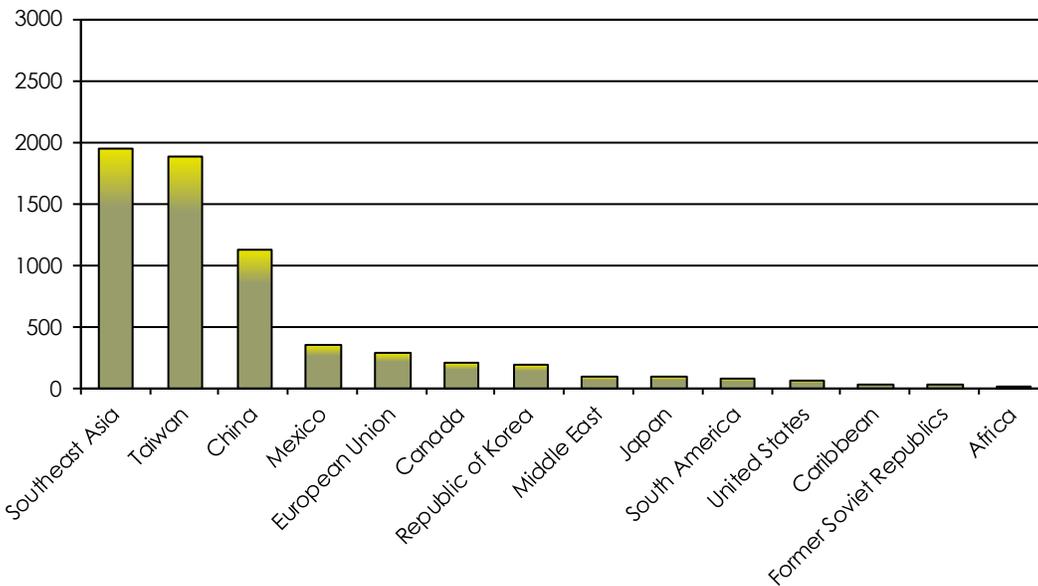
6,489 Federal Certificates

- 66 Processed Plant Product Certificates
- 6,392 Phytosanitary Certificates
- 31 Re Export Certificates

403 State Certificates

- 68 Phytosanitary Certificates
- 335 Plant Inspection Certificates

Figure 4. Total number of phytosanitary certificates issued by DATCP and country destinations.



Corn gluten used as a natural fertilizer

Wisconsin issued phytosanitary certificates for over \$615,102,572 in exports in 2011.

Table 2. Estimated total value of exports, top six countries/regions.

Country	Value	Country	Value
Republic of Korea	\$462,306,191	China	\$71,092,548
Taiwan	\$267,409,901	Thailand	\$54,040,909
Indonesia	\$112,709,386	Vietnam	\$47,115,692

FIELD CROP INSECT SURVEY

The Pest Survey Program was established to provide timely information on the abundance and distribution of important pests of Wisconsin field crops. During the growing season, surveys are conducted in alfalfa, corn, potatoes, small grains, snap beans and soybeans. Information acquired through these systematic surveys is used to alert growers and other agriculture professionals to pest



Spotted cucumber beetle

FIELD CROP INSECT SURVEY *continued...*

occurrence and outbreaks, determine pest trends affecting agricultural management practices, and certify Wisconsin plants and plant products entering trade are free from regulated pests. The program also participates in plant disease and insect survey projects in cooperation with the United States Department of Agriculture and the University of Wisconsin.



Western corn rootworm beetles

Corn Rootworm Beetle

Results from the annual beetle survey showed a substantial population increase in the southern and central districts. The state average beetle count of 0.7 per plant represents a more than two-fold increase over the historic low average of 0.3 per plant documented in 2010. The largest increase occurred in the south-central district where the average escalated sharply from 0.3 to 1.4 beetles per plant. Population increases were also noted in the southwest, southeast, west-central, central, east-central and northeast districts. By contrast, beetle counts in the northwest and northeast areas were extremely low at 0.1 per plant. The survey findings suggest that southern and central Wisconsin corn producers will need to consider crop rotation or another form of rootworm management in 2012 (Figure 5).

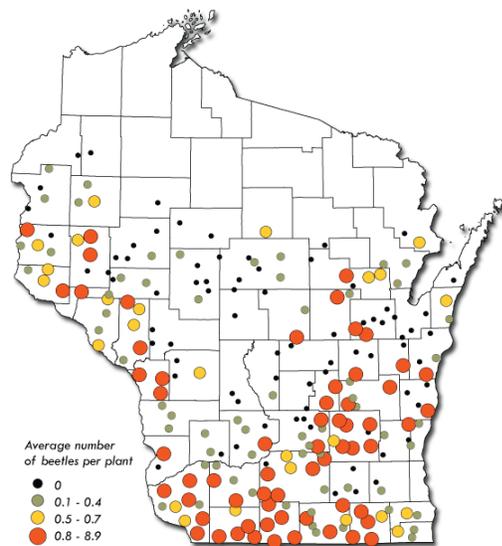


Figure 5. Corn rootworm beetle survey, 2011.

The annual soybean aphid survey found the lowest state average aphid population since 2004.

European Corn Borer

Larval populations remained historically low in 2011. The seventieth annual fall abundance survey in September revealed a state average of 0.09 borer per plant, the fourth lowest since record-keeping began in 1942. Minor population reductions from 2010 were charted in the southwest, central and northeast agricultural districts and increases occurred in the south-central, southeast, east-central, north-central and northwest. Larval densities in the south-central area increased to 0.20 per plant, or 20 larvae per 100 plants. On the basis of the fall survey results, a continued low population trend is expected for 2012.

Corn Ear Drop

Low to moderate rates of ear drop were documented in scattered corn fields last fall. The statewide average incidence was less than 4% and severity was 10%, but individual fields had severity levels as high as 28%. European corn borer shank tunneling was the leading cause, although drought stress in August accounted for much of the ear drop observed in south-central Wisconsin corn fields.

Soybean Aphid



Soybean aphids

Densities remained below economic levels last season. The annual survey conducted in July and August showed the state aphid count to be 12 per plant. This average compares to 16 aphids per plant in 2010 and is only marginally higher than the record low density of 11 per plant documented in 2004. Soybean fields were sampled in two intervals, first in late July and again in August, for a total of 284 observations in 142 fields. Aphid densities were below 103 per plant in all surveyed fields, with the exception of a single Portage County site which had an average count of 451 per plant on July 29. Natural control agents, insecticidal seed treatments, high temperatures, and several heavy precipitation events all limited soybean aphid population growth in 2011.

FIELD CROP INSECT SURVEY *continued...*

Black Cutworm

Migrants were detected in the state by April 6 and an initial cutting date of May 30 was anticipated based on an April 11 biofix. The spring trapping survey registered 2,090 moths in 30 traps from April 1-June 1, with a peak occurring from May 5-9. Subsequent waves of migrants arrived from May 12-16 and May 21-23. Localized infestations developed in corn by early June as a result of the large moth migration and various environmental factors, including delayed planting and late weed control. The threat from this early-season pest subsided by late June.

Western Bean Cutworm

The seventh annual trapping survey registered a 55% reduction in moth counts in the state. The 2011 cumulative capture was 4,895 moths, compared to 10,807 moths in 2010 (Figure 6). Larval infestations were observed or reported in Adams, Chippewa, Clark, Door, Dunn, Eau Claire, Green Lake, Jackson, Marquette, Waupaca and Waushara counties in August and September, but damage to corn was far less common this season.



Black cutworm moth

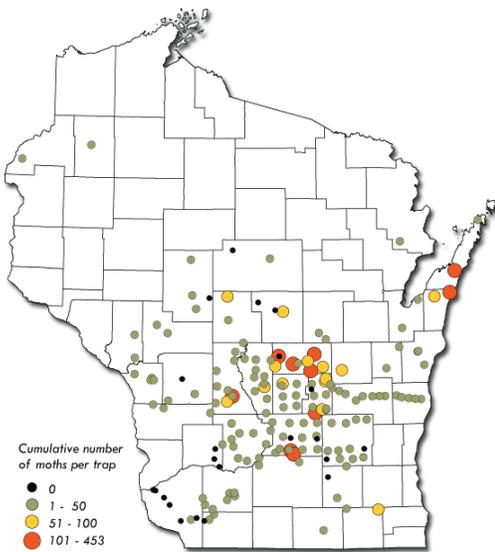


Figure 6. *Western bean cutworm trap counts, 2011.*

Corn Earworm

A lengthy flight began by July 27 and continued through September 21. The eight-week migration yielded a cumulative total of 4,571 moths at 15 sites, with a well-defined peak from August 4-10. Compared to 2010, the flight was smaller and moth activity was more concentrated in the south-central and central counties. Late sweet corn and other susceptible crops such as tomatoes and snap beans remained under a moderate to severe threat until mid-September.

Japanese Beetle

According to surveys and reports, Japanese beetles were far more abundant this season than in the last several years. The largest populations were noted on lighter soils in the southeast, south-central and northwest areas.

Delayed planting, late weed control and the largest moth migration in 10 years resulted in localized black cutworm outbreaks last season.

PLANT DISEASE SURVEY AND DIAGNOSIS

The Plant Industry Laboratory provides plant disease diagnostic services to the Pest Survey Program, the Nursery and Christmas Tree Inspection Programs, as well as the Environmental Enforcement Section. Plant samples with diseases caused by fungi, bacteria, viruses and nematodes are submitted to the lab by DATCP field specialists. The lab also offers testing for phytosanitary certification necessary for domestic and international export of certain plants.

In 2011, laboratory pathologists diagnosed disorders on 370 nursery stock and Christmas tree samples and screened 346 soil and plant samples for pests of field crops. A total of 716 plant and soil samples were processed last year.



Sudden death syndrome of soybeans

PLANT DISEASE SURVEY *continued...*

Phytophthora Root Rot



Phytophthora sojae root and stem rot on soybean

The fourth annual survey for *Phytophthora* root rot of soybean seedlings was conducted in Wisconsin from June 16-July 19. Fifty soybean fields in 30 counties were examined for stunting and wilt symptoms during the early vegetative growth stages. A total of 15 symptomatic samples were collected.

Polymerase chain reaction (PCR) analysis of DNA extracted from the soybean roots revealed two of the 15 were infected with both *Phytophthora sojae* and *Pythium* spp., 11 were infected with *Pythium* spp. only, and two were negative. The *P. sojae*-infected samples were collected from fields in Calumet and Juneau counties, while *Pythium* was found in Chippewa, Eau Claire, Fond du Lac, Kenosha, Monroe, Outagamie, Rock, St. Croix and Waukesha counties (Figure 7). DNA sequencing identified three *pythium* species from the samples, including *Pythium arrhenomanes*, *P. ultimum* and *P. sylvaticum*. All three are pathogenic on soybean seed and seedlings.

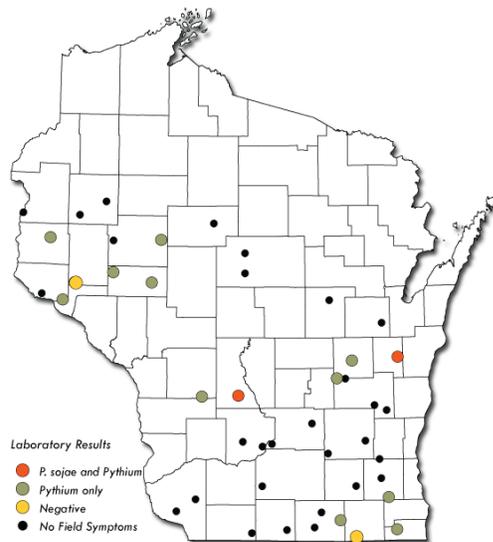


Figure 7. *Phytophthora* root rot of soybean seedlings survey, 2011.

According to the 2011 survey results, the incidence of *P. sojae* in Wisconsin soybeans decreased last year. Only 4% of surveyed fields were infected, compared to 27% in 2010, 18% in 2009, and 20% in 2008. Soybean fields infected with *P. sojae* have been found in all soybean growing regions of the state during the last four years.

Soybean Viruses

Illustrated in the adjacent map are the locations of 135 soybean fields (R2-R7) sampled and tested for alfalfa mosaic virus (AMV) and soybean dwarf virus (SbDV) last season. Sixteen (11.9%) fields were infected with AMV in 2011 compared to 12.9% in 2010. Soybean dwarf virus was found in five fields (3.7%), a decline from 7.7% the year before. Substantially lower populations of the soybean aphid vector may partially explain the decrease in SbDV-infected soybean fields in 2011.

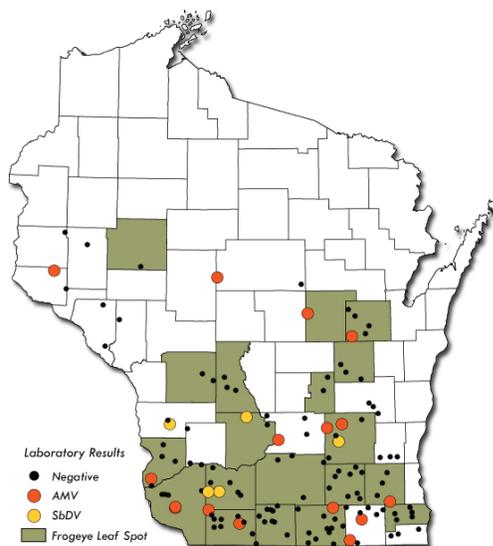


Figure 8. Soybean virus survey results, 2011.

Frogeye Leaf Spot

This foliar disease was prevalent in Wisconsin soybeans again in 2011. Symptoms were observed in 40 of 135 (30%) soybean fields sampled as part of the annual virus survey from late July to mid-September. Detected for the first time in Wisconsin soybeans in 2003, frogeye leaf spot (*Cercospora sojina*) occurred sporadically until 2010, when the disease was found in 68% of surveyed soybean fields. Development of frogeye leaf spot is favored by above-average air temperatures, high relative humidity, and extended periods of wet weather.



Frogeye leaf spot

Phytophthora root rot has infected an average of 17% of the state's soybean fields over the last three years.

PLANT DISEASE SURVEY *continued...*

Soybean Cyst Nematode

Soil from 45 soybean fields was sampled last season for soybean cyst nematode (*Heterodera glycines*), the greatest yield-reducing soybean pest in the U.S. The accompanying map shows areas with known infestations, including the most recent additions of Jackson and Polk counties. The total number of Wisconsin counties with at least one SCN-infested field is now 50 (Figure 9). Soybean acreage in the counties where SCN has been detected comprises 92% of the soybean crop in the state.

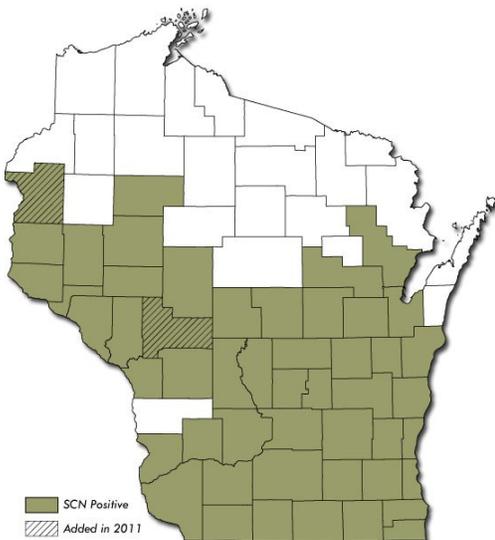


Figure 9. Status of soybean cyst nematode in Wisconsin, 2011.

most commonly observed disease, detected in 22 fields. Symptoms of tan spot were found in six fields, Fusarium head blight was detected in one field, and loose smut was found in one field. Leaf rust was noted at trace levels in five fields. No stem rust or stripe rust was detected during the wheat survey, but both leaf and stem rust were found in one barley field in Columbia County. Other significant finds of the survey were *Cephalosporium* stripe on wheat in Rock County and stripe rust on barberry in Door, Douglas, Sheboygan, St. Croix and Taylor counties, as described below.

Cephalosporium Stripe on Wheat

This fungal vascular wilt of wheat was verified from one wheat field in Rock County in 2011, representing the first confirmed report in Wisconsin. The infected sample was collected by a DATCP survey specialist on May 24 as part of the standard wheat disease survey. Confirmation was made by the Plant Industry Bureau Laboratory, with assistance from the USDA PPQ National Identification Services Mycologist.

Cephalosporium stripe is typified by one to four yellow stripes per leaf, often extending the length of the leaf and continuing to the leaf sheath and stem. Wheat plants infected with this disease are commonly stunted or dwarfed and produce white, poorly-filled heads with distorted kernels. The soil-borne causal fungus, *Hymenula cerealis* (syn. *Cephalosporium gramineum*) overwinters on crop residue and in soil. Disease development is favored by cool, wet spring weather.

The Rock County detection had no regulatory impact since *Cephalosporium* stripe is widespread in the U.S. and occurs in parts of Canada, but this disease may cause yield reductions in susceptible

Corn Wilt Diseases

The Plant Industry Laboratory tested 58 corn leaf samples from 271 seed plot acres for bacterial diseases of export significance in 2011. Goss's wilt infected 20 samples (34%) from fields in Columbia, Dane, Eau Claire, La Crosse and Rock counties. Results for Stewart's wilt were negative. Goss's wilt, a disease historically limited to the Great Plains, continues to spread across the Midwest. This was the second consecutive year that Goss's wilt was fairly common in seed corn in Wisconsin.



Young corn plant with symptoms of Goss's wilt

Winter Wheat Foliar Diseases

Forty-two wheat fields in 10 Wisconsin counties were surveyed for disease presence from May 6-June 28. Wheat fields ranged in maturity from Feekes Stage 5 to 10.5.3. Powdery mildew was the

Goss's wilt was prevalent in Wisconsin seed corn fields for the second year in a row.



Cephalosporium stripe on wheat

PLANT DISEASE SURVEY *continued...*



Emerald carousel barberry

cultivars. Surveys in 41 other wheat fields, including six nearby fields in Rock County, were negative. Review of the field history and management practices provided no evidence as to the origin of the disease. A follow-up survey is planned for 2012.

Stripe Rust on Commercial Barberry

Last season this rust was identified on several containerized ‘Emerald Carousel’ and ‘Golden Carousel’ barberry plants offered for sale in Wisconsin nurseries. Ornamental barberry must be resistant to black stem rust (*Puccinia graminis*) to be legal in trade in the Midwest. The two cultivars that showed signs of infection had undergone testing to ensure resistance to black stem rust and were on the USDA Cereal Disease Laboratory (CDL) approved list. Thus, the rust detections raised concerns about potential resistance failure or the emergence of new and more virulent strains of black stem rust. Further investigation by the Plant Industry Laboratory found the barberries to be infected with stripe rust (*Puccinia striiformis*) and not the regulated species, *P. graminis*. Based upon the cultivars affected, the stripe rust was presumed to be the form species that attacks Kentucky blue grass rather than the form that infects wheat.

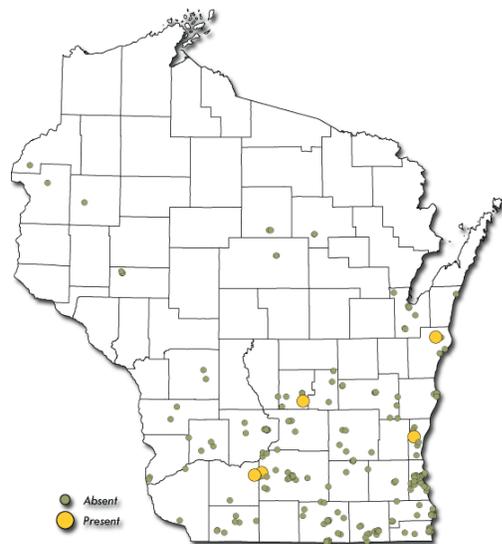


Figure 10. DATCP barberry survey, 2009-2011.

Late blight was confirmed on potato in two Wisconsin counties and on tomato in one county in 2011.

Barberry Survey

Follow-up work on the 1918-1976 USDA and State barberry eradication program continued in 2011. Sample locations from 79 historical barberry eradication sites (based on USDA Form-L records) were revisited. Nineteen sites could not be located or identified in the field. Of the 60 remaining sites, barberry was found at only one site in 2011, a pasture in Iowa County.

Common barberry has now been detected at four of 232 sites visited since follow-up surveys began in 2009, bringing the total of known barberry sites in Wisconsin to seven (Figure 10).

Late Blight

Late blight re-emerged as a plant disease of concern in 2011, after both tomatoes and potatoes were infected in 14 Wisconsin counties in 2010. The state's first report of late blight was on tomato on July 6 in Waukesha County, but no additional cases developed through July and early August. On August 25, a single report of late blight on potato was confirmed in Waushara County and a second



Late blight lesions on tomato leaves



Figure 11. Late blight reports, 2011. DATCP and UW-Madison data.

PLANT DISEASE SURVEY *continued...*

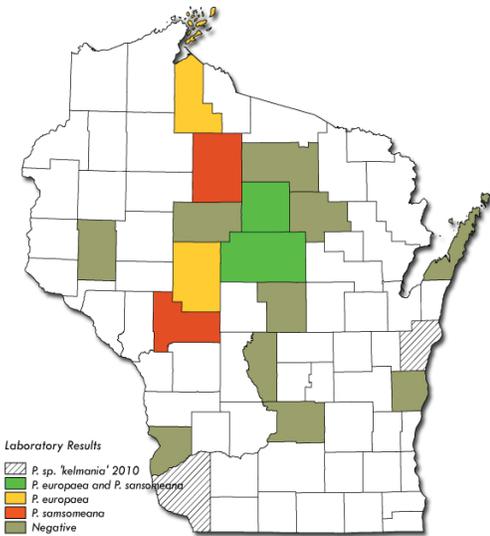


Figure 12. *Phytophthora* root rot of Christmas trees survey, 2011.

case was verified days later in adjacent Adams County. At the end of the growing season, late blight had been confirmed on tomato in one Wisconsin county and on potato in two counties.

New Phytophthora Root Rots of Christmas Trees

A survey for *Phytophthora* root rot in Christmas tree plantings was instituted after the 2010 detection of a new *Phytophthora* species, *Phytophthora* sp. '*kelmania*', in two Wisconsin counties. The sampling protocol was to collect conifers with symptoms of decline during standard Christmas tree field inspections in September and October. A total of 689 fields were inspected last fall; 51 tree samples from 37 fields were collected and analyzed for *Phytophthora* root rot. Fraser firs from 13 fields were found to be positive. Two *Phytophthora* species were identified from the samples, *P. sansomeana* and *P. europaea*, both of which are relatively new to science.



Symptoms of Phytophthora on the lower branches

The first of the two species, *P. sansomeana*, has a host range that includes several agronomic crops and weeds. *Phytophthora sansomeana* has been reported on corn in Ohio, soybean in Indiana, Douglas fir in Oregon, and weeds in alfalfa fields in New York. This finding may have important implications for crop rotation as a disease management strategy.

The second species, *P. europaea*, is associated with European forest soils and has been recovered from oak forests in Minnesota, Pennsylvania, West Virginia and Wisconsin. It is considered a weak pathogen of oak, but the extent of internal wood decay on the fir samples in this survey indicated that *P. europaea* may be more aggressive on Fraser fir. Additional research is needed to evaluate its pathogenicity on conifers.

Members of the genus *Phytophthora* are responsible for a vast range of destructive diseases and are thought to be spread by the plant trade.

Two new *Phytophthora* root rot species were found in Wisconsin Christmas tree fields last season.

APIARY PROGRAM

The Apiary Program monitors the apiculture industry to prevent the introduction and spread of harmful honeybee parasites and diseases. Inspectors examine migratory bee colonies entering Wisconsin from states such as Alabama, California, Florida, Georgia, Michigan, Mississippi and Texas, and those leaving if they are destined for states which require apiary health certification.



Apiary inspection

Program statistics showed considerable decreases in imported colonies and nucleuses, from 36,031 in 2010 to 30,517 in 2011 (including hives imported for pollination), and in imported queens and pack-

APIARY *continued...*



Beekeeper checking a frame of honey bees

ages, from 57,036 in 2010 to 25,981 in 2011. Imports of queens and packages were the lowest since 2006, despite comparable winter losses over the past two years. According to apiarist reports, winter losses were slightly above 50% in 2011 and 53% in 2010.

The statewide survey of apiaries found a decrease in varroa mite-infested hives, from 89% in 2010 to 85% in 2011 (Table 3). A total of 1,045 hives were inspected, 521 in the spring and 524 in the fall. Of the hives examined during the fall survey, small hive beetle (SHB) was found in 3.4% (18 hives) from seven counties: Brown, Calumet, Dodge, Iowa, Jackson, Racine and Vernon.

In addition, hives were inspected for a number of other honeybee pests and diseases, including American foulbrood (AFB), European foulbrood (EFB), chalkbrood, sacbrood, deformed wing virus (DWV), as well as Africanized honeybees and Tropilaelaps mites. American foulbrood was found in 4.0% of hives, EFB was found in 1.3%, chalkbrood was found in 3.5%, sacbrood was found in 1.4%, and DWV was found in 3.7% (Table 3). No Africanized honeybees or Tropilaelaps mites were detected during the annual survey.

Table 3. Annual apiary inspection results, 2007-2011.

Year	2007	2008	2009	2010	2011
No. hives checked	971	1288	1334	950	1045
Varroa mite	79%	82%	92%	89%	85%
Small hive beetle	0.3%	0.6%	2.6%	3.2%	3.4%
American foulbrood	4.5%	2.2%	4.5%	1.1%	4.0%
European foulbrood	1.4%	0.5%	0.5%	1.1%	1.3%
Chalkbrood	8.1%	6.4%	5.6%	2.4%	3.5%
Sacbrood	2%	2.7%	1.6%	1.1%	1.4%
Deformed wing virus	8.1%	4.9%	8.3%	7.6%	3.7%

Apiary inspections found increases in small hive beetle, American foulbrood, chalkbrood and sacbrood in 2011.

CHRISTMAS TREE INSPECTION



Broom rust spores on balsam fir

By licensing, inspecting and certifying Christmas trees as being reasonably free from injurious insects and diseases, the Christmas Tree Program provides a valuable service to interstate and international exporters who require certification to ship trees from Wisconsin. Growers of trees marketed locally also benefit by receiving routine inspections that identify incidence and severity levels of a wide range of non-regulated insects and diseases affecting their trees.

Annual inspections begin after the gypsy moth egg mass deposition period, usually by early September. In addition to Christmas tree fields, program staff closely examine fencerows and woodlots adjacent to fields for evidence of gypsy moth and pine shoot beetle. Growers who request plant health certification for interstate export of trees are given priority.

CHRISTMAS TREE INSPECTION *continued...*

In 2011, the number of fields inspected increased by 4% (Table 4). Fewer Christmas tree fields were infested with gypsy moth (GM) than in 2010, while pine shoot beetle (PSB) was detected at three sites compared to one in the previous year. Fir broom rust, *Rhizosphaera* needle cast and white pine blister rust were the most prevalent diseases observed. The most common insects noted during inspections were balsam twig aphid, white pine weevil and balsam gall midge.

Table 4. Christmas tree inspection results, 2007-2011.

Year	No. Fields Inspected	No. Fields with GM	No. Fields with PSB
2007	814	45	9
2008	736	39	0
2009	617	26	2
2010	663	20	1
2011	689	18	3



White pine weevil damage

Top 10 Christmas tree pests found in 2011 (followed by number of fields affected out of 689):

DISEASES: Broom rust (71), *Rhizosphaera* on fir (71), *Rhizosphaera* on spruce (71), white pine blister rust (58), *Lirula* needle cast (36), pine gall rust (35), brown spot needle blight (24), root rot (20), *Cyclaneusma* needle cast (12), and spruce needle drop (12).

INSECTS & ABIOTICS: Balsam twig aphid (145), white pine weevil (90), balsam gall midge (87), Eastern spruce gall adelgid (58), pine needle scale (27), Zimmerman pine moth (15), spider mites (9), eriophyid mites (9), spruce needle miner (8), and pine shoot moth (8).

Broom rust and *Rhizosphaera* were the most common diseases in Wisconsin Christmas tree fields last year.

POTATO ROT NEMATODE

During the 57-year period since the potato rot nematode (PRN) was first identified in Wisconsin, the overall incidence of this pest has decreased significantly. From 1953-1963, a total of 68 infested fields were detected, but only 41 have been found in the last 48 years. Program specialists inspect an average of 13 fields per year and detect about one infested field annually. Today, there are a total of 3,014 acres with a history of PRN infestation. Of these acres, 95% are located in Langlade County, the largest seed potato production area in the state.

Eight potato fields totaling 414 acres were inspected in 2011. All fields were negative for PRN. Three of the eight fields were released as certified seed potatoes after fumigation and two successive potato crops showed no evidence of the pest. The other five fields, all entering seed potato production for the first time, were inspected as a requirement of the certification process.

The Potato Rot Nematode inspection and quarantine program has played a major role in limiting spread of the PRN since 1953. Due to the program's effectiveness, this pest has never been intercepted in shipments of commercially grown potatoes or seed potatoes from Wisconsin.



Potato preharvest inspection

BIOLOGICAL CONTROL & WEEDS

Biological Control Efforts



Release of leafy spurge biological control agent

Biological agents for control of spotted knapweed and leafy spurge were introduced at nearly 200 new locations last year. An estimated 58,000 spotted knapweed weevils (*Larinus* spp.) were released in July at 147 sites along the Hwy 39/51 corridor from Portage to Wausau, and next to Hwy 22 in Columbia, Marquette and Waushara counties. Another 43,000 leafy spurge agents were introduced at 43 sites in 11 counties. The effort was largely funded by the Department of Transportation and carried out by DOT and DNR personnel. The objective of the biological control program is to establish natural enemies of leafy spurge and spotted knapweed for eventual localized control of these invasive species.

Invasive Weed Surveys

Statewide distribution records were collected in 2011 for three highly invasive weeds: poison hemlock, teasel spp., and wild parsnip. A total of 1,996 site observations were made in 62 counties.

As anticipated, wild parsnip was the most common of the species, observed at 23% of surveyed sites, followed by teasel (1%), and poison hemlock (0.2%). Most wild parsnip was noted in the southwest and south-central districts where an average of 44% and 49% of sites were infested, respectively. In the central and northern areas, invasion by wild parsnip was uncommon and only 2-9% of sites were infested. A map depicting the occurrence of wild parsnip is shown here.

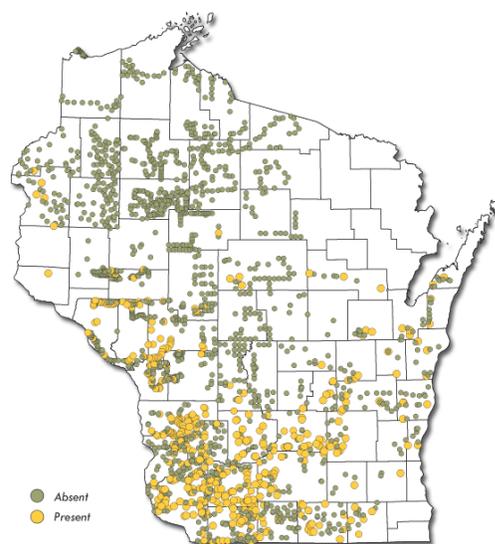


Figure 12. DATCP wild parsnip survey, 2011.

SEED COMPLIANCE ACTIONS TAKEN IN 2011:

- 9 seed lots were relabeled to meet compliance standards
- 12 lots were removed from sale by the labeler
- 9 lots were returned to the labeler
- 2 lots were sold and planted before compliance actions could be taken

SEED CONTROL

The Seed Control Program monitors and enforces labeling, germination and purity requirements to assure quality seed is sold in Wisconsin. Field inspectors perform a range of duties, such as evaluating labels for compliance, issuing stop sale orders, and collecting official samples for analysis.

Three hundred and thirty-six samples from 163 of 727 licensed labelers were collected by DATCP inspectors in 2011. Seed labelers with poor compliance records or an increasing number of violations, as well as those not sampled in the last two years, were targeted for sampling. The annual violation rate was 10%, which represents a 2% decrease from last season. Of these violations, two were rated as *technical*, 11 were rated as *minor*, and 20 were rated as *serious*.

All licensed labelers in the state are sampled or inspected on a three-year rotation. The program currently inspects an average of 33% of the 727 labelers annually, and samples approximately 14%.

