

BUREAU OF PLANT INDUSTRY

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ANNUAL REPORT 2019

Wisconsin Department of Agriculture, Trade and Consumer Protection
2811 Agriculture Dr., Madison, WI 53708 | <https://datcp.wi.gov>



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Plant Industry Bureau PROGRAMS

Description and Major Duties	2019 Highlights
<p>The Apiary Program monitors honey bee hives to prevent the introduction and spread of harmful pests and diseases. Inspection services are offered to all beekeepers, though emphasis is placed on package-bees entering Wisconsin in spring, and migratory bee colonies leaving in fall that require apiary health certification.</p>	<ul style="list-style-type: none"> • 204 beekeepers inspected • 3,398 hives opened for inspection • 98 inspection certificates issued for 39,815 migratory hives
<p>The Christmas Tree Program licenses Christmas tree growers, inspects, and certifies trees as being free of damaging insects and diseases. Provides required certificates to interstate and international shippers. Local sellers benefit by receiving information on pests and diseases. Christmas tree lots, wreath, and roping producers who request plant health certificates are also inspected.</p>	<ul style="list-style-type: none"> • 362 licensed Christmas tree growers • 480 fields inspected: gypsy moth detected in 41 fields; pine shoot beetle detected in 2 fields
<p>The Export Certification Program inspects and certifies plant products for interstate or international shipment. Program staff maintain knowledge of commodity-specific plant pest regulations and assist customers in understanding important standards for over 200 countries. The program ensures the safe export of pest-free Wisconsin agricultural products.</p>	<ul style="list-style-type: none"> • 12,079 applications processed • Export to 83 countries • Export product value over \$683 million
<p>The Firewood Certification Program regulates the movement of firewood into Wisconsin and within state borders to limit spread or introduction of insects and diseases. Transporting firewood into state-managed lands from locations farther than 10 miles away is prohibited, unless the firewood is from a DATCP-certified dealer.</p>	<ul style="list-style-type: none"> • 34 dealers certified • 88 dealers certified since the program's inception
<p>The Forest Pest Regulatory Program works with members of the nursery and forest products industry to facilitate compliance with state and federal quarantine regulations related to the movement of trees, shrubs, and forest products. DATCP inspectors work with individual businesses and enter into compliance agreements.</p>	<ul style="list-style-type: none"> • 23 hemlock woolly adelgid compliance agreements signed • 49 gypsy moth compliance agreements signed
<p>Forest Pest Survey and Detection conducts early detection and monitoring surveys for new and emerging forest pest concerns in Wisconsin. Survey and detection work is focused on regulated forest pest species and evaluates pest presence/absence in support of DATCP's regulatory programs.</p>	<ul style="list-style-type: none"> • Velvet longhorn beetle detected in 3 new counties • EAB detections still limited in the northern half of the state
<p>The Gypsy Moth Program is a cooperative effort between DATCP, U.S. Department of Agriculture (USDA)-Animal and Plant Health Inspection Service (APHIS), USDA-Forest Service (FS), University of Wisconsin (UW)-Madison, and the Wisconsin Department of Natural Resources. The program's mission is to detect and treat infestations of the gypsy moth and to slow its spread across the state. Trapping surveys help pinpoint the locations of significant gypsy moth populations and determine potential spots for treatment the following season.</p>	<ul style="list-style-type: none"> • 49 treatment sites, totaling 113,911 acres • 52,396 male moths captured in 10,916 traps

<p>The Industrial Hemp Pilot Program maximizes the opportunity for a person to plant, grow, cultivate, harvest, sample, test, process, transport, transfer, take possession of, sell, import, and export industrial hemp to the greatest extent authorized under federal law. The purpose of this program is to research the growth, cultivation, and marketing of industrial hemp. Growers and processors must have licenses to grow and process hemp and follow other requirements, including record-keeping and reporting.</p>	<ul style="list-style-type: none"> • 1,325 hemp growers and 627 processors licensed • 5,000 acres of hemp planted across 71 counties • 2,200 regulatory samples were taken
<p>The Nursery Program provides regulatory inspection of licensed retail and wholesale nurseries to ensure the production of healthy, insect- and disease-free plants. Inspections enforce licensing requirements and issue certificates needed to facilitate the movement of nursery stock in trade.</p>	<ul style="list-style-type: none"> • 583 nursery growers and 1,139 retailers licensed • 44% of growing sites inspected
<p>The Plant Industry Bureau Laboratory provides plant disease and insect pest diagnostic services to the Christmas Tree, Nursery, and Pest Survey Programs. The lab also performs testing for phytosanitary certification necessary for domestic and international export of certain plants, and differentiates disease from chemical injury for the environmental enforcement section of the agrichemical management bureau.</p>	<ul style="list-style-type: none"> • 1,805 samples processed • 105 different plant pathogens detected • <i>Phytophthora ramorum</i> detected on nursery stock for the first time in 2019
<p>The Potato Program includes Potato Rot Nematode (PRN) surveys, late blight response, and coordination of Wisconsin's seed potato certification program with UW-Madison. This program has played a major role in preventing the spread of PRN since 1953. To date, PRN has never been intercepted in shipments of commercially grown potatoes or seed potatoes from Wisconsin. The program targets first-year seed production fields for priority sampling in addition to fields with a history of infestation. Previously infested fields are released from quarantine after two successive potato crops that show no evidence of PRN.</p>	<ul style="list-style-type: none"> • 15 new seed potato production fields (788.8 acres) inspected for PRN • All fields tested negative
<p>The Pest Survey Program conducts field surveys to detect new or exotic plant pests and to assess distribution, abundance or incidence of endemic insects, plant diseases, and nematodes affecting Wisconsin. Information acquired through these surveys is used to alert growers and agriculture professionals to pest occurrence and outbreaks, determine pest trends influencing agricultural and management practices, and to certify Wisconsin plants and plant products entering trade. The program also participates in plant disease and insect survey projects in cooperation with USDA and University of Wisconsin.</p>	<ul style="list-style-type: none"> • Swede midge was found • 1,437 crop fields sampled • 74 orchards and vineyards surveyed • 55 cooperators monitored insect traps
<p>The Seed Program monitors and enforces labeling, germination, and purity requirements to assure quality agricultural seed is distributed and sold in Wisconsin. Seed that does not conform to state standards may be removed from the marketplace and labelers may be subject to penalties. Field inspectors in the program perform a range of duties, such as evaluating labels for compliance, issuing stop sale orders, and collecting samples for analysis.</p>	<ul style="list-style-type: none"> • 789 seed labeler licenses issued • 192 license-holders inspected • 392 samples collected

APIARY PROGRAM

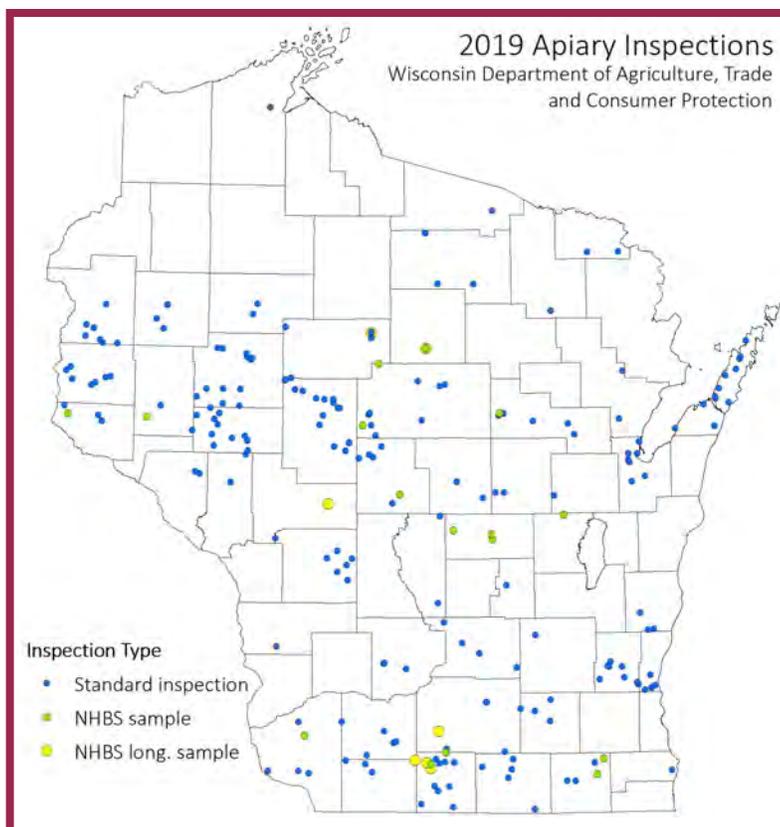
Apiary Inspections - Apiary inspectors visited 204 beekeepers this year, opening 3,398 hives for inspection. Based on these voluntary inspections, winter mortality decreased for the second year in a row from 47% in 2017-18 to 32% in 2018-19, which is slightly lower than the 38% national average winter loss for beekeepers during the same time period. Varroa mite was detected in 51% of hives sampled for this pest, compared with 58% last season. Other pests and diseases found include American foulbrood in 0.7% of hives, chalkbrood in 5.9% of hives, European foulbrood in 6.4%, deformed wing virus in 11.8%, sacbrood in 4.8%, and small hive beetle in 6.3% of hives. Inspectors issued 98 apiary inspection certificates for out-of-state movement of 37,622 migratory hives, primarily destined for California, Florida, and Texas to be used for pollination services.

National Honey Bee Health Survey (NHBS) - Wisconsin participated in the USDA National Honey Bee Health Survey for the ninth straight year. Live bee samples and brood comb wash samples from 24 apiaries were sent to the USDA bee research lab for parasite analysis. Another 24 samples of bees in alcohol were sent to the USDA bee research lab for virus analysis, and 10 wax samples were submitted for pesticide analysis. The full results are still pending. To date, no *tropilaelaps*, *Nosema apis*, or *Apis mellifera capensis* have been found. American and European foul brood, *Nosema ceranae*, Varroa mites, chalkbrood, and various viruses—including detections of varroa destructor virus and k-wing.

Table 1: Apiary Inspections 2019

Year	2015	2016	2017	2018	2019
Total hives opened	1190	2208	4214	3342	3398
Varroa mite	71%	68%	64%	58%	51%
Sm Hive Beetle	3.1%	7.5%	10.2%	1.7%	6.3%
American Foulbrood	1.1%	1.2%	0.1%	0.1%	0.7%
European Foulbrood	3.6%	0.3%	0.2%	0.3%	6.4%
Chalkbrood	3.1%	2.8%	4.2%	1.1%	5.9%
Sacbrood virus	0.1%	0.4%	5.8%	1.4%	4.8%
Deformed wing virus	6.8%	7.3%	19.8%	1.2%	11.8%

Figure 1: Apiary Inspections 2019



CHRISTMAS TREE PROGRAM

Inspections of Christmas Trees - Inspections begin once the gypsy moth egg mass laying is complete, typically after September 1. In addition to Christmas trees, staff inspect fence rows and wood lots adjacent to each field for evidence of gypsy moth life stages as well as indicators of pine shoot beetle. Christmas tree growers who plan to ship trees from state-to-state and/or request a plant health certificate are the focus of high-priority inspections.

Field location information is collected from growers and entered into a database. Data from gypsy moth trapping provides county-level gypsy moth trap count maps that are used to prioritize inspections and inform growers of gypsy moth populations in the area. Field inspection reports of pest incidence and severity levels are provided to growers, along with diagnoses for symptomatic plant samples submitted to DATCP's lab.

Starting around Thanksgiving and ending at Christmas, inspectors inspect Christmas tree lots to survey for pests and diseases, ensure trees are free from regulated pests, and verify that Christmas tree growers selling trees grown in Wisconsin have the appropriate DATCP license. In 2019, 88 Christmas tree lots were inspected. Of the 88 lots, 15 had material infested with Elongate Hemlock Scale (EHS). Pest abatement orders were issued for all material with EHS, material was removed from sale and landfilled or burned.



Balsam twig aphid damage

Top 10 Christmas Tree Pests Found in 2019

Diseases and abiotic factors: broom rust of fir (71), Lirula needlecast (44), white pine blister rust (41), root rot (38), chlorosis (32), Rhizosphaera on fir (28), winter injury (28), needlecast (22), pine gall rust (20), Rhizosphaera on spruce (15).

Insects/pests: balsam twig aphid (96), deer damage (49), white pine weevil (40), balsam gall midge (34), Zimmerman pine moth (20), pine needle scale (17), Allegheny mound ant (10), aphids (9), Pales weevil (7), spruce spider mite (3).

Table 2: Christmas Tree Field Inspection Finds 2010-2019

Year	# Fields Inspected	# Fields with Gypsy Moth	# Fields with Pine Shoot Beetle
2010	663	20	1
2011	689	18	3
2012	702	6	6
2013	767	10	0
2014	667	11	2
2015	679	10	6
2016	553	15	5
2017	673	17	15
2018	511	45	1
2019	480	41	2

EXPORT CERTIFICATION PROGRAM

2019 Phytosanitary Certification Program Summary - The Phytosanitary Certification Program serves Wisconsin exporters of plants and plant commodities by certifying their shipments as free from regulated pests. In 2019, the program was responsible for the export of over \$683 million in plants and plant products. The total number of certificates (phytos) issued was 12,079. That was a decrease of 2,973 from 2018. China, Southeast Asia (Indonesia, Malaysia, Philippines, Thailand), Vietnam, and Taiwan remained top destination countries for phytos issued. The export of grain, including corn and soybeans, accounted for the largest percentage phytos issued, at 56%, followed by wood products at 33%. No Wisconsin commodities were rejected or destroyed at destination ports in 2019.

Table 3: Federal Certificates

Application/Certificate Status	2018 # of Applications	2018 % of Total Applications	2019 # of Applications	2019 % of Total Applications
Canceled	54	0%	42	0%
Printed	9,283	70%	8,504	70%
Replaced	2,486	19%	2,497	20%
Returned	28	0%	10	0%
Voided	1,229	9%	1,036	8%
Work in Progress	208	2%	136	1%
Total Applications	13,288	13,052 = 98%	12,225	12,079= 99%

Figure 2: Federal and State Phytosanitary Certificate - 7-Year Look (includes replacements)

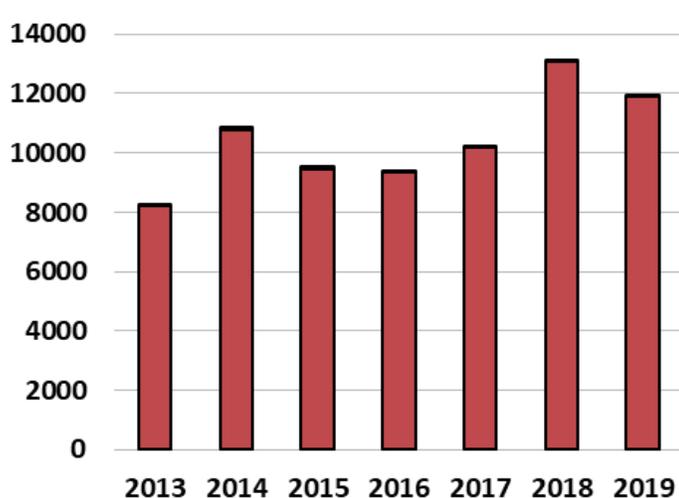


Figure 3: Total Certificates Issued by Country Destinations

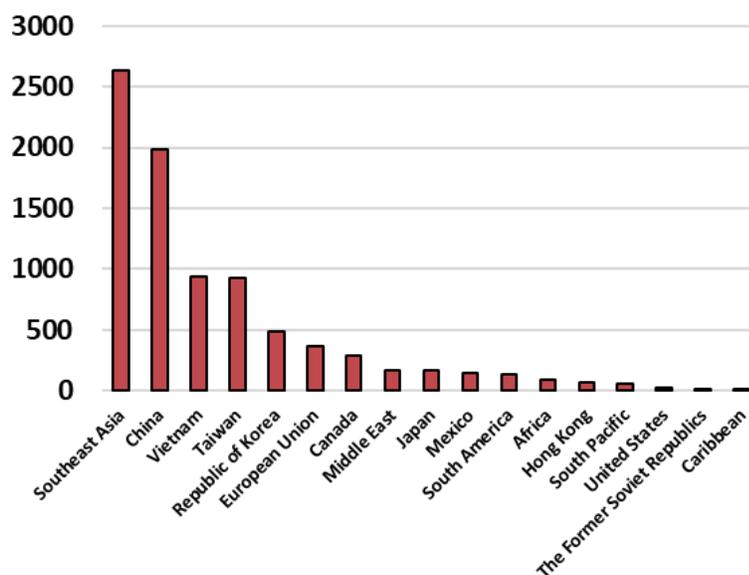


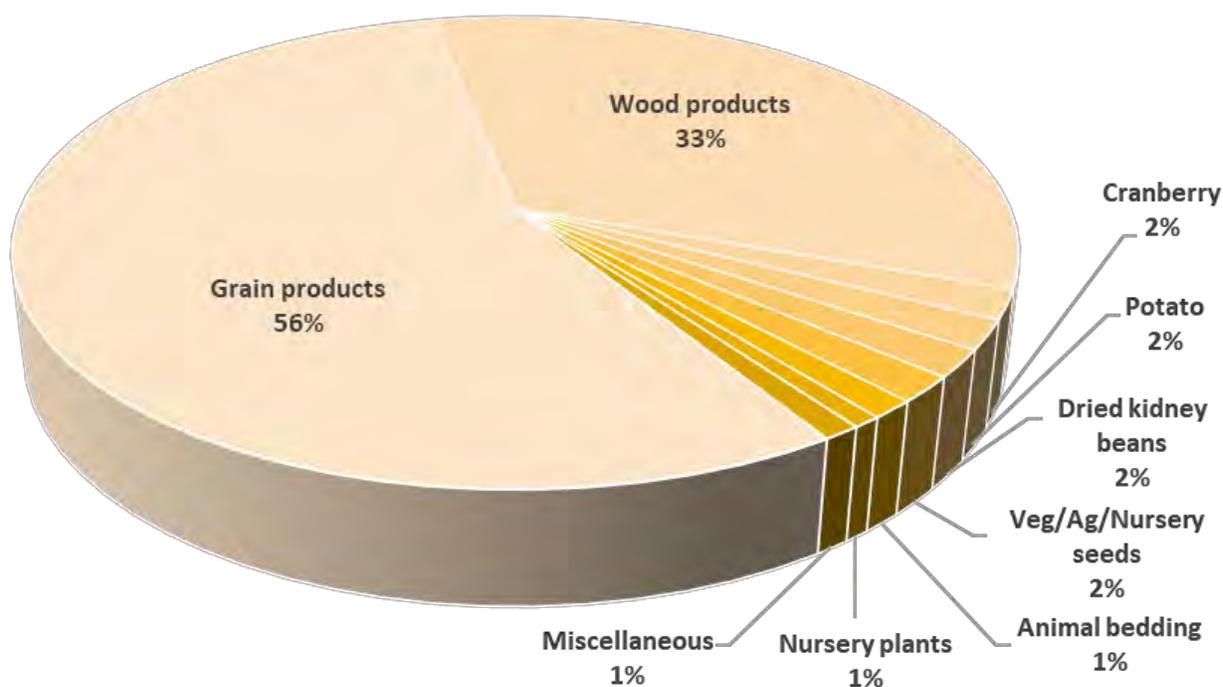


Photo credit: <https://unsplash.com/s/photos/tree-lumber>

Highlights

- Wisconsin exported to 83 countries in 2019
- Total export product value was over \$683 million
- Top export commodity was soybean grain

Figure 4: Commodities and Certificates Issued in 2019



2019 Seed Field Inspection Summary - 466 acres were inspected for 15 seed producers. Corn, soybean, onion, gourd, pepper, squash, tomato, tomatillo, and watermelon were the nine seed crops inspected for regulatory pests, noxious weeds, bacterial and fungal diseases, and viruses. Seed producers reported that they intended to export to Argentina, Australia, Brazil, Canada, Chile, China, European Union, India, Israel, Japan, Kazakhstan, Malaysia, Mexico, New Zealand, Peru, Russia, South Africa, Thailand, Turkey, and Ukraine.



FIREWOOD CERTIFICATION PROGRAM

Photo credit: <https://www.ccsand.com/firewood>

Firewood Certification Program - Certifies dealers that treat their firewood to reduce the risk of spreading firewood-borne pests. Certified firewood is either heat-treated or seasoned and can legally be moved across quarantine lines and to state parks and other state-owned properties.

- Certified 34 dealers in 2019
- Certified 88 dealers since the program's inception

Treatment methods to kill pests:

- Heat firewood to an internal temperature of 140°F or higher for at least 60 minutes, or
- Store firewood on your premises at least two years before selling or distributing it in Wisconsin, or
- Treat firewood using a method approved by the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP)

The firewood dealer certification program is voluntary. You can sell firewood in Wisconsin without being certified. If you choose to become certified, you must complete an application form and have your facilities and processes inspected by DATCP.

All packaged firewood sold in Wisconsin must be labeled, regardless of whether it is certified pest-free. However, certified wood also must bear the DATCP-certified label.



Photo credit: <http://pest.ceris.purdue.edu/>

FOREST PEST REGULATORY PROGRAM

Forest Pest Regulatory Program - Works with members of the nursery and forest products industry to facilitate compliance with state and federal quarantine regulations related to the movement of certain trees, shrubs, and forest products. DATCP inspectors work with individual businesses and enter into compliance agreements.

- 23 hemlock woolly adelgid compliance agreements signed
- 49 intrastate gypsy moth compliance agreements signed
- 69 nursery and forest product industry individuals trained in gypsy moth identification



FOREST PEST SURVEY AND DETECTION

Forest Pest Survey and Detection:

Emerald Ash Borer - DATCP continues to track emerald ash borer (EAB), sharing recent detection information with Wisconsin's citizens, private businesses, and governmental entities to aid in EAB readiness planning and management. New detections in 2019 included Pierce County (River Falls) in July, one new tribal find on Oneida Nation land in August, and 55 new municipal confirmations in previously infested counties. Since 2008, EAB has been detected in 52 Wisconsin counties and almost 30% of the state's 1,849 municipalities (cities, villages, and towns). The 20 remaining counties without EAB detections are in the northern part of the state where 80% of the state's ash volume is found.

Ash decline and mortality of untreated trees is evident across much of the southern half of the state, including both urban and forestland trees, with over 90% ash mortality found in the far southeastern counties of Ozaukee, Kenosha, Racine, and Walworth. Significant decline of ash is also found along the Mississippi River, from Grant to Buffalo County.

No coordinated state or federal EAB trapping program was conducted in 2019 since DATCP enacted a statewide quarantine in 2018. New EAB detections are the result of validated reports from citizens, tribal, municipal, state and county forestry staff.

Walnut Twig Beetle - A trapping survey to detect the walnut twig beetle, *Pityophthorus juglandis*, was conducted at eight sites in Buffalo, Chippewa, Columbia, Dane, Grant, Iowa, Sauk, and Trempealeau counties. Selected trapping locations included five sawmills, two walnut-dominant forestlands, and a walnut plantation. Twenty-six pheromone baited Lindgren funnel traps were monitored from mid-May through early September and 166 trap catch samples collected. Laboratory screening of samples found no walnut twig beetles. DATCP has conducted surveys for walnut twig beetle since 2011 when an exterior quarantine for thousand cankers disease went into effect.

Figure 5: 2019 EAB locations

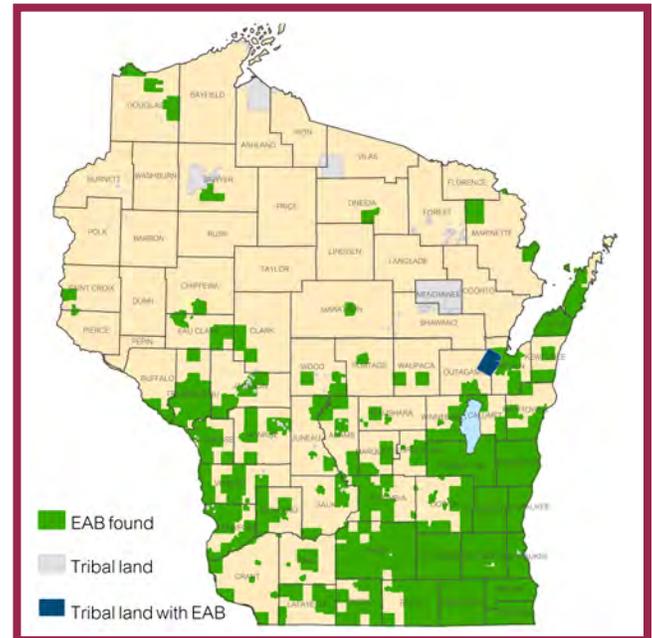


Table 4: EAB detections by year, 2008-2019

Year	Statewide Detections (Municipality)	Number of County Detections	Number of County Quarantines
2008	2	2	4
2009	9	5	5
2010	2	0	0
2011	2	2	2
2012	16	4	4
2013	47	6	6
2014	51	10	16
2015	50	6	2
2016	98	5	3
2017	118	8	7
2018	83	3	ALL
2019	55	1	ALL
Total	533	52	72



Cryptocephalus on Fraser fir



Cryptocephalus Needle Damage



Cryptomeria scale

Confer Leaf Beetle - Needle feeding damage by the native Chrysomelid leaf beetle, *Cryptocephalus schreibersii*, was observed in August on balsam, Canaan, and Fraser fir trees in Chippewa and Eau Claire County. Feeding damage caused browning of current-year needles and was significant enough for growers to consider treatment options. This beetle has not been widely collected in the state, with historical reports of *C. schreibersii* collected from pine in Dane and Iowa County, as well as Fraser fir in Trempealeau County.

Elongate Hemlock Scale - Hemlock from three nurseries in Ozaukee and Milwaukee counties were removed from sale in May and July due to infestation by elongate hemlock scale (EHS), *Fiorinia externa*. Plants originated from out-of-state and had been unsuccessfully treated with dinotefuran insecticide, as viable scales could still be found on the underside of needles. This invasive pest is not known to be established in the state, but there is concern for the Christmas tree industry and native conifers given its broad host range, which includes fir, hemlock, pine, and spruce.

In addition to nursery detections, DATCP inspectors also intercepted EHS-infested fir material (trees, wreaths, and evergreen decorations) during Christmas tree lot inspections. EHS-infested material was found at 15 lots, with pest abatement orders issued for all material with EHS to be removed from sale and landfilled or burned.

Cryptomeria Scale - For the second year in a row Cryptomeria scale, *Aspidiotus cryptomeriae*, was detected during Christmas tree lot inspections. Cryptomeria scale was found on fir wreath material sourced from North Carolina and sold at three locations in Milwaukee and Marinette counties. Similar to EHS, Cryptomeria scale is a non-native armored scale that feeds on the underside of needles, causing yellow mottled foliage prior to needle drop. First detected during 2018 lot inspections, this pest is not known to be established in the state. Cryptomeria scale is often found co-mingled with EHS. All infested material was removed from sale.

Exotic Woodborer Survey - A third year of trapping surveys targeting exotic wood-boring beetles was conducted in 2019. Surveys targeted eight beetle species from the CAPS Exotic Woodborer/Bark Beetle Survey (Table 5). With the exception of velvet longhorned beetle (VLB), none of the species are known to occur in the state. Sixty-five baited traps were set across 25 sites in 14 counties. Sites were prioritized in population dense industrial and manufacturing areas where risk of introduction is high due to the arrival of international shipments containing wood cargo and packaging materials. Traps were monitored bi-weekly May through September, and all 364 samples were screened in the laboratory for target species. With the exception of VLB, none of the other seven target species were detected.

Velvet Longhorned Beetle - Detection surveys were conducted in response to the recent discovery of the velvet longhorned beetle (*Trichoferus campestris*), a potential fruit and landscape tree pest, in Wisconsin. Like other invasive woodborers, VLB larvae can be unknowingly moved long distances in firewood and wood shipping crates and cargo, including furniture. Native to Asia, VLB has been intercepted at multiple commercial ports and warehouses across the U.S. since 2002.

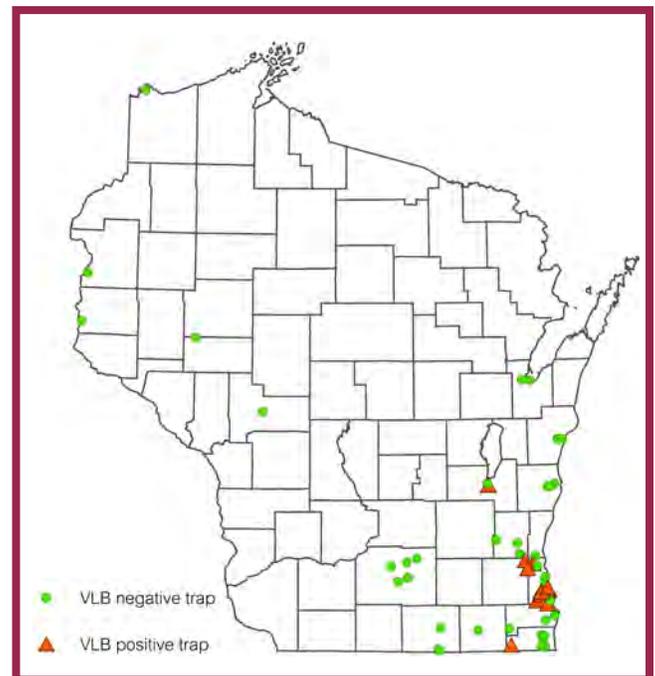
The first Wisconsin detection of VLB occurred with the collection of two beetles in Milwaukee County detection traps in 2017, with follow-up surveys in 2018 collecting an additional 75 beetles from nine Milwaukee County traps, all near Mitchell International Airport. This year's survey was conducted at 27 sites across 14 counties, capturing 22 beetles in eight traps during July and August. Positive traps found four in Milwaukee County, where VLB is now considered established, and the remaining positive traps represented new county detections in Fond du Lac, Kenosha, and Waukesha counties. No VLB-infested trees have been located to date, and potential economic or environmental impacts to urban forests or orchards are unknown.

SPOTTED LANTERNFLY (SLF) - Spotted lanternfly (*Lycorma delicatula*), has not been found in Wisconsin, however, preferred host species occur. DATCP has focused on detection, confirmation and evaluation of SLF host species, with an emphasis on Tree of Heaven, *Ailanthus altissima*. In Wisconsin, *Ailanthus* is considered to be somewhat rare, with a restricted distribution. Survey efforts focused on finding new sites of the tree, and on confirming known locations, based upon historical information, herbarium records, citizen-science reports and USDA PPQ and Wisconsin DNR data. Egg mass surveys were conducted at the same time as tree location and identification. A total of 52 historical sites were visited, almost all in Dane or Milwaukee counties, of which 37 had *Ailanthus* present. No SLF egg masses were detected.

Table 5: Exotic Woodborer Survey Results

Common Name	Scientific Name	# of Traps	Pest Found
Brown Fir Long-horned Beetle	<i>Callidiellum villosulum</i>	10	No
Large pine weevil	<i>Hylobius abietis</i>	10	No
Japanese pine sawyer	<i>Monochamus alternatus</i>	10	No
Black fir sawyer	<i>Monochamus urussovii</i>	10	No
Spruce engraver	<i>Pityogenes chalcographus</i>	10	No
Black spruce beetle	<i>Tetropium castaneum</i>	10	No
Brown spruce longhorned beetle	<i>Tetropium fuscum</i>	10	No
Velvet long-horned beetle	<i>Trichoferus campestris</i>	27	Yes

Figure 6: Velvet Longhorn Beetle Detections



GYPSY MOTH PROGRAM



Gypsy Moth - In 2019, gypsy moth trappers reported a total of 52,396 male moths (4.8 moths/trap). This total represents a 33% decrease from last year's numbers (2018: 76,447 total moths, 7.1 moths/trap), and a 48% decrease from two years ago (2017: 108,808 total moths, 9.9 moths/trap). In combination with treatment efforts, DATCP attributes these decreases in population size to two consecutive winters with sustained periods of lethal cold temperatures, and a cool, wet spring that favored pathogens in 2019. The north central area of the state was an exception to this trend of population decrease; despite the cold temperatures, several counties in this region experienced small to moderate increases in moth catches from the previous year.

The Gypsy Moth Slow the Spread Program treated 49 sites totaling 113,911 acres in 2019. AI's Aerial Spraying of Ovid, MI applied all Btk (*Bacillus thuringiensis kurstaki*) and mating disruption products. Btk applications began May 21 and ended June 6. Foray Btk was applied to 36,640 acres at 40 sites in western Wisconsin. No Gypchek was applied in 2019. The Forest Service mating disruption applications occurred from June 28-July 15. A total of 77,271 acres at nine sites were treated with mating disruption product in western Wisconsin. The mating disruption project has moved entirely to a liquid formulation treatment product, SPLAT Gypsy Moth-Organic. Post-treatment evaluations indicated treatments were effective; there was only one treatment failure and four treatments were evaluated as partially successful.

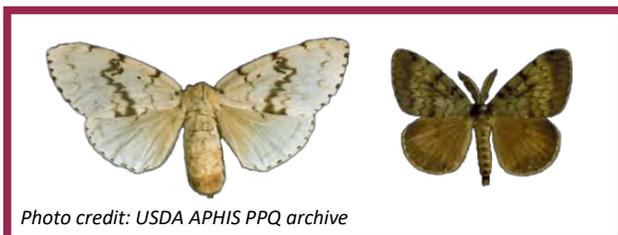
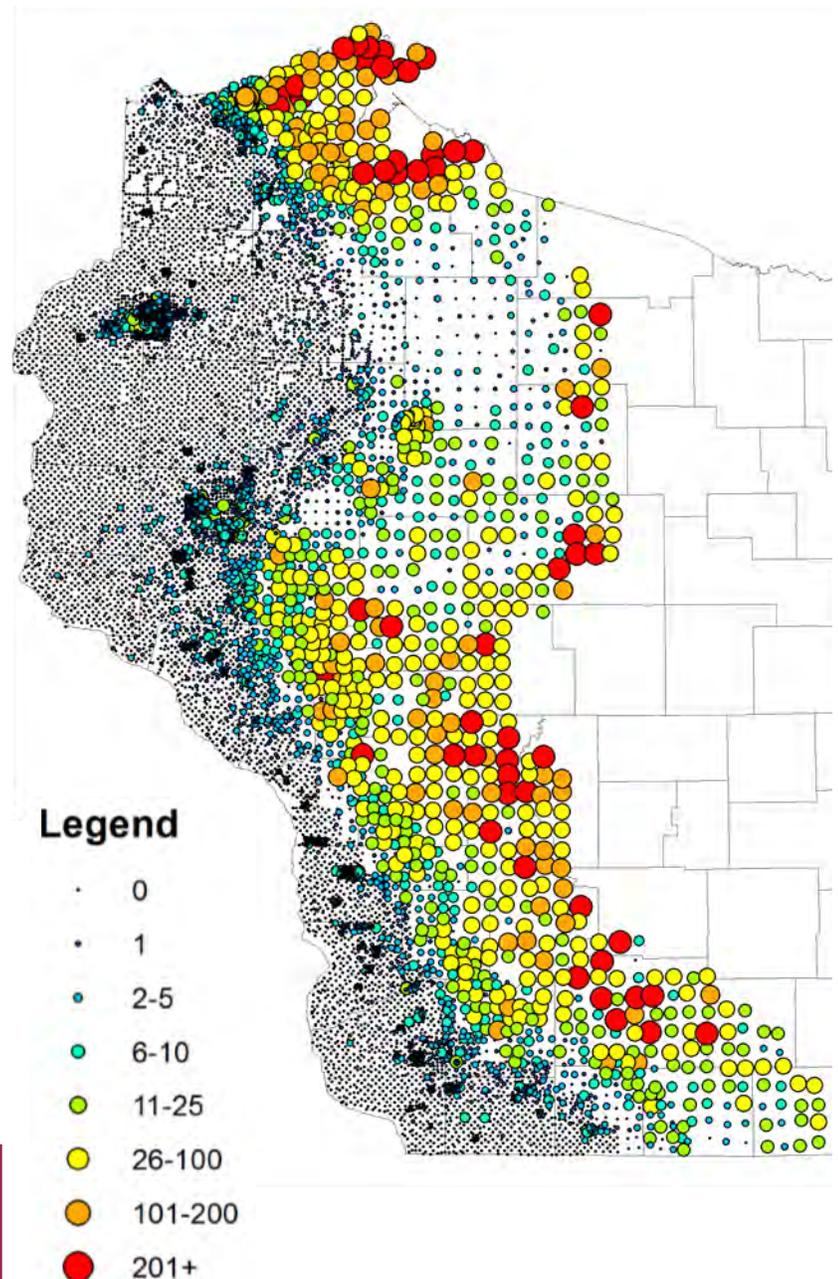


Photo credit: USDA APHIS PPQ archive

Female (left) and male (right) gypsy moth adults

Figure 7: Gypsy Moth Population Monitoring, 2019



INDUSTRIAL HEMP

Wisconsin Industrial Hemp Pilot Program:

DATCP regulates the growing of hemp. Hemp crops with a total delta-9 tetrahydrocannabinol (THC) content of 0.3% or below are allowed to be harvested and marketed.

DATCP'S responsibilities:

- Process new grower and processor license applications and annual renewal registrations
- Facilitate criminal background checks
- Collect research plans and agreements from growers
- Record planting reports from growers who must submit this within 30 days of planting
- Schedule testing before harvest, after grower provides 30-day notice of anticipated harvest date
- Collect regulatory hemp samples for each growing location and variety of hemp licensed
- Complete regulatory laboratory testing to determine that THC content is 0.3% or below
- Provide fit for commerce certificates for each crop with the allowable level of THC
- Assure destruction of crops that test higher than the allowable level of THC
- Receive all final production (for hemp growers) and processing reports at the end of the growing season
- Execute authorities granted under Wis. Stat. § 94.55 and promulgate emergency rule (Wis. Admin. Code § ATCP 22)

2019 Hemp Grower Data

Licenses and Annual Registrations 2019:

- 1,325 growers licensed
 - 1,251 obtained a hemp grower license and 2019 annual registration, meaning they could grow hemp
- 627 processors licensed
 - 560 obtained a hemp processor license and 2019 annual registration, meaning that they could process hemp

Hemp Planted, Sampled, and Tested:

- 860 hemp growers planted hemp and had regulatory samples taken.
- 5,000 acres of hemp was planted in Wisconsin, throughout 71 counties.
- 2,200 regulatory samples were taken.
- 88% of the regulatory samples passed with a total delta-9 THC content of 0.3% or below.



DATCP industrial hemp inspection

INDUSTRIAL HEMP

2019 Final Grower Production Reports - As of March 4, 2020, approximately 75% of growers submitted their required final reports.

Hemp grower license holders indicated on their final production reports that the majority of hemp grown in Wisconsin was some combination of CBD and CBD biomass markets.

Approximately 3.5 million pounds of hemp was harvested in Wisconsin in 2019.

At the time that license holders filled out their final reports, most indicated that they had not yet sold the hemp that they had harvested.

2019 Final Processor Reports - As of March 4, 2020, approximately 70% of processors have submitted their required final reports.

Hemp processor license holders indicated on their final reports that approximately 33% of those who could legally process hemp, actually processed hemp.

Approximately one million pounds of hemp were reported as processed in Wisconsin in 2019.

Please note that one license holder could have both a grower and processor license.



Industrial hemp field in Wisconsin



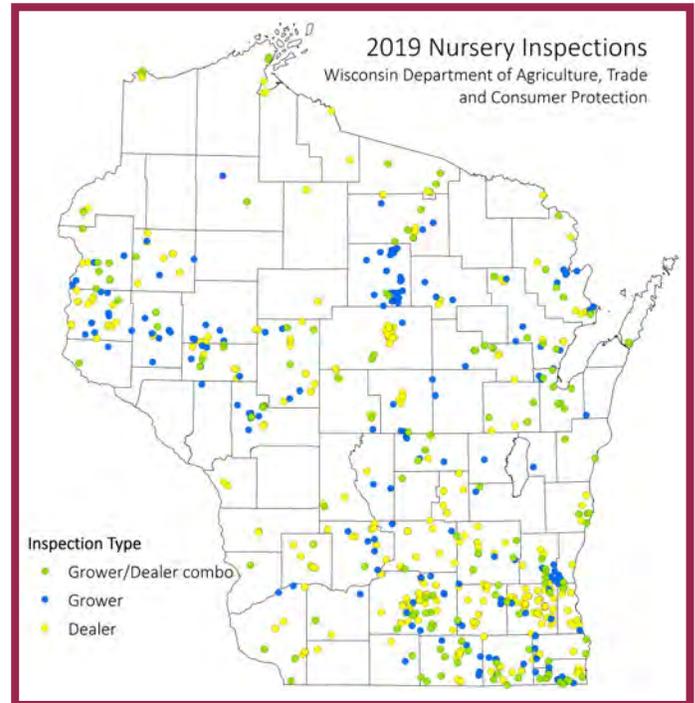
Industrial hemp plant grown for CBD

THE NURSERY PROGRAM

Nursery Licensing and Inspections - The Nursery Program licensed 583 nursery growers and 1,139 retailers this year, with personnel performing inspections at 403 of the 914 (44%) growing sites and 547 of the 2,558 (21%) retail sites statewide. Annual inspections are prioritized for out-of-state shippers and those holding a plant health certificate. The program's goal is to inspect all licensees at least once every three years. The top 10 pests and diseases found this season were, by total number of detections: virus symptoms, powdery mildew, apple scab, leaf spots (assorted), non-viable nursery stock, Japanese beetle, leafminers (assorted), aphids (assorted), NR 40 invasive plant species, and necrosis/dieback. The following are some highlights from the 2019 inspections.

Boxwood Blight - Nursery inspectors collected 117 boxwood and pachysandra samples from 17 counties for testing at the lab. Twelve boxwood samples, including the varieties 'Green Velvet' and 'Korean' were positive for boxwood blight. The infected plants came from two different national retailers in Dane and Portage counties and two nurseries in Kenosha County. DATCP also continued to work on eradication efforts with the production nursery in Kenosha County where boxwood blight was first detected in 2018. Boxwood blight was also found on shrubs at a Dane County residence in late October, marking the first report of the disease in the Wisconsin landscape. A second urban landscape detection followed.

Figure 8: 2019 Nursery Inspections



Boxwood Blight

Ramorum Blight - Ramorum blight, *Phytophthora ramorum*, was found for the first time on imported nursery stock in Wisconsin. Infected rhododendrons imported from Washington state were found during a trace-forward survey of 59 garden centers and nurseries that had received potentially infected stock from the Washington supplier. Wisconsin inspectors collected 43 samples, but only one rhododendron in a Marathon County nursery was positive for the disease. USDA confirmed the initial lab ramorum blight identification. This was Wisconsin's only ramorum blight detection in 2019.

In late October, another potential ramorum blight introduction was reported on 'Double Red Knockout' rose plants that were distributed to a national retail store. The roses originated in an Oklahoma nursery where blight-infected plants were found. All roses were sold before regulatory actions could be taken.

DATCP and the University of Wisconsin (UW) advised consumers who purchased azaleas, rhododendrons, and roses in 2019 to monitor plants for leaf and shoot dieback symptoms next season.

Invasive Species Rule - Invasive plants prohibited or restricted in Wisconsin under state law (Wis. Admin. Code § NR 40 Invasive Species Rule) were found at 69 unique nursery locations this season, down from 102 in 2018. The most common were Japanese barberry, common buckthorn, woodland forget-me-not, tartarian honeysuckle, multiflora rose, bishop's goutweed or snow-on-the-mountain, ribbon grass or gardener's garters, and moneywort. Nurseries and plant buyers are advised to review the invasive species rule prior to ordering plants for the 2020 season. The list currently includes 68 prohibited species, 63 restricted species, and 14 split-listed species.



Photo credit: USDA Forest Service

Sudden oak death, ramorum blight



Hosta virus X



Photo credit: <http://invasivespeciesinfo.gov>

Japanese barberry



Lily leaf beetle



Viburnum leaf beetle



European chafer

Lily Leaf Beetle - The invasive red lily leaf beetle (LLB) was reported in six new counties this season: Dane, Door, Oneida, Pierce, Price, and Taylor. First detected in Marathon County in 2014, LLB has now been confirmed in 12 Wisconsin counties. The adult beetles are bright red and conspicuous, while the larvae can be found by inspecting Asiatic lily leaves for defoliation. The leaf damage caused by LLB larvae can be significant and, without intervention, will eventually kill the plant.

Viburnum Leaf Beetle - Nursery inspections found 18 cases of the viburnum leaf beetle (VLB) in southeastern Wisconsin in 2019. This newly-established pest feeds exclusively on the leaves of viburnums, and both the adults and larvae cause extreme defoliation and eventual shrub mortality after successive years of infestation. Native viburnums are an important understory component of many Wisconsin woodlands and are at risk of VLB. It now occurs in Iron, Kenosha, Milwaukee, Ozaukee, Walworth, Waukesha, Washington, and Winnebago counties—and continues to spread.

European Chafer - This destructive lawn grub was identified in Langlade County on July 10 by UW-Madison entomologist PJ Liesch. The European chafer has been established since 2013 in Door County, where it has caused extensive lawn damage in Sturgeon Bay and surrounding areas. Its larvae are considered a more serious turf pest than the Japanese beetle because they feed later into the fall and earlier in spring, and even resume activity during warm periods in winter.

CAPS PEST DETECTION SURVEYS



Photo credit: Hernan Tolosa
www.biodiversidadvirtual.org

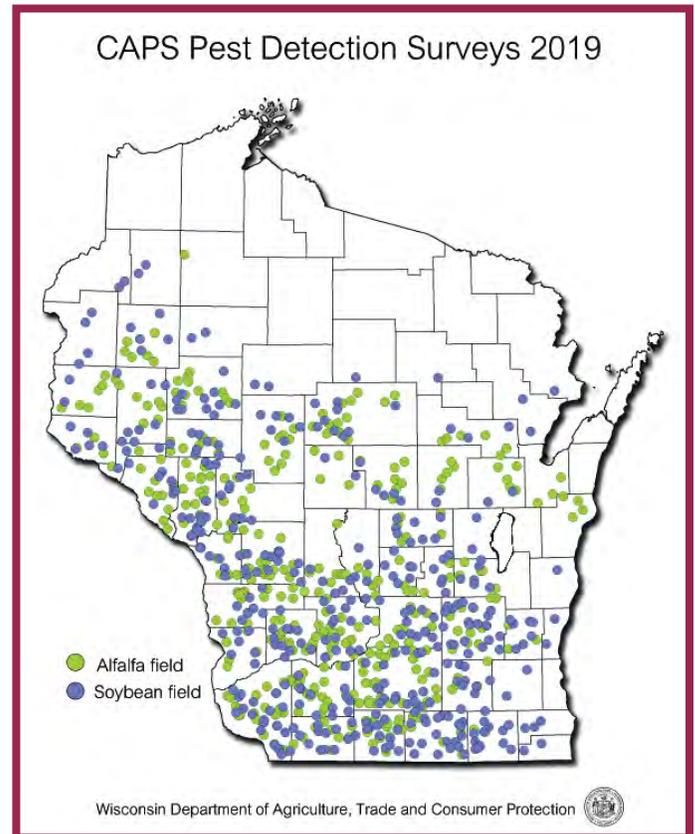
CAPS Pest Detection Surveys - The Cooperative Agricultural Pest Survey (CAPS) activities were accomplished with the support of USDA funded cooperative agreements.

Surveillance activities conducted through the CAPS program in 2019 targeted three high-risk pests of national concern: cucurbit beetle (*Diabrotica speciosa*), maritime garden snail (*Ceratomyxa virgata*), and yellow witchweed (*Alectra vogelii*). Field sampling was carried out in 818 alfalfa fields and soybean fields in 51 Wisconsin counties. None of these targeted pests were found.

In the soybean commodity survey, 52 soybean sites were tested early in the season for *Phytophthora* root rot organisms, and 358 fields were visually surveyed from June through August for CAPS target pests. A total of 410 sites were visited. No target pests were detected by visual survey.

During the forage bundled survey, 408 alfalfa fields were surveyed for the target organisms. No target pests were found in the alfalfa fields sampled.

Figure 9: 2019 CAPS Survey Locations



PEST SURVEY CORN



European Corn Borer - Larval populations reached the lowest level in recorded history. DATCP's fall European corn borer (ECB) survey documented a state average of 0.01 borer per plant, the same average as 2018 and tying the lowest count since surveys began in 1942. Seven of the state's nine agricultural districts showed averages less than or equal to 2018 levels, while negligible increases were noted in the southwest and south-central areas. Larvae were absent from 89% of the 229 sampled fields in September and October. The main contributing factor to the all-time low ECB pressure is Wisconsin's continued high use rate of Bt corn, which accounted for 75% of planted corn acres.

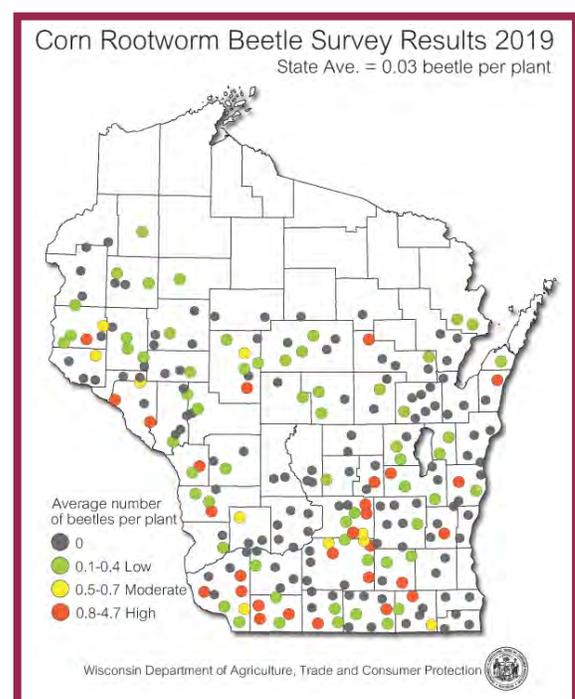
Corn Earworm - Pheromone traps captured a total of 3,495 moths (15 traps) during late-season monitoring, with largest flights recorded during the last two weeks of September. The highest individual pheromone count was 589 moths at Mayville in Dodge County from September 19-25, while the Janesville trap registered its highest weekly total of 932 moths from September 26-October 2. Compared to 2018 when 7,905 moths were collected in 15 pheromone traps, this year's total count was markedly lower. September corn earworm flights produced localized larval damage to apples, corn, and tomatoes in fall.

Corn Rootworm - After two years of historically low averages, beetle counts increased in southern Wisconsin in 2019. The August survey found slightly higher rootworm pressure in the southwest and south-central areas, while populations remained the same or decreased in the seven other crop districts. The average count in 229 corn fields was generally low at 0.3 beetle per plant. Above-threshold populations of 0.75 or more beetles per plant were found in 27 (12%) of the fields, compared to last year's 20 (9%) fields. No beetles were observed in 120 (52%) of the sites. The 2019 total count of 711 beetles was 26% higher than the 566 beetles recorded in 2018.

Black Cutworm - Unprecedented planting delays and wet, weedy field conditions contributed to an elevated threat of cutworm damage in spring of 2019. Moths appeared by April 4 and migration flights occurred throughout May. April-June trapping captured 1,271 moths in 44 traps, with an individual high of 111 moths near Waupun in Dodge County. In 2018, the survey collected 2,217 moths in 47 traps. Late corn planting resulted in a protracted larval damage period that extended throughout June, but black cutworm damage to emerging corn was not prevalent this season.

Western Bean Cutworm - Moth counts and larval injury to corn increased in 2019. Annual trapping from June-August registered an average of 65 moths per trap (3,600 moths in 55 traps), the second highest average in 15 years. The highest individual count for the 10-week monitoring period was 405 moths at Princeton in Green Lake County. This season's relatively large flight generated larval infestations in central and southern areas that traditionally experience western bean cutworm problems, though widespread damage was not observed during fall corn pest surveys.

Figure 10: 2019 Corn Rootworm Detection



PATHWAYS FRUIT & VEGETABLE SURVEY

gardenoflife.com

PATHWAYS FRUIT AND VEGETABLE SURVEY - DATCP implemented a second year of the USDA-funded Pathways Bundled Fruit and Vegetable Pest Survey to detect a broad range of insects and pathogens that threaten state agriculture. Surveys were concentrated in varied agricultural systems (farms, gardens, orchards, vineyards) near urban centers due to the convergence of multiple pathways in these areas. DATCP field specialists partnered with IPM Institute orchard pest experts and the UW-Madison Division of Extension Door County agriculture agent to gain coverage of orchards and vineyards near key metropolitan areas, as well as the Door County peninsula where 99% of the state's tart cherries are grown.

This year's survey included 76 sites: 32 vegetable farms and gardens, 18 apple orchards, 12 vineyards, 8 cherry orchards and 6 blueberry sites. USDA survey methods were used for 12 exotic insect species and 17 plant pathogens. Survey targets were selected based on site characteristics and host type (for example, community garden, orchard, or vineyard). Sites were monitored biweekly and specimens were screened regularly throughout the summer. The lab processed the plant disease samples, and a DATCP entomologist screened the insect samples and forwarded suspects to USDA identifiers for official determination.

A total of 376 insect trap samples and 162 pathogen samples were collected during the four month monitoring period. Most of the insect trap samples were non-targets. Ten samples were considered "suspect" and were sent to USDA identifiers for final determination.

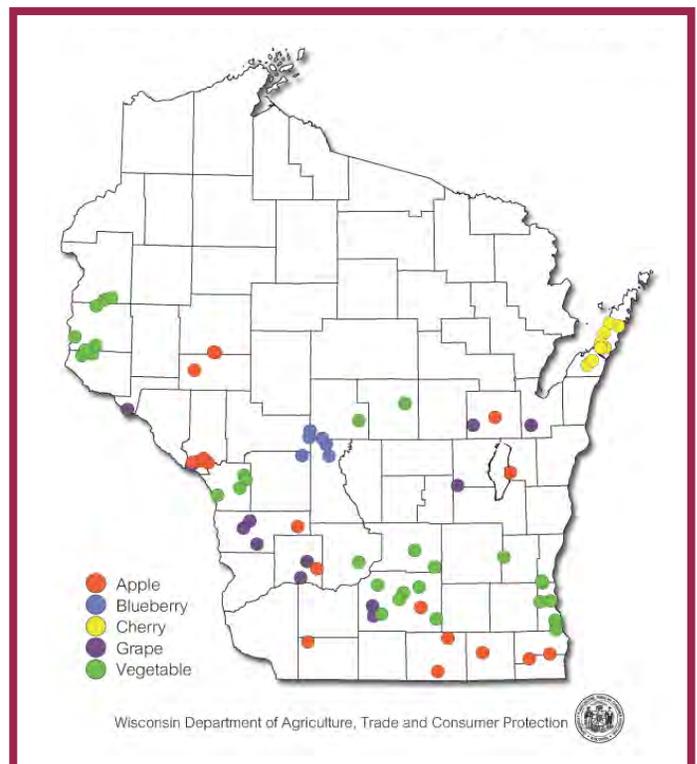
The PIB lab identified late blight from tomatoes at four community supported agriculture (CSA) farms in La Crosse, Pierce, Polk, and St. Croix counties, and basil downy mildew from samples collected in Dane and La Crosse counties. Tomato samples also tested positive for *Fulvia* leaf mold, early blight and septoria leaf spot.

Lab testing found no evidence of cucumber green mottle mosaic virus (CGMMV), a disease of concern for crop exporters, in cucurbit samples. In addition, 28 solanaceous crop samples from Dane, Kewaunee, La Crosse and Polk counties tested negative for potato spindle tuber viroid (PSTVd) and tomato chlorotic dwarf viroid (TCDVd), two potyviruses of phytosanitary concern.

The 10 most common fruits and vegetables submitted for testing were, by total number of samples: tomato (35), pepper (14), cucumber (10), grape (10), squash (9), potato (8), corn (7), strawberry (4), apple (3) and blueberry (2).

These efforts were funded through the USDA Plant Protection Act Section 7721.

Figure 12: 2019 Pathways Survey Locations





Swede Midge - *Contarinia nasturtii* (Keiffer) (Diptera: Cecidomyiidae) specimens were identified from two trap samples. The flies were captured in Dane County on June 17 and in Milwaukee County on July 1, both in Jackson traps set in broccoli plantings. The positive identifications represent the first detection of invasive swede midge (SM) in Wisconsin and a new state record. Swede midge has the potential to impact brassica production in the state as it becomes more widely established. DATCP is planning an expanded survey for swede midge in 2020.

European Cherry Fruit Fly - A detection survey was conducted on the Door County peninsula of northeastern Wisconsin in 2018 and 2019 for the European cherry fruit fly (ECFF), *Rhagoletis cerasi*. ECFF is a pest of economic and quarantine significance that poses a high risk to Door County's \$1.9 million dollar tart cherry crop. Surveys for ECFF were conducted at eight orchards, and included the placement of four yellow sticky traps (32 traps total) baited with ammonium carbonate attractant at each location. No ECFF were captured on any of the traps in either season.



Swede midge damage on brussel sprouts



PEST SURVEY VEGETABLE



Late blight on tomato

Late Blight - Disease pressure increased sharply in 2019 due to wet weather, with detections in 18 counties, compared to four counties in 2018. The state's first infected commercial potato field was confirmed in Wood County by the UW-Plant Pathology Department. A Pathways survey positive sample was collected in a community supported agriculture (CSA) tomato field in La Crosse County and identified by the lab. Additional cases of late blight on both potato and tomato were detected in the following counties: Adams, Barron, Crawford, Green Lake, Jackson, Juneau, Monroe, Pierce, Polk, Portage, Sauk, Shawano, St. Croix, Vernon, Walworth, and Waushara. All samples tested by UW from Wisconsin were the US-23 pathogen genotype.

PEST SURVEY FRUIT

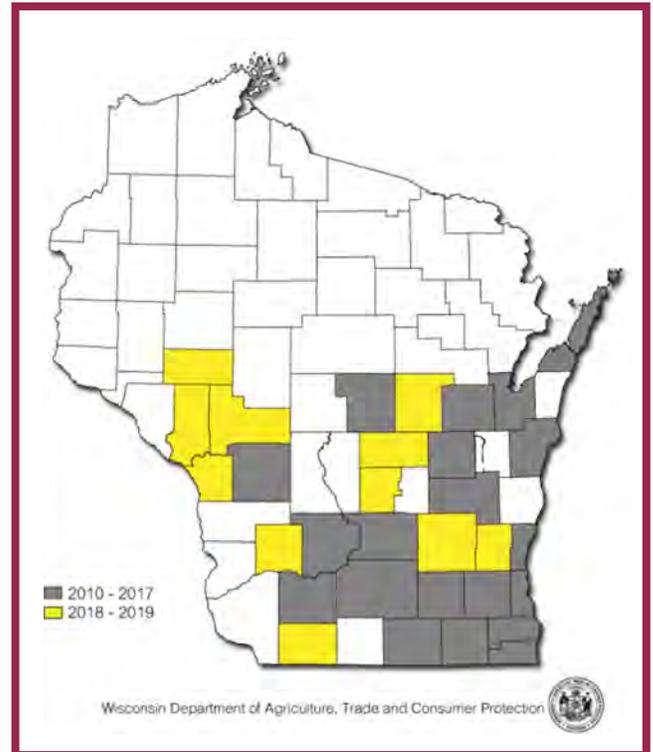
USDA SNAP-ED

Brown Marmorated Stink Bug (BMSB) - DATCP cooperators, the UW-Madison Division of Extension Door County agriculture agent, and two IPM Institute consultants set clear sticky panel traps in 39 apple orchards, 12 vineyards, and 8 cherry orchards. Ten trap locations in Dane, Lafayette, Racine, Richland, Rock, and Walworth counties were positive for BMSB.

The season's highest count was 62 BMSB adults and nymphs on a trap near Janesville. Rock County is one of several counties, along with Brown, Dane, Fond du Lac, Milwaukee, Outagamie, Waukesha, and Winnebago where densities are high enough that BMSB has become an urban nuisance. The three new additions to the Wisconsin BMSB distribution map this year were Dodge, Lafayette, and Waupaca counties. Thirty-one of the state's 72 counties are now known to be infested with BMSB.

Black Stem Borer - The Asian ambrosia beetle *Xylosandrus germanus* was identified on June 4 in an apple tree in a Lafayette County orchard. Black stem borer attacks a wide range of fruit trees and hardwoods and has been documented by DATCP in 21 Wisconsin counties since 2013. Until the Lafayette County report, there had been no confirmed cases of apple tree damage in the state.

Figure 11: Brown Marmorated Stink Bug Detections

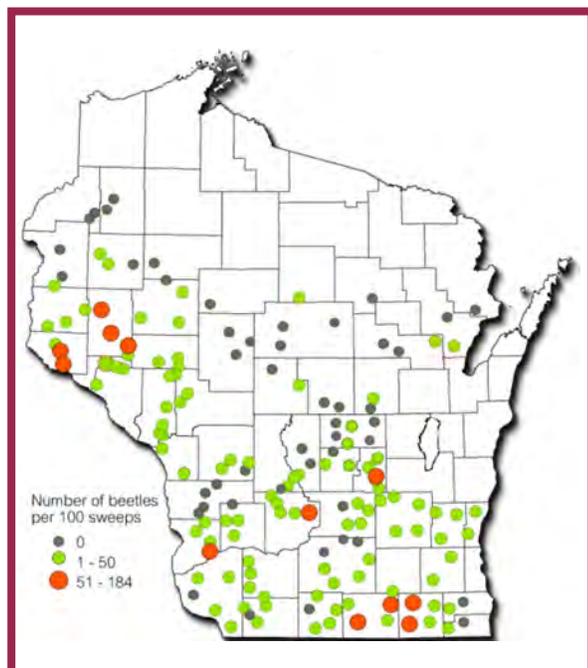


Asian ambrosia beetle, Xylosandrus germanus

PEST SURVEY SOYBEAN

Photo credit: agriculture.com

Figure 13: Japanese Beetle Survey Results



Soybean Aphid - Populations recorded during the annual survey were very low. The state average count in 160 fields sampled from July 26-August 26 was only five aphids per plant. For comparison, the 2018 survey found an average of 14 aphids per plant, the 2017 average was six aphids per plant, and surveys from 2010-2016 documented counts of 7-55 aphids per plant. This season's state average was the lowest in the 18-year history of Wisconsin soybean aphid surveys. In addition, no cases of pyrethroid insecticide failure were reported in the state in 2019.

Japanese Beetle - Defoliation was observed in 75% of the soybean fields examined in August. Counts taken during the soybean aphid survey ranged from 1-184 beetles per 100 sweeps, with a state average of 14 per 100 sweeps (the 2018 average was 8 per sweep). The highest counts of 50 or more beetles per 100 sweeps were noted in the southern and west-central districts for the second year in a row. The prevalence of Japanese beetles documented by the survey signals that this invasive pest is becoming an increasingly significant defoliator threat to the state's soybean crop.

PEST SURVEY INDUSTRIAL HEMP



Eurasian hemp borer in industrial hemp

Eurasian Hemp Borer - Moth emergence was first reported on May 26 in Walworth County and a peak in the spring flight was noted around June 9. Larval damage became evident by late June, when many hemp growers began noticing infestations in their fields. Reports of first-generation Eurasian hemp borer (EHB) damage were received by DATCP from July 1-14.

A second flight started around July 18 and continued for several weeks. The lengthy second flight produced widespread infestations of second-generation larvae ranging from very mild to severe. Observations from hemp inspections indicate EHB pressure was highest in southern Wisconsin. Eurasian hemp borer was the most common and destructive hemp pest reported in 2019.

PLANT INDUSTRY LABORATORY

DATCP's Plant Industry Bureau Laboratory - In 2019, the lab processed 1,805 samples for plant diseases, nematodes, and pest identifications. The lab houses both plant pathologists and entomologists. Plant pathology tested 1,000 samples for diseases and nematodes; and entomology examined 805 samples for pests. Plant pathologists detected 105 different plant pathogens on 624 nursery and Christmas tree samples; and 376 field crop, fruit, and vegetable samples.

Ramorum Blight - *P. ramorum* identification requires DNA-based laboratory testing to tell it apart from other *Phytophthora* blights and diebacks that are established in Wisconsin. USDA confirmed the *P. ramorum* identification by the lab. Since *P. ramorum* can spread and survive in water, DATCP collected pond water samples from one of the receiving nurseries in late August; these samples tested negative for *P. ramorum* and any other species of *Phytophthora*.

Other *Phytophthora* blights were detected on lilac (*P. citrophthora*) and rhododendron (*P. cactorum*, *P. citrophthora*, *P. nicotianae*, *P. pini* and *P. plurivora*). These *Phytophthora* species may also cause leaf blights, diebacks, and even plant death but not to the devastating extent caused by *P. ramorum*. All intercepted *Phytophthora* infected plants were removed from sale and destroyed.

DATCP issued a news release advising consumers who purchased azaleas and rhododendrons in 2019 to be on the lookout for the disease including potential spread to surrounding plantings with other host genera.

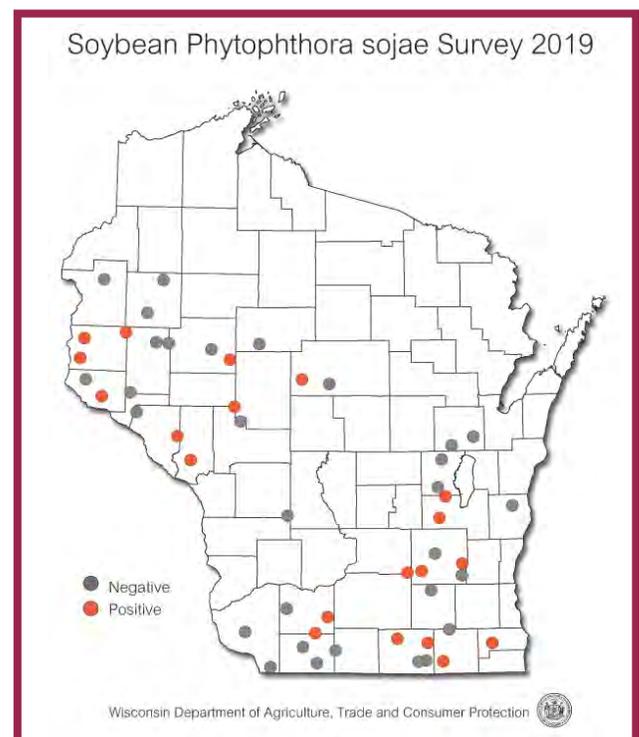


Stem symptoms of ramorum blight infected rhododendron

Soybean Seedling Root Rot - DATCP surveyed 52 soybean fields from June 21-July 19 for seedling root rot diseases. Twenty seedlings from each field were tested at the lab for *Phytophthora sojae*, general *Phytophthora* species, and general *Pythium* species, using molecular methods. Testing confirmed 38% (20 of 52) of fields were positive for *P. sojae* and 100% (52 of 52) were infected with *Pythium*. The *Phytophthora* rate was a decrease from the previous year when the pathogen was found in 46% (in 2018) of fields. Surveys in the past decade have found *P. sojae* prevalence ranging from 13% in 2011 to 49% in 2014.

In 2019, there were no detections of *Phytophthora sansomeana*. Since the first Wisconsin detection of this new species in 2012, *P. sansomeana* has been documented in twelve counties: Calumet, Dane, Dodge, Dunn, Eau Claire, Green, Jefferson, Outagamie, Marathon, Rock, Sheboygan, and Winnebago.

Figure 14: Soybean Seedling Root Rot Survey



Viruses of Ornamental Plants - Plant viruses continue to be one of the most prevalent plant health issues encountered at nurseries likely due to (1) a lack of awareness and (2) sometimes elusive symptoms. Wisconsin continues to have a zero tolerance policy for viruses, therefore it is important for nurseries to purchase virus-free tested stock, to be regularly scouting for symptoms, and to be practicing proper sanitation to prevent virus spread to avoid removal and destruction orders from DATCP.

In 2019, nursery inspectors collected 234 ornamental samples for testing at DATCP's lab. There were 113 of 234 (48%) samples that tested positive for at least one virus. And 43 out of 56 (77%) Iris samples were positive for a potyvirus, most likely iris severe mosaic virus. Wild or blue flag iris (2) did not test positive for potyvirus but rather tomato spotted wilt virus (TSWV). More hosts infected with potyviruses were: *Armoracia* (horseradish), *hosta*, *pulmonaria*, *sedum*, and *tradescantia*. Tobacco rattle virus (TRV) was detected on: *lamprocapnus* (*dicentra*), *astilbe*, *hosta*, *hydrangea*, and *sedum*. *Astilbe* and *prunus* "Weeping Yoshino" tested positive for a virus in the ilarvirus group. Cucumber mosaic virus (CMV) was found on *aconitum*, *ajuga*, and *lamprocapnos*. *Impatiens necrotic spot virus* (INSV) was found on *lobelia*, *begonia*, and *actinidia* (*kiwi*). Other virus finds include: TSWV on *hosta*, tobacco mosaic virus (TMV) on *sedum*, lilac leaf chlorosis virus (LLCV) on lilac and clematis chlorotic mottle virus (CICMoV) on clematis. *Delphiniums* sent to USDA for further testing were positive for potato virus S and a caulimovirus.

Table 6: 2019 Survey of Viruses in Ornamental Plants

VIRUS SAMPLES	POTY ¹	TRV ²	HVX ³	ILAR ⁴	CMV ⁵	INSV ⁶	LLCV ⁷	TMV ⁸	TSWV ⁹	CICMoV ¹⁰
No. of positives	61	13	16	7	4	3	1	3	3	2
No. of plants tested	94	37	81	19	44	31	1	38	46	2
Percent of positives	65%	35%	20%	37%	9%	10%	100%	8%	7%	100%

¹Potygroup viruses; ²Tobacco rattle virus; ³Hosta virus X; ⁴ilarvirus group; ⁵Cucumber mosaic virus; ⁶Impatiens necrotic spot virus; ⁷Lilac leaf chlorosis virus; ⁸Tobacco mosaic virus; ⁹Tomato spotted wilt virus; ¹⁰Clematis chlorotic mottle virus.

Lab Testing for Export Certification

In 2019, the pest survey team provided field inspections to 15 Wisconsin seed producers to meet phytosanitary certification requirements of importing countries. The lab tested 95 samples from nine field crops, fruits, vegetables, and small grains for 48 different bacterial, fungal, viral diseases, and nematodes.

Corn - All 49 seed corn samples submitted for testing were negative for Goss's wilt, Stewart's wilt, and bacterial leaf streak (*Xanthomonas vasicola* *pv.* *vasculorum*) in 2019. Stewart's wilt has not been detected in this state since 2010. Common rust (48%), gray leaf spot (33%), and anthracnose (22%) were the most common fungal pathogens. Corn virus screens showed no high plains disease (HPV), wheat streak virus (WSV), or maize chlorotic mottle virus (MCMV). Only one sample in Dane county tested positive for sugarcane mosaic virus (formerly maize dwarf mosaic virus).

Soybeans - Five samples were examined and found free from anthracnose.

Solanaceous crops (pepper tomato, tomatillos) - Twenty-two submissions were tested for and found free from potyviruses such as PSTVd, TCDVd.

Cucurbits - Seven squash and gourd samples were screened for several viruses including: potyviruses, squash mosaic virus, and zucchini yellow mosaic. None were detected.

Onions and small grains - Four samples were checked for diseases caused by nematodes such as *Ditylenchus dipsaci* and *Anguina tritici*. No plant pathogenic nematodes were detected.

Blueberry - Cuttings for planting (8 samples) tested negative for blueberry shock and blueberry scorch virus.

Fruit and Vegetable Survey - DATCP plant specialists visited 32 CSAs, community and immigrant gardens in the La Crosse, Madison, Milwaukee, and Hudson areas on a biweekly bases, checking for vegetable diseases. Orchard pest experts from the IPM institute scouted 12 vineyards and 8 orchards for this collaborative survey that targeted a total of 17 diseases of special concern to agriculture in the state. None of the targeted new and invasive pathogens were detected in 2019. However, an abundance of rain and cold temperatures in the spring followed by more rain throughout the summer created perfect conditions for many bacterial and fungal pathogens to cause significant disease problems on vegetable and fruit crops.

None of the targeted pathogens were detected, with the exception of late blight (*Phytophthora infestans*).

Table 7: 2019 Fruit and Vegetable Survey Target Pathogens by Crop Host

Primary Crop Host(s)	Common Disease Name	Scientific Name of Pathogen	Detected Y/N
Tomato and pepper	Bacterial wilt and canker of tomato	<i>Clavibacter michiganensis michiganensis</i>	N
Tomato, pepper, potato	Late blight of tomato/potato	<i>Phytophthora infestans</i>	Y
Tomato, pepper, potato	PSTVd, TCDVd virus symptoms	<i>Potato spindle tuber and tomato chlorotic dwarf pospiviroids</i>	N
Onion, garlic, bulb flowers	Stem and bulb nematode	<i>Ditylenchus dipsaci</i>	N
Cucurbits	Downy mildew of cucurbits	<i>Pseudoperonospora cubensis</i>	N
Cucurbits	Cucumber green mottle mosaic (CGMMV)	<i>Tobamovirus Cucumber green mottle mosaic virus</i>	N
Corn	Java downy mildew	<i>Peronosclerospora maydis</i>	N
Corn	Philippine downy mildew	<i>Peronosclerospora philippinensis</i>	N
Strawberry/Asian pear	Asian pear blight	<i>Erwinia pyrifoliae</i>	N
Apple	Apple proliferation	<i>Candidatus Phytoplasma mali 16SrX-A</i>	N
Apple	Virus symptoms	Apple mosaic virus (ApMV)	N
Apple	Apple crown and root rot	<i>Phytophthora sp.</i>	N
Apple	Marssonina blotch	<i>Marssonina coronaria</i>	N
Grape	Australian grapevine yellows	<i>Candidatus Phytoplasma australiense 16SrXII-B</i>	N
Grape	Flavescence doree	<i>Candidatus Phytoplasma vitis 16SrV-C</i>	N
Grape	Boir noir, Stolbur	<i>Candidatus Phytoplasma solani 16SrXII-A</i>	N
Grape	Pierce's disease	<i>Xylella fastidiosa</i>	N

Potato and Tomato Late Blight - There was a significant increase in late blight pressure compared to 2018. Late blight was reported in 18 counties in 2019 compared to only four in 2018. The state's first infected commercial potato fields were confirmed by the UW Plant Pathology Department in Wood County on July 17. The lab confirmed late blight on tomatoes in four counties: La Crosse, Polk, Pierce, and St. Croix. UW Plant Pathology reported that all 2019 late blight isolates were US-23 pathogen genotype, which has not developed resistance to phenylamide fungicides such as mefenoxam.

Pepper - Bacterial diseases caused significant problems on peppers, leading to bacterial spot (*Xanthomonas vesicatoria* or *X. euvesicatoria*) and syringae seedling blight and leaf spots (*Pseudomonas syringae*) on 10 of 14 (71%) samples submitted to the lab. Bacterial spot is a serious problem on peppers causing lesions on fruit and stem which renders the fruit unmarketable. In addition, major crop losses result from the shedding of blossoms and young, developing fruit.

Pospivroids - Potato spindle tuber viroid (PSTVd) and tomato chlorotic dwarf viroid (TCDVd) are of concern to Wisconsin exporters of pepper, potato, and tomato seed. These viroids are highly transmissible by seed and by touching infected plants. Twenty-eight samples from Dane, Kewaunee, La Crosse, and Polk counties tested negative for these viroids.

Cucurbit: Cucurbit Downy Mildew - Cucurbit downy mildew (CDM) was first diagnosed on August 20 in Dane County by the UW Plant Pathology Department, with subsequent detections in Buffalo and Vernon counties. This aggressive foliar disease produces no direct symptoms on cucumber fruits, but increases the risk of sunscald, causes secondary fruit decay, and reduces photosynthetic activity. Cucurbit downy mildew spreads into the northern U.S. in summer on airborne sporangia from infected plants in other states. Nationwide forecasting and reporting of CDM can be found at <http://cdm.ipmpipe.org/>.

The DATCP fruit and vegetable survey found common diseases such as anthracnose (*Colletotrichum orbiculare*) on cucumber, bacterial leaf spot, angular leaf spot (*Pseudomonas sp./Xanthomonas sp.*) and downy mildew on squash and pumpkins. Lab testing showed that cucumber green mottle mosaic virus (CGMMV), a disease of concern for crop exporters, was not present in any cucurbit samples submitted.



Tomato leaves and fruit with late blight symptoms



Alternaria fruit rot on peppers

POTATO ROT NEMATODE PROGRAM

Potato Rot Nematode - Priority fields are inspected for potato rot nematode which include fields going into seed potato production for the first time and previously infested fields with a current crop of potatoes. New fields that have no evidence of potato rot nematode are allowed into the Wisconsin Seed Potato Certification Program. Fields with a history of potato rot nematode are released from quarantine after fumigation and two successive potato crops with no evidence of potato rot nematode. There has never been a report of an interception in state or out of state of seed potatoes or commercially grown potatoes with evidence of potato rot nematode.

Inspection Results for 2019

Fifteen potato fields, totaling 788.8 acres, were inspected for potato rot nematode in 2019. All fields were new to seed potato production and found to have no evidence of the disease.



Table 8: Number of Fields and Acres by County and Current Potato Rot Nematode Status

County	Current Status	Sum Of Acres	Field Count
Forest	Released not used for potato	15	1
Kenosha	Released not used for potato	1	1
Langlade	Infested	397.3	18
Langlade	Released not used for potato	197.77	9
Langlade	Released/certified seed	1,742.44	51
Langlade	Released/table stock	538.04	23
Lincoln	Released/certified seed	37	1
Manitowoc	Released/certified seed	9.3	1
Marathon	Infested	8.4	1
Marathon	Released/certified seed	64.5	2
Portage	Released/table stock	38.2	1

SEED LABELER'S PROGRAM

Seed Labeling Compliance Program - DATCP inspects all licensed seed labelers in the state on a three-year rotation while targeting labelers that historically exceed the state violation average. An average of 29% of the licensed labelers have been inspected annually over the program's past 10-year history. During the 2019 season, DATCP focused on three companies with compliance records for priority sampling in addition to companies who had not been sampled in the past two years. Also targeted for 2019 sampling were grasses, mixtures, and legumes.

Concern over the agricultural weeds Palmer amaranth and waterhemp also prompted these species to be added to the noxious weed seed list in 2019.

In 2019, DATCP issued licenses to a record total of 789 seed labelers (Table 9). Fifty-nine seed labelers from 2018 claimed "out of business" or canceled their licenses and 96 new licenses were processed. There were 192 (37%) licensed labelers inspected and 111 (15%) were sampled for a total of 371 samples.

The overall violation percentage of 6.3% is 1.2% higher than last season and is among the lowest in program history and indicates a continuing trend of improvement in labeling compliance.

Table 9: 10-Year Seed Inspection Results (2010-2019)

Year	Number of Labelers	Number of Samples	Number of Violations	% Violation	% Labelers Inspected	% Labelers Sampled
2010	685	308	38	12.34%	33%	15%
2011	725	336	33	9.82%	23%	13%
2012	729	335	38	11.34%	30%	12%
2013	725	375	30	8.00%	26%	14%
2014	730	341	18	5.30%	29%	12%
2015	725	343	16	4.66%	33%	14%
2016	728	374	18	4.8%	28%	16%
2017	742	410	22	5.37%	24%	16%
2018	743	371	17	5.12%	26%	15%
2019	789	392	26	6.6%	37%	16%



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