BUREAU OF PLANT INDUSTRY

Photo by Krista Hamilton, DATCP

ANNUAL REPORT 2020

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	2020 Highlights
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.	• 141 beekeepers inspected • 2,396 hives opened for inspection • 83 inspection certificates issued for 38,226 migratory hives
The **Christmas Tree Program** licenses Christmas tree growers, inspects and certifies Christmas trees as being reasonably free of damaging insects and diseases. Provides required certificates to interstate and international shippers. Local sellers benefit by receiving inspections and information on pests and diseases. Christmas tree lots, wreath, and roping producers are also inspected.	• 517 fields inspected • Gypsy moth detected in 28 fields; Elongate hemlock scale detected at 2 lots
The **Phytosanitary 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.	• 13,135 applications processed • Export to 76 countries; Export product value over $845 million • Top export commodity: soybean grain
The **Firewood Certification Program** is a voluntary program available to firewood dealers that heat treat firewood or season it for 24 months to kill pests 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.	• 33 dealers certified • 92 dealers certified since the program's inception
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.	• 21 hemlock woolly adelgid compliance agreements signed • 8 gypsy moth compliance agreements signed
Forest Pest Survey conducts field surveys for early detection and monitoring of new and emerging forest pests in Wisconsin. Survey and detection work also focuses on presence/absence surveys for regulated pests and monitoring established pest-free areas in support of DATCP's Christmas tree, Nursery, and Forest Pest regulatory programs.	• 148 traps monitored • 808 trap samples collected • 15,346 specimens identified and screened for regulated & non-native species
The **Gypsy Moth Program** is a cooperative effort between DATCP, USDA-Forest Service (FS), 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 gypsy moth populations and determine potential spots for treatment the following season.	• 58 treatment sites, totaling 152,978 acres • 83,720 male moths captured in 10,139 traps

The **Hemp Research Program** regulates the production of hemp as defined at Wis. Stat. § 94.55(1). The hemp program provides the opportunity to plant, grow, cultivate, harvest, produce, sample, test, process, transport, transfer, take possession of, sell, import, and export hemp in this state to the greatest authorized under federal law.	• 1,301 hemp growers and 649 processors licensed • 5,444 acres of hemp planted across 72 counties • 1,752 regulatory samples
The **Nursery Program** provides regulatory inspection of licensed nursery growers and nursery dealers 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.	• 582 nursery growers and 1,175 nursery dealers licensed • 701 site inspections
The **Plant Industry Bureau Laboratory** provides plant disease diagnosis and insect pest identification for the Bureau's Christmas Tree, Nursery, and Pest Survey Programs. The lab also performs testing for phytosanitary certification necessary for domestic and international export of plants and plant products.	• 791 samples processed for plant diseases • 146 plant samples processed for insect pests
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.	• 18 fields (875.7 acres) inspected for PRN • One field tested positive for PRN during harvest inspections
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.	• 1,546 crop fields surveyed • 99 fruit and vegetable sites surveyed
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. * Due to the COVID pandemic hitting right at the time we began sampling, most sampling efforts and laboratory testing were put on hold for the safety of our inspectors and the public.	• 821 seed labeler licenses issued • 39* license-holders inspected • 84* samples collected

APIARY PROGRAM

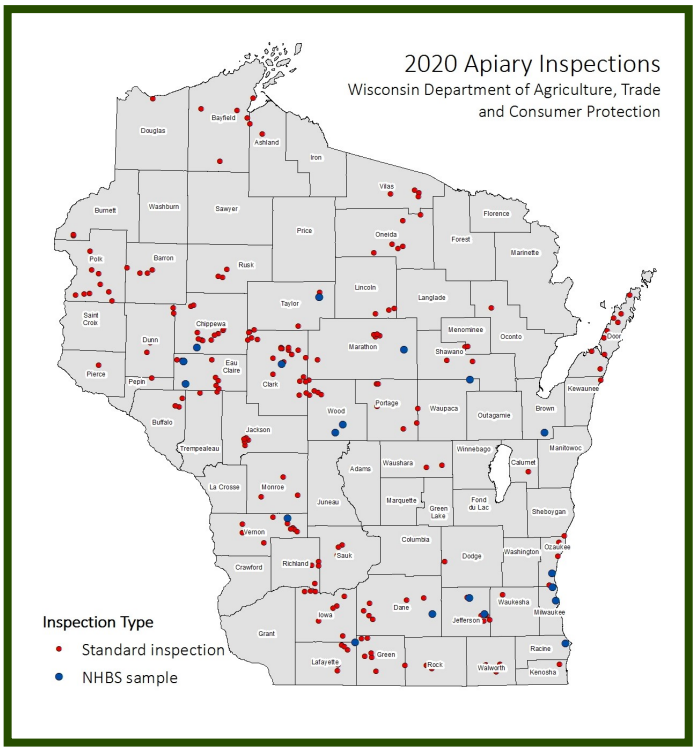
Apiary Inspections

Apiary inspectors visited 141 beekeepers this year, opening 2,396 hives for inspection. Based on these voluntary inspections, winter mortality decreased for the third year in a row from 32% in 2018-19 to 20% in 2019-20, which is slightly lower than the 22% national average winter loss for beekeepers during the same time period. Varroa mite was detected in 65% of hives sampled for this pest, compared with 51% last season. Other pests and diseases found include American foulbrood in 0.6% of colonies, European foulbrood in 1.2%, chalkbrood in 8.3% of colonies, deformed wing virus in 9.3%, sacbood virus in 9.7%, and small hive beetle in 2.1% of colonies. Inspectors issued 83 apiary inspection certificates for 38,226 migratory hives, primarily destined for California, Florida and Texas to be used for pollination services.

Table 1: Apiary Inspections 2020

Year	2016	2017	2018	2019	2020
Total hives opened	2208	4214	3342	3398	2396
Varroa mite	68%	64%	58%	51%	65%
Small Hive Beetle	7.5%	10.2%	1.7%	6.3%	2.1%
American Foulbrood	1.2%	0.1%	0.1%	0.7%	0.6%
European Foulbrood	0.3%	0.2%	0.3%	6.4%	1.2%
Chalkbrood	2.8%	4.2%	1.1%	5.9%	8.3%
Sacbrood virus	0.4%	5.8%	1.4%	4.8%	9.7%
Deformed wing virus	7.3%	19.8%	1.2%	11.8%	9.3%

Figure 1: Apiary Inspections 2020



National Honey Bee Health Survey (NHBS)

Wisconsin continued to participate in the USDA National Honey Bee Health Survey for the tenth 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 USDA Bee Research Lab for virus analysis, and 10 pollen samples were submitted for pesticide analysis. The full results are still pending. To date, no *tropilaelaps*, *Nosema apis*, Slow Bee Paralysis Virus or *Apis mellifera capensis* have been found. American and European foulbrood, *Nosema ceranae*, Varroa mites, chalkbrood and various viruses--including varroa destructor virus and k-wing were found.

CHRISTMAS TREE PROGRAM

INSPECTIONS OF CHRISTMAS TREES

Inspections of Christmas trees begin September 1st. In addition to Christmas trees, staff inspect fence rows and wood lots adjacent to each field for evidence of gypsy moth life stages. Christmas tree growers who plan to ship trees interstate 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. Support from the Gypsy Moth Trapping Program 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 the DATCP Plant Industry 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 Christmas tree growers selling trees have the appropriate license with DATCP. In 2020, 57 Christmas tree lots were inspected. Of these, two (including one chain store with multiple locations) had imported material from out-of-state 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

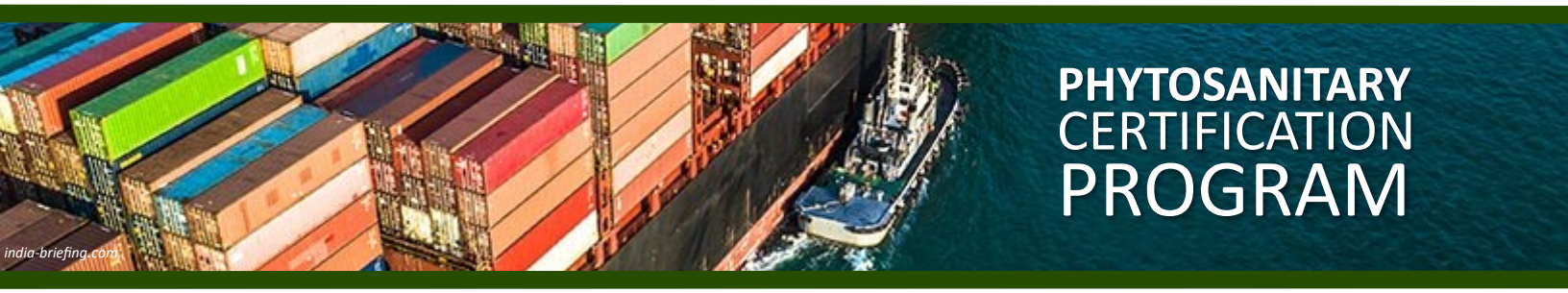
Top 10 Christmas Tree Pests Found in 2020

Diseases and abiotic factors: Broom rust of fir (71), root rot (45), Rhizosphaera on fir (42), Lirula needle-cast (40), mortality (23), bud damage (15), chlorosis (14), brown spot (13), envirionmental/abiotic (13).

Insects/Pests: Balsam twig aphid (145), white pine weevil (61), balsam gall midge (46), deer damage (32), fir coneworm (27), Zimmerman pine moth (19), pine leaf beetle (13), pine needle scale (12), Allegheny mound ant (11), Eastern spruce gall adelgid (11).

Table 2: Christmas Tree Field Inspection Finds 2010-2020

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
2020	517	28	0



PHYTOSANITARY CERTIFICATION PROGRAM

2020 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 2020, the program was responsible for the export of over $845 million in plants and plant products. The total number of certificates (phytos) printed was 9,332, that's an increase of 805 from 2019. China, Southeast Asia (Indonesia, Malaysia, Philippines, Thailand), Vietnam, and Taiwan remained top destination countries. The export of grain, including corn and soybeans, accounted for the largest percentage of 50%, followed by wood products at 36%. No Wisconsin commodities were rejected or destroyed at destination ports in 2020.

Table 3: Federal Certificates

Application/Certificate Status	2019 % of Total Applications	2019 % of Total Applications	2020 % of Total Applications	2020 % of Total Applications
Canceled	42	0%	40	0%
Printed	8,504	70%	9,332	71%
Replaced	2,497	20%	2,489	19%
Returned	10	0%	27	1%
Voided	1,036	8%	1,102	8%
Work in Progress	136	1%	145	1%
Total Applications	**12,225**	**99%**	**13,135**	**99%**

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

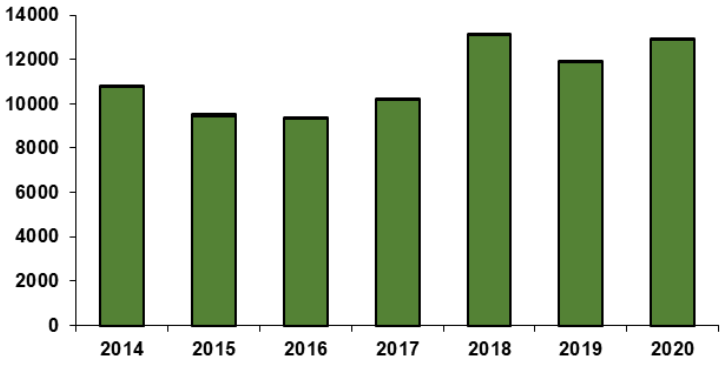
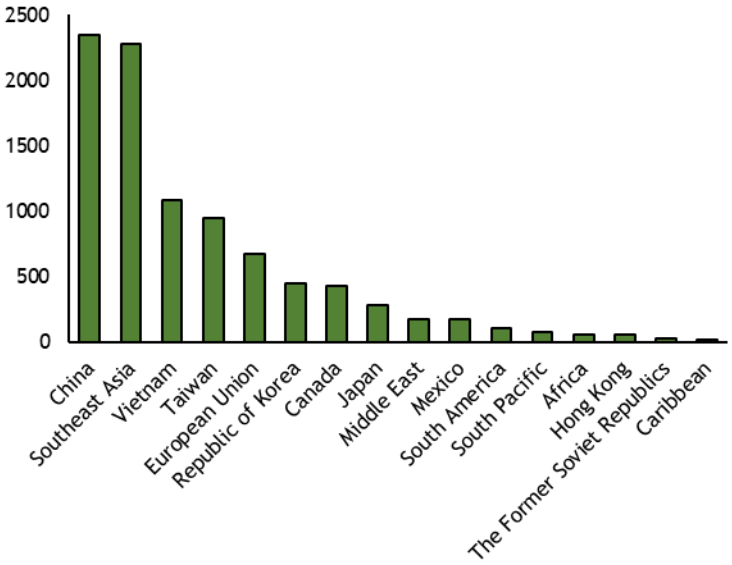


Figure 3: Total Certificates Issued by Country Destinations



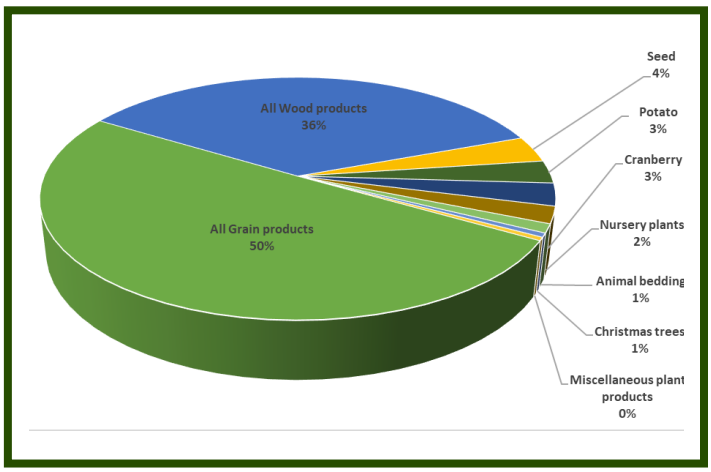
Highlights

- Wisconsin exported to 76 countries in 2020
- Total export product value was over $845 million
- Top export commodity was soybean grain

SEED FIELD INSPECTION SUMMARY

1,074 acres were inspected for 18 seed producers. Corn, soybean, onion, oat, and garden bean were the 5 seed crops inspected for regulatory pests, noxious weeds, bacterial and fungal diseases, and viruses. Seed producers intend to export to the countries of Argentina, Australia, Brazil, Canada, Chile, China, European Union, Israel, Japan, Kazakhstan, Malaysia, Mexico, New Zealand, Peru, Russia, South Africa, Thailand, Turkey, United Kingdom, and Ukraine.

Figure 4: Commodities and Certificates Issued in 2020



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 33 dealers in 2020
- Certified 92 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.

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
- 13 nursery and forest product industry individuals trained in gypsy moth identification

OUTREACH

2020 saw a dramatic increase in DATCP's efforts to increase awareness of invasive plant pests. DATCP was able to use grant funds to hire an outreach intern to create and help post timely social media messages.

Outreach messages covered a variety of topics such as "Don't Move Firewood" and invasive insects like Spotted Lanternfly, depicted on the billboard below that was displayed in 3 locations in SE WI last fall.

FOREST PEST HIGHLIGHTS

EMERALD ASH BORER

DATCP continues to receive and validate reports of dying ash trees due to the emerald ash borer (EAB) from citizens, arborists, and tribal, municipal, state and county forestry staff. In 2020 these reports resulted in six new county detections in central and northern Wisconsin, including Dunn, Florence, Oconto, Pepin, Price and Shawano counties, and 275 municipal confirmations located within previously confirmed counties. New detections were significantly higher in 2020, with just 55 reports received in 2019, and more than double those ever reported in any year prior. Likely reasons for the substantial increase may be due to a greater number of people spending time outdoors due to the pandemic and dedicated effort by municipal and DNR forestry staff to document EAB in those locations believed to be likely infested, but hadn't yet been confirmed.

DATCP continues to track EAB's spread, sharing detection information by an online map available to Wisconsin's citizens, private businesses, and governmental entities to aid in EAB readiness planning, management and biological control activities. In just 12 years since finding the State's first infested ash trees, only 14 of 72 counties and little over half (56%) of the state's 1,849 municipalities remain free of this pest. EAB is now widespread across the southern half of the state and the southern third is now confirmed generally infested with dead and declining ash evident throughout. Although still more isolated, established EAB populations in northern counties have expanded in 2020 and decline across these areas where 71% of the state's ash volume is found has just begun to impact the large swaths of ecologically important black ash dominant swamps.

Figure 5: 2020 EAB locations

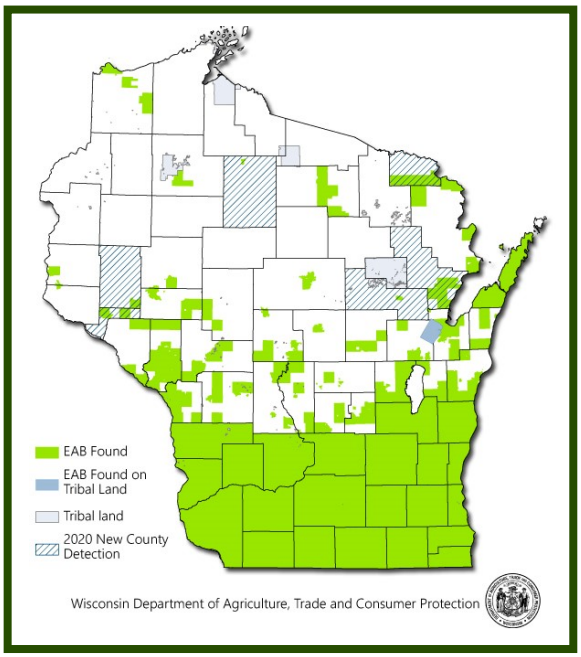


Table 4: Number of new county and municipal level confirmed EAB detections from 2008 to present

Year	Statewide Detection (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
2020	275	6	ALL
Total	**533**	**58**	**72**

COTTONY ASH PSYLLID

A Wood County homeowner reported this seldom-observed exotic European pest of ash this season. Adult psyllids, also known as jumping plant lice, were found on the main trunk of a 12-year-old Mancana ash in late June, followed by nymphs within twisted and curled foliage by mid-July. This was the second report of cottony ash psyllid in Wisconsin, with the first detection confirmed by UW-Extension in 2006 on samples from St. Croix County. Unlike native foliage pests such as ash plant bug or ash leaf curl aphid that cause mostly cosmetic damage, infestation by this pest over multiple years can be lethal to black and Manchurian ash and their cultivars.

Mancana ash showing early stages of cottony ash psyllid infestation with decline beginning in the lower canopy before moving towards the top

FIR CONEWORM

Damage to terminals of young plant stock and recently transplanted Fraser, Canaan, and balsam fir trees was observed in Dodge, Dunn, Grant, Jackson, Jefferson, Langlade, Marathon, Marquette, Portage, Taylor, Walworth and Waushara counties in 2020. Less common were reports of damage to white pine leaders and main stems in Dane, Eau Claire, and Polk counties. Although more commonly reported as a cone feeder, fir coneworm caterpillars are often found feeding within terminal shoots or within the first branch whorl of young and recent transplant stock. In white pine, larvae have been found boring in the terminal leader and feeding in the cambium lower on the stem at branch whorls of larger plant stock. Lab confirmed samples taken from Christmas tree plantations since 2018 have documented a sustained presence of this pest statewide.

White pine stem broken open at branch whorl to show fir coneworm infestation

Fraser fir showing wilted terminal shoot and symptomatic frass and feeding damage by fir coneworm larvae

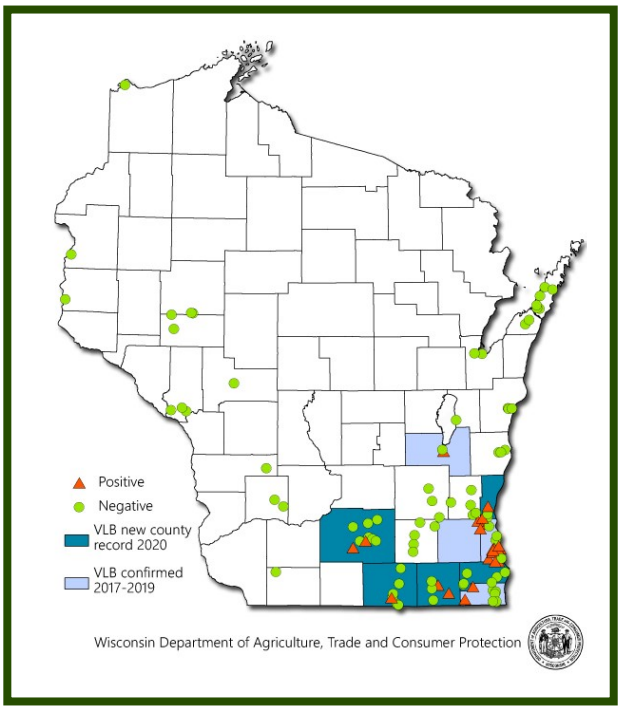
FOREST PEST SURVEY SUMMARY

VELVET LONGHORNED BEETLE

Survey work continued in 2020 in response to the 2017 detection of this potential fruit and landscape tree pest. Trapping surveys in the last four years have collected a total of 110 velvet longhorned beetle (VLB) adults at 28 sites across nine counties; including Dane, Fond du Lac, Kenosha, Ozaukee, Milwaukee, Racine, Rock, Walworth and Waukesha counties. The majority of VLB (86%) have been collected in Milwaukee County and sites where the insect has been found include industrial and manufacturing areas, in the vicinity of Mitchell International Airport, and apple orchards. The beetle was also intercepted in Wisconsin in 2016 infesting rustic hickory-style log furniture manufactured in China.

Trapping surveys were conducted at 25 urban industrial locations and 26 fruit orchards across 17 counties June – August, 2020. Survey results found VLB present in Wisconsin orchards for the first time, with three orchard traps in Kenosha, Dane, and Rock counties capturing a single beetle each. Six urban traps collected eight beetles in Dane, Ozaukee, Racine and Walworth counties, all locations representing new county records.

Figure 6: Velvet Longhorn Beetle Detections



The pest potential of this introduced Asian woodborer in Wisconsin is unclear and no local infestation or host impact has been documented. VLB has the ability to infest a wide range of living, but stressed, forest, orchard and urban trees. This woodborer has also demonstrated an ability to survive in wood packing, dry wood hosts and finished forest products. Ongoing trapping is planned for 2021 to understand the threat, if any, that this new pest may pose to Wisconsin orchards.

WALNUT TWIG BEETLE

DATCP has conducted surveys for walnut twig beetle (WTB), *Pityophthorus juglandis*, since 2011 when an exterior quarantine for thousand cankers disease went into effect. Annual surveys have established the absence of this pest across the natural range of walnut in Wisconsin. Current surveys consisted of setting three phermomone baited traps at each of four sawmill locations to monitor for beetle presence at sites processing walnut logs sourced from out-of-state. Traps were set in log yards and monitored May – September. The laboratory processing of 90 sample collections found no WTB, but did identify a handful of exotic ambrosia beetle species more recently documented in the state. The ambrosia beetles identified and number collected include; *Ambrosiophilus atratus* (17), Cyclorhipidion bodoanum (1), Cyclorhipidion pelliculosum (9), Xylosandrus crassiusculus (9) and Xylosandrus germanus (416). Although most species are thought to only attack severely weakened and stressed host trees, X. crassiusculus and X. germanus are documented pests of nursery stock and fruit trees that sometimes require chemical treatments to reduce pest populations from reaching damaging levels. For more information on the status of X. germanus in Wisconsin orchards please see the fruit section.

Walnut twig beetle

EXOTIC WOODBORER SURVEY

This annual survey focused on detection of non-native bark and ambrosia beetles in 2020. Early detection surveys targeting new and recently introduced species can increase the likelihood of successful eradication and control efforts when necessary. Trapping surveys were conducted at sawmill, biofuel and county wood disposal locations in 2020 to address the risk of beetle introductions along these wood movement pathways.

Two multi-funnel traps baited with a general woodborer attractant either conifer or deciduous hosts were set at each of 10 sites across Barron, Buffalo, Crawford, Dunn, Grant, La Crosse and Rusk counties. Traps were monitored biweekly mid-April through August and 124 trap samples collected. A total of 2692 beetles were identified during laboratory processing, with 25% representing non-native species. Non-native species were comprised of 62 bark beetles and 602 ambrosia beetles (Table 5). An additional noteworthy detection, 13 specimens of the seldom collected native species Orthotomicus latidens were recorded from Grant County. Potential impact to host health is likely limited for most of these species, however X. germanus and X. crassiusculus have been documented to attack and kill stressed nursery stock and further weak stressed fruit trees in orchard situations.

Table 5: Exotic Woodborer Survey Results

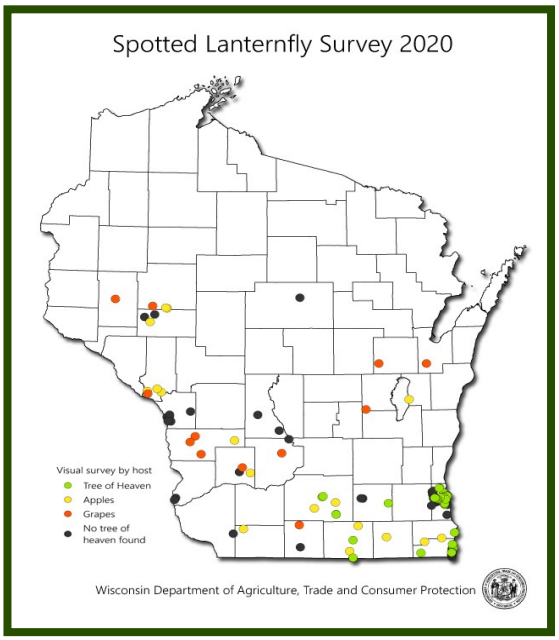
Non-native Species Identified	Number Collected
Ambrosiodmus rubricollis	1
Cyclorhipidion pelliculosum	1
Hylastes opacus	33
Scolytus mali	2
Scolytus schevyrewi	22
Tomicus piniperda	5
Xyleborinus saxesenii	135
Xylosandrus crassiusculus	4
Xylosandrus germanus	461
Total	664

SPOTTED LANTERNFLY

DATCP increased early detection efforts this year to keep this highly invasive "hitchhiker" out of the state. Fifty-three sites with tree of heaven (*Ailanthus altissima*), spotted lanternfly's preferred host, were identified and surveyed for spotted lanternfly (SLF) life stages. Tree of heaven (TOH) was found in Dane, Jefferson, Kenosha, Milwaukee, Racine and Rock counties. In Milwaukee County, a limited number of baited circle traps were monitored from August-November to pilot this potential detection tool. In addition to TOH surveys, visual surveys in search of SLF life stages were conducted at 12 vineyards and 18 apple orchards during the growing season.

Live SLF have not been found in Wisconsin, however a regulatory incident occurred in December where a Marquette County resident reported a single dead adult SLF they found in a workshop receiving frequent shipments from online retailers. A site visit was conducted and no additional SLF life stages were found. More information about this pest is available at https://slf.wi.gov.

Figure 7: 2020 Spotted Lanternfly Visual Surveys



GYPSY MOTH PROGRAM

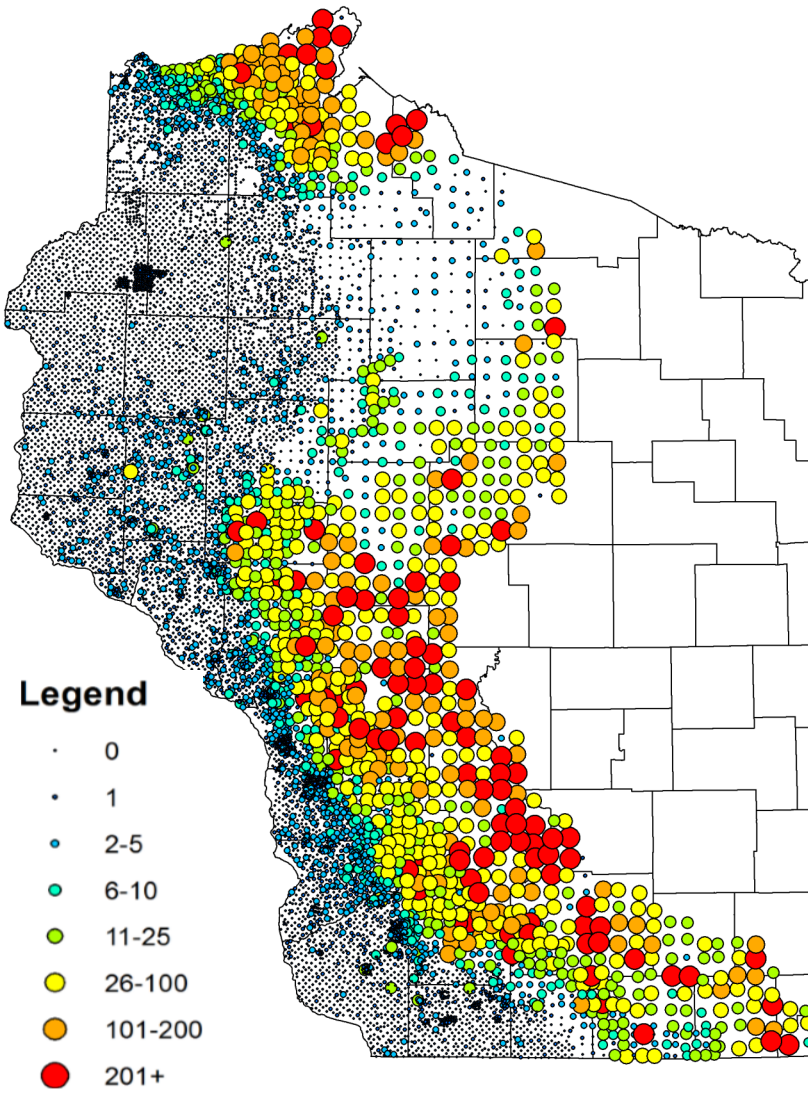
GYPSY MOTH

In 2020, gypsy moth trappers set 10,139 traps across western Wisconsin and reported a total of 83,720 male moths caught (8.3 moths/trap). This total represents a 60% increase from last year's numbers (2019: 52,396 moths, 4.8 moths/trap). Moth trap catch numbers increased markedly statewide in 2020 after two consecutive years of decreased catches. Mild winter temperatures and spring conditions favorable for larval development were likely important factors in the population increase. The advancing gypsy moth front in Wisconsin moved an average of 5.9 km westward. This was largely driven by movement in the southern and central regions of the state.

The Gypsy Moth Slow the Spread Program treated 58 sites totaling 152,978 acres in 2020. Al's Aerial Spraying of Ovid, MI applied all BTK and mating disruption (MD) products. BTK applications began May 20th and ended June 5th. Foray BTK was applied to 19,322 acres at 28 sites in western WI. The Forest Service mating disruption applications occurred from June 29th- July 15th. A total of 133,656 acres at 30 sites were treated with MD in western Wisconsin.

Federal and state quarantines are expected to be enacted for Eau Claire and Richland counties in early 2021. With these additions, 52 of Wisconsin's 72 counties are now under quarantine for gypsy moth.

Figure 8: Gypsy Moth Population Monitoring, 2020



USDA APHIS PPQ archive

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

HEMP PROGRAM

DATCP RESPONSIBILITES

Execute authorities granted under Wis. Stat. § 94.55 and promulgate emergency rule (Wis. Admin. Code ch. ATCP 22).

Due to changes in state and federal laws, as of the writing of this report, DATCP has promulgated three emergency rules for Wis. Admin. Code ch. ATCP 22.

DATCP anticipates promulgating additional emergency rules as needed.

More information about ongoing changes to the hemp program is available at the our webpage DATCP Home Hemp Program Transition (wi.gov).

- Process new grower and processor license applications and annual renewal registrations.
- Facilitate criminal background checks.
- Review varieties of hemp for approval.
- 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 lot with the allowable level of THC.
- Assure destruction of lots 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.

2020 HEMP PROGRAM DATA

Hemp Licensing:

1,301 growers licensed

- 1,249 could grow in 2020 because they had a 2020 grower annual registration.

649 processors licensed

- 619 could process in 2020 because they had a 2020 processor annual registration.

Hemp Planted, Sampled, and Tested:

5,444 acres of hemp were planted in 72 counties.

1,752 regulatory samples were taken. One regulatory sample is required per lot of hemp. One lot of hemp is one contiguous planting of one variety or strain.

Passed sample: A lot of hemp has passed the regulatory test if it has a total delta-9 THC content of 0.3% or below.

Failed sample: A lot of hemp has failed the regulatory test if it has a total delta-9 THC content of above 0.3%.

1,727 initial regulatory samples taken

- 1,552 initial regulatory samples passed (89%)
- 175 initial regulatory samples failed (11%)

25 were re-samples requested in the event of a failed initial regulatory sample

- 36% of the 2020 re-samples passed.
- 64% of the 2020 re-samples failed.

Additional hemp program data is available on our webpage DATCP Home Hemp Program Data (wi.gov).

HEMP PESTS

DATCP hemp inspectors conducted the state's first official industrial hemp pest survey in 2020, documenting the prevalence of five leading hemp insects and diseases: Eurasian hemp borer, European corn borer, gray mold, leaf spot, and white mold. Inspectors recorded pest observations at 877 distinct locations in 69 counties.

Eurasian hemp borer (EHB), thought to be the most common and destructive hemp pest insect in the state, was found at 15% of the sites. Eighty percent of those sites had light infestations impacting 1-10% of the plants, 14% had moderate infestations affecting 11-49% of the plants, and 6% had severe infestations (>50% of the plants). The highest EHB pressure was observed in Dane, La Crosse, Lafayette and Sauk counties. Dane County had the most fields with EHB infestations rated as severe.

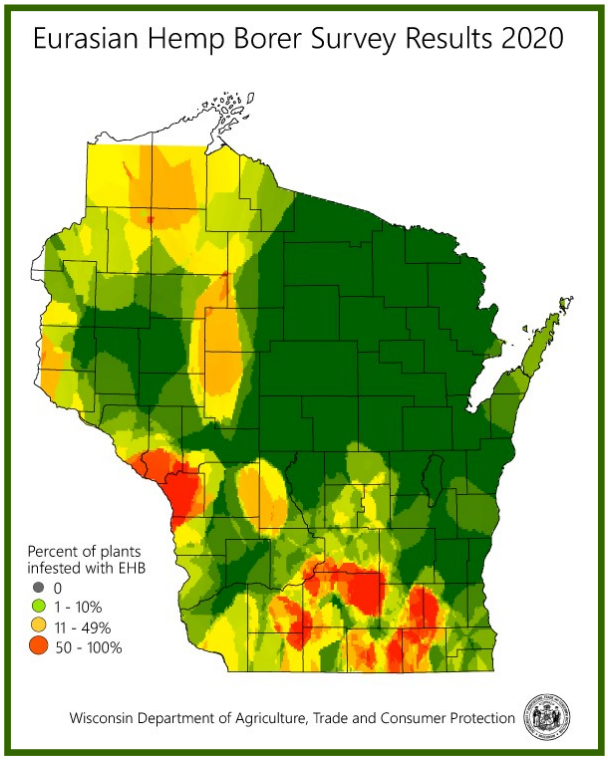
Inspectors also looked for European corn borer (ECB), which was found at 5% of sites. ECB pressure was low overall. Only two locations, one each in Dane and La Crosse counties, had heavy ECB populations affecting >50% of plants.

Of the three disease targets, hemp leaf spot was the most prevalent. Inspectors noted leaf spot symptoms at 42% of sites, white mold in 7%, and gray mold at 2% of the sites. Hemp leaf spot was mild, with 30% of fields rated as having light symptoms, 8% having moderate symptoms and 4% having severe symptoms (>50% of plants).

Table 6: Wisconsin's 2020 Hemp Pest Survey

	Total Positive	% Positive	50-100	11-49	1-10	0
EHB	134	14%	8	19	107	743
ECB	48	5%	2	6	40	829
Gray Mold	15	2%	0	2	13	862
Leaf spot	420	42%	42	83	295	457
White Mold	71	7%	0	8	63	806

Figure 8: Eurasian Hemp Borer Survey



Eurasian hemp borer in industrial hemp

THE NURSERY PROGRAM

NURSERY LICENSING AND INSPECTIONS

The Nursery Program licensed 582 nursery growers and 1,175 retailers this year, with staff performing 701 site inspections statewide. Annual inspections are prioritized for out-of-state shippers and those holding a Plant Health Certificate. The top 10 insects and diseases found were, by total number of detections: viruses, rusts, leaf spots, anthracnose, leafminers, aphids, Japanese beetle, powdery mildew, apple scab and spider mites. Summarized below are highlights from the 2020 inspections.

CONIFEROUS FIORINIA SCALE

This nonnative scale pest was detected on hemlock nursery stock imported from the Mid-Atlantic region to southeastern Wisconsin in July. Coniferous Fiorinia scale (*Fiorinia japonica*) originates in Southeast Asia and had not previously been reported in the state. This insect has the potential to impact native evergreens, including fir, pine, spruce, hemlock, juniper (including red cedar), and Canadian yew. DATCP issued a Pest Abatement Order to prevent this potentially invasive species from becoming established in Wisconsin.

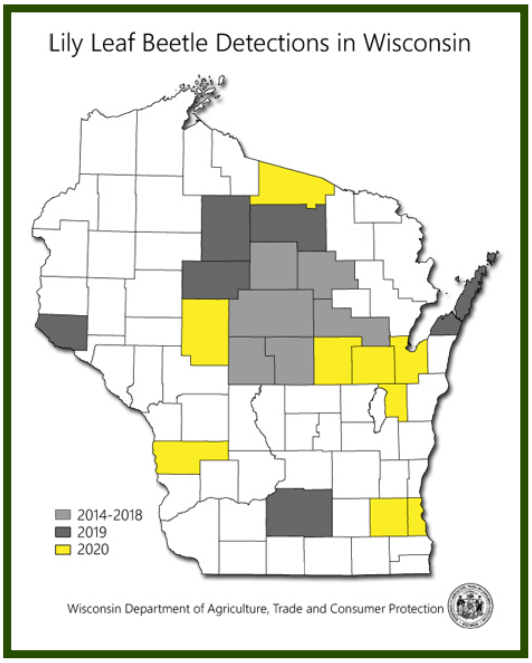
DAYLILY RUST

This disease was significantly more prevalent in 2020 than in prior years. Daylily rust is not known to overwinter in Wisconsin, but arrives by spores on southerly winds or on infected plants from out-of-state. Nurseries receiving daylilies infected with rust were allowed to either return the material to the supplier or cut back the foliage and apply a chemical treatment. Daylilies successfully treated could then be sold.

Coniferous Fiorinia scale

Daylily Rust

Figure 10: 2020 Lily Leaf Beetle



Lily Leaf Beetle

Viburnum Leaf Beetle adult

NR 40 INVASIVE PLANTS

NR40 invasive plants were found at 46 nursery locations this season, down from 69 in 2019. The phase-out period for selling remaining inventory classified as "restricted" ended May 1, 2020. Inspectors issued orders for the invasive plants to be either removed from sale and destroyed or returned to the supplier.

LILY LEAF BEETLE

The invasive red lily leaf beetle was documented in eight new counties this season: Brown, Calumet, Clark, Milwaukee, Outagamie, Vernon, Vilas, Waukesha, and Waupaca. First detected in Marathon County in 2014, lily leaf beetle has now been confirmed in 21 Wisconsin counties. Nurseries that grow lilies should become familiar with this beetle's life cycle and how to manage it, and pass the information along to their customers. Overwintered bright red adult beetles will begin feeding on foliage as soon as lilies break through the ground each spring.

VIBURNUM LEAF BEETLE

Nursery inspectors detected viburnum leaf beetle at 24 locations in southeastern Wisconsin in 2020. This recently-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. Viburnum leaf beetle has now been found in 11 Wisconsin counties since 2009: Brown, Dane, Iron, Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, Waukesha, and Winnebago.

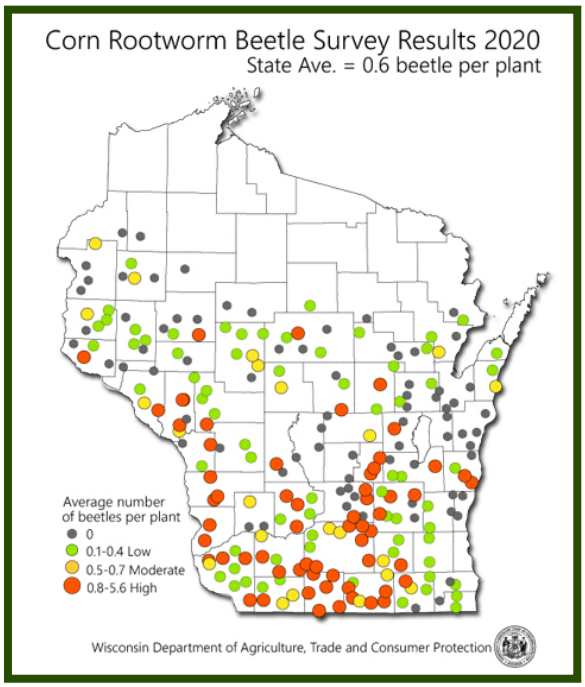
PEST SURVEY
CORN

CORN ROOTWORM

Beetle populations increased in 2020 to the highest levels recorded in five years. The annual survey in August documented a state average count of 0.6 beetle per plant in 229 fields, or twice the average found in 2019. The greatest increase was recorded in the south-central district (0.5 beetle to 1.3 beetles per plant), while counts were also relatively high in the southwest and central regions, at 0.6 and 0.7 beetle per plant, respectively. Cornfields with populations above the 0.75 beetle-per-plant economic threshold comprised 27% of this year's sites, compared to last year's 12%.

Based on the higher adult corn rootworm populations observed this season, southern Wisconsin corn producers should closely review their rootworm management plans for 2021 and consider crop rotation if practical.

Figure 11: 2020 Corn Rootworm Detection



CORN EARWORM

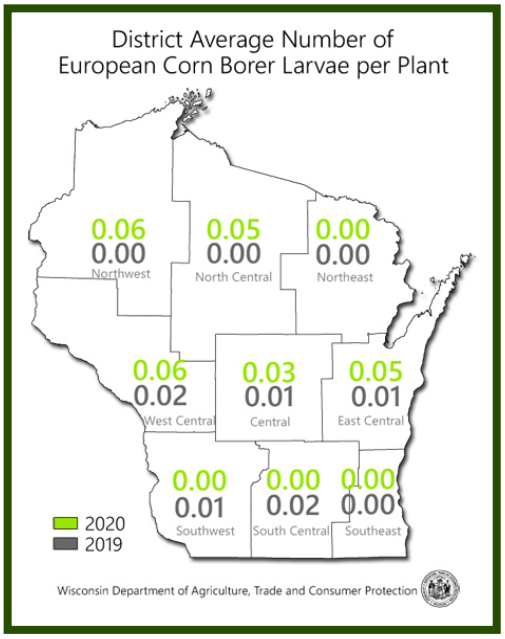
Pheromone traps captured a cumulative total of 4,747 moths in 18 traps during the late-season monitoring program, with the largest flights recorded during the first week of September. The highest individual pheromone count was 433 moths at Beaver Dam in Dodge County from August 27-September 2. Compared to 2019 when 3,495 moths were collected in 15 pheromone traps, this year's total count was 26% higher. The risk to late sweet corn from migrating corn earworm adults was also elevated in 2020, and the September moth flights produced localized larval damage to apples, corn and tomatoes. Earworm caterpillars were found in 10% of sites surveyed for European corn borer in fall.

Corn Earworm

EUROPEAN CORN BORER

Larval populations increased from historically low levels in 2018-2019, but remained extremely low. The state average count in 229 cornfields sampled was 0.03 borer per plant, which is only marginally higher than the all-time low average of 0.01 per plant recorded during the two preceding seasons. All three of the state's southern agricultural districts showed averages less than or equal to 2019 levels, while negligible increases were noted in the central and northern areas. Larvae were absent from 90% of the fields sampled in September and October. The near-record low number of corn borers observed again this year reflects the continued prevalence of Bt corn, which accounted for 79% of the state's corn acres in 2020.

Figure 12: 2020 European Corn Borer



European Corn Borer

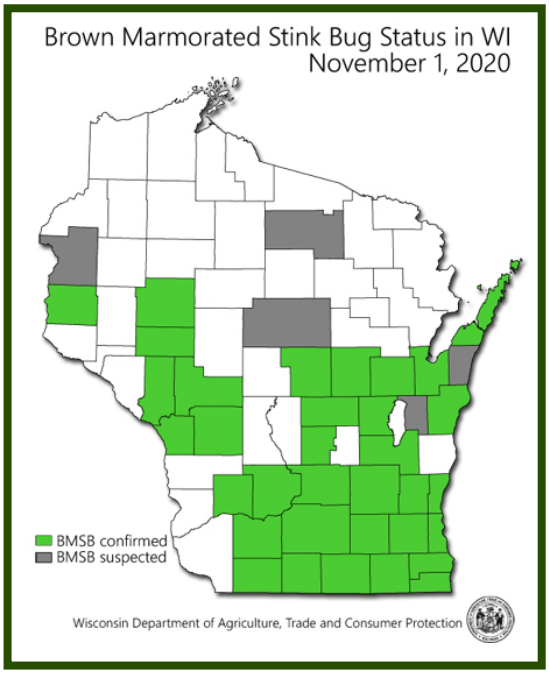
BLACK CUTWORM

Early corn planting and a delayed moth migration resulted in a low risk of spring cutworm damage to emerging corn. Although migrants began appearing in survey traps by April 8, the first significant flights of nine or more moths in two nights did not occur for another month, until May 4. The April 8-June 5 trapping survey captured 1,355 moths in 44 traps, with a peak recorded May 13-19. Significant black cutworm injury was not observed or reported this season.

WESTERN BEAN CUTWORM

Moth counts in 2020 were remarkably similar to those recorded in 2019. The annual trapping program from June-August registered an average of 65 moths per trap (3,789 moths in 58 traps), tying 2019 for the second highest average in 16 years. The survey record of 79 moths per trap (10,807 moths total) was set in 2010. The highest individual count for the 10-week monitoring period was 385 moths at Princeton in Green Lake County, the same location that collected the high count of 405 moths in 2019. This season's relatively large flight generated larval injury to scattered cornfields in the west -central and central counties in August and September.

Figure 13: Brown Marmorated Stink Bug Detections



Brown Marmorated Stink Bug

BROWN MARMORATED STINK BUG

Monitoring was carried out at 57 sites this season. DATCP cooperators and IPM Institute consultants placed clear sticky panel traps in 45 apple orchards and 12 vineyards. Ten trap locations in Chippewa, Dane (3 sites), Fond du Lac, Kenosha, Racine (2 sites), Walworth, and Winnebago counties captured BMSB. All traps collected fewer than six BMSB adults per week, with most capturing only 1-2 specimens for the season. Two new counties were added to the Wisconsin BMSB distribution map this year: Chippewa and St. Croix. Thirty-four of the state's 72 counties now have confirmed reports of BMSB.

EUROPEAN CHERRY FRUIT FLY

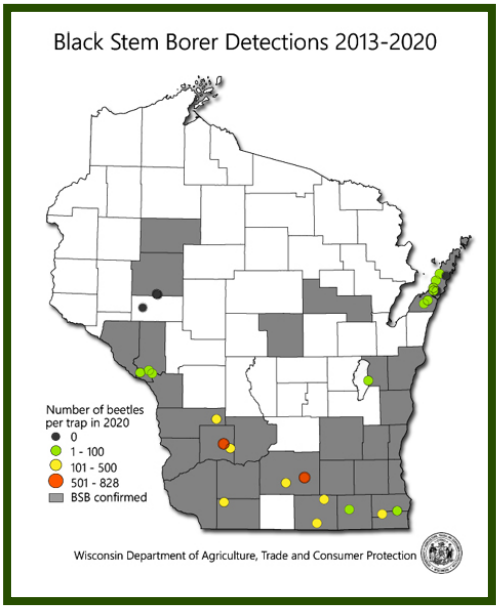
A pest detection survey was conducted on the Door Peninsula of northeastern Wisconsin from 2018-2020 for the European cherry fruit fly (ECFF), *Rhagoletis cerasi*. First found in North America in Ontario in 2015 and two years later in New York, ECFF is a pest of economic and quarantine significance that 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 during the three-year survey.

BLACK STEM BORER

Forty-two of 52 Lindgren funnel traps deployed in apple and cherry orchards in Calumet, Dane, Door, Kenosha, Lafayette, Racine, Richland, Rock, Trempealeau, Vernon and Walworth counties collected this Asian ambrosia beetle (*Xylosandrus germanus*) in 2020. Twenty-two traps captured 1-100 beetles, 18 traps caught 101-500 beetles, and two traps collected 501-828 beetles, for a total capture of 6,988 beetles. Most were collected in the two weeks from June 1-15.

Until June of 2019 when an infested apple tree was identified in a Lafayette County orchard, there had been no confirmed cases of BSB apple tree damage in Wisconsin. Orchards in Michigan, Ohio and other northeastern states have had serious issues with this pest in the last few years, and in western New York, the beetles have killed large numbers of apple trees. Results of the 2020 survey provide further evidence of BSB's prevalence in the state and suggest future orchard monitoring is needed. Black stem borer has been documented by DATCP in 29 Wisconsin counties since 2013.

Figure 14: Black Stem Borer



Black Stem Borer

APPLE DISEASES

Consultants from the IPM institute scouted 18 orchards as part of a multi-year collaborative survey that targeted nine apple diseases of special concern to agriculture in the state. Notable diseases found by the survey were crown gall (2 positives) and fire blight (2 positives). The positive samples were collected from sites in Chippewa, Portage, Rock and Trempealeau counties. Other apple disorders diagnosed this season were flyspeck, Phomopsis canker, and rust.

Figure 15: 2020 Soybean Aphid

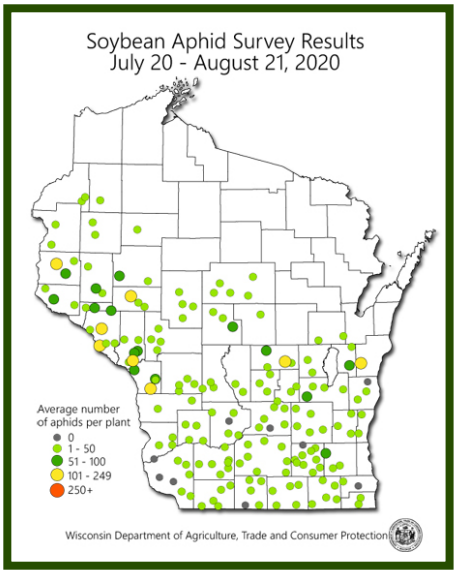
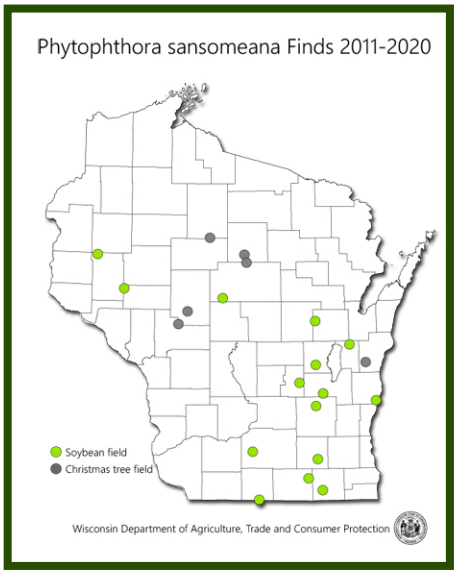


Figure 16: 2020 Phytopthora sansomeana



SOYBEAN APHID

Populations recorded during the annual survey were mostly low. Ninety-one percent of the 180 fields sampled from July 20-August 21 had average counts below 50 aphids per plant, 5% had 51-100 per plant, and only 4% had moderate populations of 101-175 aphids per plant. The 2020 state average count was just 15 aphids per plant, with no surveyed fields showing above-threshold populations of 250 aphids per plant. For comparison, the 2019 survey found a record-low average of five aphids per plant, the 2018 average was 14 aphids per plant, and surveys from 2010-2017 documented average counts of 6 -55 aphids per plant. Results of this season's effort suggest that while aphid pressure was slightly higher than in 2019, the soybean fields sampled did not meet treatment guidelines during the survey timeframe.

SEEDLING ROOT ROT

DATCP surveyed 50 soybean fields from June 8-July 3 for seedling root rot disease caused by *Phytophthora sojae*, general *Phytophthora* species, and general *Pythium* species. Testing at the Plant Industry Bureau Laboratory confirmed 46% (23 of 50) of fields were positive for *P. sojae*; 6% (3 of 50) of fields were positive for *P. sansomeana*; and 80% (43 of 50) were infected with *Pythium*. The *P. sojae* rate increased from the previous year when the pathogen was identified in 38% of fields. Surveys in the past decade have found *P. sojae* prevalence ranging from 13% in 2011 to 49% in 2014.

Phytophthora sansomeana was detected in Fond du Lac, Green Lake and Walworth counties this year. All three counties are new records for *P. sansomeana*, bringing the total Wisconsin counties where this root rot has been detected in soybeans to 18.

JAPANESE BEETLE

Defoliation was observed in 70% of the 180 soybean fields examined in August. Counts recorded during the annual aphid survey ranged from 1-138 beetles per 100 sweeps, with a state average of 17 per 100 sweeps (the 2019 average was 14 per 100 sweeps). The highest counts of 50 or more beetles per 100 sweeps were noted in the southwestern and west-central districts for the third year in a row. Individual fields in Clark, Crawford, and Lafayette counties had counts exceeding 100 beetles per 100 sweeps and defoliation levels well above the 20% economic threshold for this pest.

SOYBEAN GALL MIDGE

An emerging pest of Midwestern soybeans, the soybean gall midge (SGM) was not found in Wisconsin in 2020. Populations were confirmed this season in Iowa, Minnesota, Nebraska, and South Dakota. Larvae of the SGM, a member of the Hessian fly family (Cecidomyiidae), feed internally at the base of soybean stems and cause stem discoloration. Infested plants snap off near the ground and the orange or white maggots can be found feeding inside. Much remains unknown about this insect, including the exact species and whether it is a direct or a secondary soybean pest.

Japanese Beetles on soybean

Figure 17: 2020 Japanese Beetle

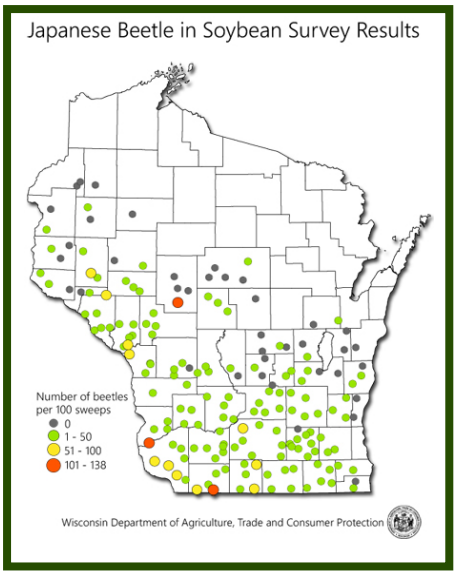
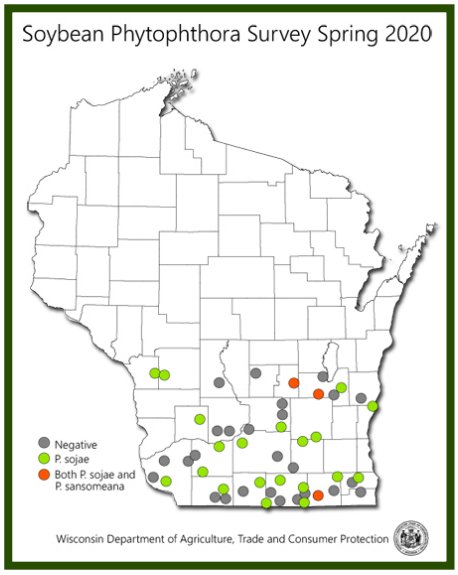


Figure 18: 2020 Phytophthora Survey on Soybean



PEST SURVEY VEGETABLE

leuongchopan/fotolia

BASIL DOWNY MILDEW

This aggressive foliar disease was confirmed in late August in Pierce and St. Croix counties. Basil downy mildew spreads via wind-dispersed spores, rapidly infecting entire fields and causing complete plant loss. The pathogen is often present on greenhouse-grown basil in garden centers in the spring, though it may not progress until late summer. Purchasing disease-free plants, promoting airflow, and frequent monitoring of the crop, so harvest can occur quickly once the mildew appears, are all important controls. Planting resistant varieties (not sweet basil) is also recommended.

COLORADO POTATO BEETLE

Overwintered beetles were unusually abundant this spring. Damaging populations were reported by May 25 from several western and northern Wisconsin CSAs where the beetles caused severe defoliation of young potato and eggplant crops. Control of the overwintered adults and resulting first-generation larvae required persistent scouting every few days until the peak colonization period ended in June.

Colorado Potato Beetle

LATE BLIGHT

Disease pressure decreased significantly in 2020 due to dry late summer weather, with detections in only three counties, compared to 18 counties in 2019. The state's first infected commercial potato field was confirmed in Adams County on August 10 by the UW Plant Pathology Department. Two additional cases of late blight, both on tomato, were diagnosed during the remainder of the season, one in Pierce County on August 20 and a second in St. Croix County on September 15. All samples tested by UW from Wisconsin were the US-23 pathogen genotype.

At the DATCP Plant Industry Bureau Lab, 24 tomato samples and two potato samples were also screened for late blight. This disease was not detected, but testing found septoria leaf and stem blight was very common on tomato (12 positive samples), followed by early blight (3 positives), and Fulvia leaf mold in a greenhouse (1 positive).

TOBACCO RINGSPOT VIRUS

Tomatoes with very striking virus-like symptoms were screened for several viruses of concern to greenhouse growers and exporters. Three heirloom tomato samples from La Crosse County showing oval-shaped blisters on the fruits were diagnosed with tobacco ringspot virus (TRSV). Tobacco ringspot virus infects a wide range of woody and herbaceous plants, including many common ornamental plants and weeds. The virus is frequently seed-transmitted or spread by plant sap. Nematodes and honey bees can also vector TRSV. Unlike the emerging threat tomato brown rugose fruit virus, which exhibits similar symptoms, TRSV reportedly causes only minor damage and does not spread rapidly.

Tobacco Ringspot Virus on Tomato

SQUASH MOSAIC VIRUS

Zucchini plants in a La Crosse County community garden tested positive for this virus. Squash mosaic virus (SqMV) is common on cucurbits and produces mosaic, rugosity and distortion symptoms. SqMV also infects common lambsquarters and other weeds in the Chenopodiaceae family. This seed-transmitted virus is spread by cucumber beetles and in plant sap on hands and tools. The virus can overwinter on perennial weeds. Disease management starts with using clean seed, practicing good sanitation, minimizing weeds, and controlling insect pests.

Squash Mosaic Virus on Zucchini

TOMATO BROWN RUGOSE FRUIT VIRUS

Three symptomatic tomato samples and one potato sample were submitted by a local USDA APHIS PPQ inspector as part of a national survey for tomato brown rugose fruit virus (ToBRFV). The tomatoes were screened and no positives were found. In 2019, APHIS imposed import restrictions on tomato and pepper fruit, transplants and seed lots from all countries where ToBRFV exists. ToBRFV has caused significant economic losses in greenhouse production of tomatoes. This newly identified virus was detected and eradicated from Arizona and California greenhouses in 2018 and 2019.

Tomato Brown Rugose Fruit Virus

DATCP'S PLANT INDUSTRY BUREAU LABORATORY

The Plant Industry Bureau Laboratory (PIB Lab) processed 791 samples for plant diseases and 146 for plant pest concerns in support of the Bureau's Christmas tree, nursery and phytosanitary programs in 2020. In addition, 784 field collected insect trapping samples were processed in the PIB Lab and screened for regulated and non-native species, an increase of 8% from 2019.

In 2020, the PIB Lab detected *Ophiostoma quercus* on sugar maple (*Acer sacchurum*) for the first time in Wisconsin. The fungus, which causes discoloration of the wood, was found during a routine lumber mill inspection. After determining that the log was not infected with maple sapstreak (*Davisoniella virescens*), a disease of phytosanitary concern, lab members investigated further into the cause of the discoloration. The unknown fungus was cultured from the infected wood. Both morphological and molecular gene-based methods were used to determine the species of the unknown fungus. Staff came to identity the unknown fungus as a member of the *Ophiostoma* genus, but were unable to determine the exact species. A culture of the fungus and sequences were sent to the USDA national mycologist for confirmation of genus and to identify the sample to the species level. The national identifier used molecular gene-based methods to determine the unknown fungus as *Ophiostoma quercus*.

Each year, the PIB lab adds new diagnostic tests to the laboratory. This year the PIB Lab added three new tests to the lab's testing capability. The first detects fireblight (*Erwinia amylovora*) by antibodies in a lateral flow device. The implementation of this test has allowed for same day turnaround of fireblight positive samples from sample reception to delivery of results. The second new test added in 2020 detects *Geosmithia morbida* by the gene-based method polymerase chain reaction (PCR). The addition of this test to the laboratory has increased the labs capacity to detect this important pathogen. Lastly, the PIB Lab has established a new test in the laboratory to identify unknown insects by a gene-based PCR method and DNA sequencing. This new test has increased the lab's ability to identify insects for which morphological identification by taxonomic key is difficult or impossible.

For the first time, the PIB Lab submitted DNA sequences to the National Center for Biotechnology Information (NCBI) nucleotide database. Sixty sequences from previous survey work on Christmas tree root rots, soybean root rots, nursery diseases, and cyst nematodes were submitted.

NURSERY DETECTIONS

GERANIUM WILT

DATCP inspectors participated in the trace-forward investigation and national recall of Ralstonia wilt-infected florist's geraniums 'Fantasia Pink Flare' and 'Fantasia Salmon' from 28 Wisconsin greenhouses. Eighteen samples were screened at the PIB Lab. All tested negative for *R. solanacearum*.

RAMORUM BLIGHT

During routine nursery inspections, staff collected 32 symptomatic plants from 18 locations. The PIB Lab tested five lilacs, one magnolia tree, one pear tree, two pieris plants, 22 rhododendrons and one viburnum. All were negative for *Phytophthora ramorum*, including seven samples that were infected with blights caused by other *Phytophthora* species.

BOXWOOD BLIGHT

This devastating fungal disease was diagnosed in two boxwood samples from a Milwaukee County residence in April. Sixty-eight other suspect samples collected by inspectors from 22 nurseries and retailers all tested negative in 2020.

RUSTS ON ORNAMENTALS

Conditions were conducive for many rust diseases in 2020. Gymnosporangium rusts were detected on apple, crabapple, hawthorn, and serviceberry. The striking elderberry rust (*Puccinia sambuci*) was detected on four occasions. Bracken rust (*Uredinopsis pteridis*), Eastern leatherwood rust (*Puccinia dioicae),* hawthorn rust (*Puccinia coronata)* and pine-oak rust (*Cronartium quercuum f.sp.banksianae)* were also noted during inspections.

NEMATODES

Root knot nematodes (*Meloidogyne spp.*) were detected on Anemone 'Prince Henry' and Astilbe varieties 'Fanal,' 'Visions in Red,' 'Maggie Daley' and 'Younique Silvery Pink' at two nurseries in Jefferson and Washington counties. The roots, already weakened by the nematode damage, were colonized by fungal pathogens contributing to decay. The fungal pathogens *Fusarium*, *Phytophthora* or *Pythium* and *Thielaviopsis* were identified on the blackened roots. Foliar nematodes (*Aphelenchoides spp.)* were detected on anemone, hosta, and sensitive fern.

FIREBLIGHT

This bacterial blight caused by *Erwinia amylovora* was common in 2020. The lab confirmed the disease on nine apple tree and three pear tree samples. The infected apple varieties were 'Candy Crisp,' 'Cortland,' 'Honeycrisp,' 'Firestorm™ Honeycrisp,' 'Jonathan,' and 'State Fair.' 'Anjou semi-dwarf CVI,' 'Parker' and 'Patten' pears tested positive for the bacterial blight.

VIRUSES OF ORNAMENTALS

Nursery inspectors collected 125 ornamental samples for virus testing in 2020. Twenty-three of 24 iris plants tested positive for potyvirus, most likely iris severe mosaic virus. Besides iris, canna (2 plants) and sedum (3 plants) were infected with potyviruses. Inspectors are collaborating with UW Madison to support further iris potyvirus research.

Tobacco rattle virus (TRV) continued to be a problem on bleeding heart and many astilbe varieties. TRV was also found on Celandine poppy, hosta, peony and phlox. Co-infections of TRV and a virus in the ilarvirus group, likely tobacco streak virus, occurred on astilbe varieties 'Fanal,' 'Freya,' and 'Red Sentinel.' Hosta virus X infections were found on the hosta varieties "Color Festival," "Medio Variegata," and "Sherbourn Swallow." Single ilarvirus infections were found on astilbe 'Fanal,' 'Maggie Daley,' 'Purple Candles,' and 'Rheinland.' A different ilarvirus, possibly alfalfa mosaic virus, was found infecting pachysandra. Other virus finds included two lilacs with lilac leaf chlorosis virus, one clematis with clematis chlorotic mottle virus and one Stokes aster with impatiens necrotic spot virus.

Table 7: Viruses on ornamentals diagnosed at the Plant Industry Laboratory in 2020

VIRUS SAMPLES	POTY[1]	TRV[2]	HVX[3]	ILAR[4]	CMV[5]	INSV[6]	LLCV[7]	TMV[8]	TSWV[9]	ClCMoV[10]
No. of positives	28	21	3	19	0	1	2	0	0	1
No. of plants tested	40	50	18	39	18	17	2	20	17	1
Percent of positives	70%	42%	16.7%	48.7%	0	5.9%	100%	0%	0%	100%

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

Lab Testing for Export Certification

In 2020, the pest survey team provided field inspections to 23 Wisconsin producers to meet phytosanitary certification requirements of importing countries and U.S. states. The lab tested 96 samples from 10 field crops, fruits, vegetables, ornamentals and small grains for 63 different bacterial, fungal, viral diseases, and nematodes.

Corn - All 61 seed corn samples were negative for Goss's wilt, Stewart's wilt, and bacterial leaf streak *(Xanthomonas vasicola pv. vasculorum*). Stewart's wilt has not been detected in this state since 2010. Corn virus screens showed no high plains disease (HPV), wheat streak virus (WSV), maize chlorotic mottle virus (MCMV) or sugarcane mosaic virus (formerly maize dwarf mosaic virus).

Soybeans - One sample was examined and found free from bean pod mottle virus, southern bean mosaic virus, tobacco ringspot virus, tomato ringspot virus, and bacterial wilt of dry beans.

Snap Beans – Two samples were collected in 2020. One sample was examined and found free from *Pseudomonas syringae* pv. p*haseolicola* but was positive for *Xanthomonas campestris* pv. *phaseoli.* The second sample was examined and found free of *Xanthomonas campestris* pv. *Phaseoli.*

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

Blueberry – Twelve samples tested negative for the viruses blueberry shock, blueberry scorch, and sheep pen hill.

Sugar Maple – Twelve samples were checked for and found free of sapstreak disease of maple caused by the pathogen *Davisoniella virescens.*

Black Walnut - One sample was examined and was found free from the fungus *Geosmithia morbida.*

Peony - Three samples were examined and tested free of citrus leaf blotch virus.

Kalanchoe – One sample was examined and determined to be free of any hazardous pests.

VEGETABLE DISEASES

DATCP plant pest specialists visited 29 CSA farms and community gardens near La Crosse, Madison, Milwaukee and Hudson biweekly this season to monitor for 30 new and invasive vegetable diseases and insects. Sixty-seven symptomatic vegetable samples were collected and submitted to the PIB Lab for testing. Although none of the targeted pathogens were detected, other notable diseases found in 2020 were: basil downy mildew on basil, tobacco ringspot virus (TRSV) on tomato, and squash mosaic virus on zucchini. See Table 2 for a complete list of the vegetable diseases diagnosed in 2020.

Table 8: Number of samples tested and diseases diagnosed as part of the 2020 Fruit and Vegetable Crops Survey

Host Crop	No. of Samples	Diseases Diagnosed
Apple	9	Crown gall, Fire blight, Flyspeck, Phomopsis canker, Rust
Basil	4	Basil downy mildew
Bean	3	Bean rust, Phyllosticta leaf spot
Blueberry	2	Godronia canker
Cole vegetables	7	Black rot, Bacterial leaf spot, Cercospora leaf spot, Mycosphaerella ring spot
Cucurbits	14	Anthracnose, Alternaria leaf blight, Angular leaf spot, Powdery mildew, Phoma leaf spot, Squash mosaic virus
Eggplant	1	Abiotic
Garlic	1	Garlic rust
Onion	1	Purple blotch
Pea	1	Powdery mildew
Pepper	7	Pseudomonas and Xanthomonas bacterial spot
Potato	2	Early blight, Soft rot
Sweet corn	2	Common rust, negative for Goss's or Stewart's wilt

CEREAL CYST NEMATODE SURVEY

Since 2015, the Plant Industry Lab has surveyed for exotic cyst nematodes that could impact production and trade if introduced into Wisconsin. These cyst nematodes are the exotic cereal cyst (*Heterodera filipjevi),* the Mediterranean cyst *(Heterodera latipons),* the cereal cyst (*Heterodera avenae),* and the Mexican corn cyst (*Puctodera chalcoensis).* In addition to screening and testing for these species, staff record any other cyst nematodes species detected during the survey.

Last year, no exotic cyst nematodes were detected in any of the 58 fields sampled. Nineteen fields had other cyst nematodes detected: six fields with cactus cyst-like nematodes (*Cactodera spp.*); six fields with soybean cyst nematodes (*Heterodera glycines*); and seven fields with soybean cyst-like nematodes, including clover cyst nematodes (*Heterodera trifolii*).

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 2020

A total of eighteen fields were inspected for Potato Rot Nematode, totaling 875.7 acres. Fifteen fields were new fields to seed potato production. One field was found positive for Potato Rot Nematode during harvest inspection. The field had a prior history of PRN. Two commercial fields were inspected with a prior history of PRN. One of the fields was released for table stock.

Table 9: 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	442.3	19
Langlade	Released not used for potato	122.47	8
Langlade	Released/ certified seed	1,697.44	50
Langlade	Released/ table stock	613.34	24
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 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 2020 season, the Seed Program goal was to target companies with poor compliance records for priority sampling in addition to companies who had not been sampled in the past two years. Also targeted for 2020 sampling were grasses, mixtures and legumes.

In 2020 the program issued licenses to a record total of 821 seed labelers (Table 9). Forty-eight seed labelers from 2019 claimed "out of business" or canceled their licenses and eighty-six new licenses were processed. Thirty-six (4%) of licensed labelers were inspected and 36 (4%) were sampled for a total of 84 samples.

Table 10: 10-Year Seed Inspection Results (2011-2020)

Year	Number of Labelers	Number of Samples	Number of Violations	% Violation	% Labelers Inspected	% Labelers Sampled
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%
2020*	821	*84	0	0%	4%	4%

* Due to the COVID pandemic hitting right at the time we began sampling, most sampling efforts and laboratory testing were put on hold for the safety or our inspectors and the public.

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