DEPARTMENT OF AGRICULTURE

2021 Nursery Inspection and Certification Program Annual Report

Plant Protection Division
Prepared December 2021

Background

The Minnesota Department of Agriculture (MDA) is responsible for the administration of the Nursery Law, Minnesota Statute Chapter 18H. The law prevents the introduction and spread of harmful plant pests in the state. To accomplish this, nursery stock produced for sale must be inspected annually and certified free of harmful plant pests. Stock originating outside Minnesota must be officially certified to be free from harmful pests and under all applicable quarantines at origin.

The MDA Nursery Inspection and Certification Program provides a vital service to the nursery industry and protects consumers from purchasing plants that are not viable or contain pests. Annual inspections reduce losses from harmful plant pests by detecting and treating problems before they can cause more serious damage. Certified nursery stock can move freely within the United States, and special certificates are issued for plants being exported. A standard of quality is maintained to assure the industry, as well as consumers, that the product they are purchasing is viable and in a healthy condition.

Anyone selling nursery stock in Minnesota must have a valid Minnesota Nursery Stock Dealer or Nursery Stock Grower Certificate. They must also sell only certified nursery stock and provide documents to verify certification of stock offered for sale.

Nursery Stock Certificates

There are two types of nursery stock certificates issued by the MDA's Nursery Inspection and Certification Program, grower and dealer, that are issued annually and last a full calendar year. Nursery stock growers include businesses that grow more than half of the nursery stock they sell. Grower fees are based on the number of acres on which the the business is growing nursery stock. Growers consist of tree farms, nurseries, and garden centers. All stock produced by growers must be inspected within 12 months preceding sale. Nursery stock dealers include businesses that purchase more than half of the nursery stock they sell. The dealer fees are based on gross sales of nursery stock from the previous year. Dealers include garden centers, box stores, landscape companies, brokers, and tree spade operators. Nursery stock includes trees, shrubs, vines, perennials, biennials, grafts, cuttings, and buds.

Nursery Stock Dealer Certificates issued in 2021 increased by 18 and Nursery Stock Grower Certificates increased by five.

Table 1. Nursery Stock Certificates Issued

Certificate Type	2017	2018	2019	2020	2021
Nursery Stock Grower	250	248	286	232	236
Nursery Stock Dealer	1,989	1,951	2,158	1,819	1,837

Table 2. Nursery Stock Growing Acres

Certificate Type	2017	2018	2019	2020	2021
Nursery Stock Grower	-	-	-	3,954	3,804
Nursery Stock Dealer	-	-	-	2,204	995
Total Acres	5,381	5,312	5,378	6,158 *	4,799

** Due to suspected reporting issues, this total may be inaccurate and be over reporting total acres.*

Nursery Stock Inspections

Annual inspection of growing stock proceeded as normal; however, some nurseries continued to implement policies limiting access to buildings due to the coronavirus pandemic. Communication via telephone and social distancing measures were followed to complete inspections. The Nursery Inspection and Certification Program has five regional staff located in Bemidji, St. Cloud, Rochester, and the Twin Cities. Staff completed 704 nursery inspections in 2021. This includes 471 mandatory inspections of growers and dealers with growing stock. A mandatory inspection is done on all nursery stock grown for sale within 12 months before the sale. Inspections at dealers with no growing stock were prioritized to focus on the sources of stock and sales volume. Those that purchase stock from outside Minnesota and have gross sales of nursery stock above $20,000 were classified as high priority. Inspectors completed 179 of these high priority dealer inspections. Low priority dealers purchase stock from within Minnesota with annual gross sales below $20,000. Thirty-one low priority inspections were completed. An additional 23 follow-up inspections were conducted at sites previously inspected and identified as having a pest or disease problem.

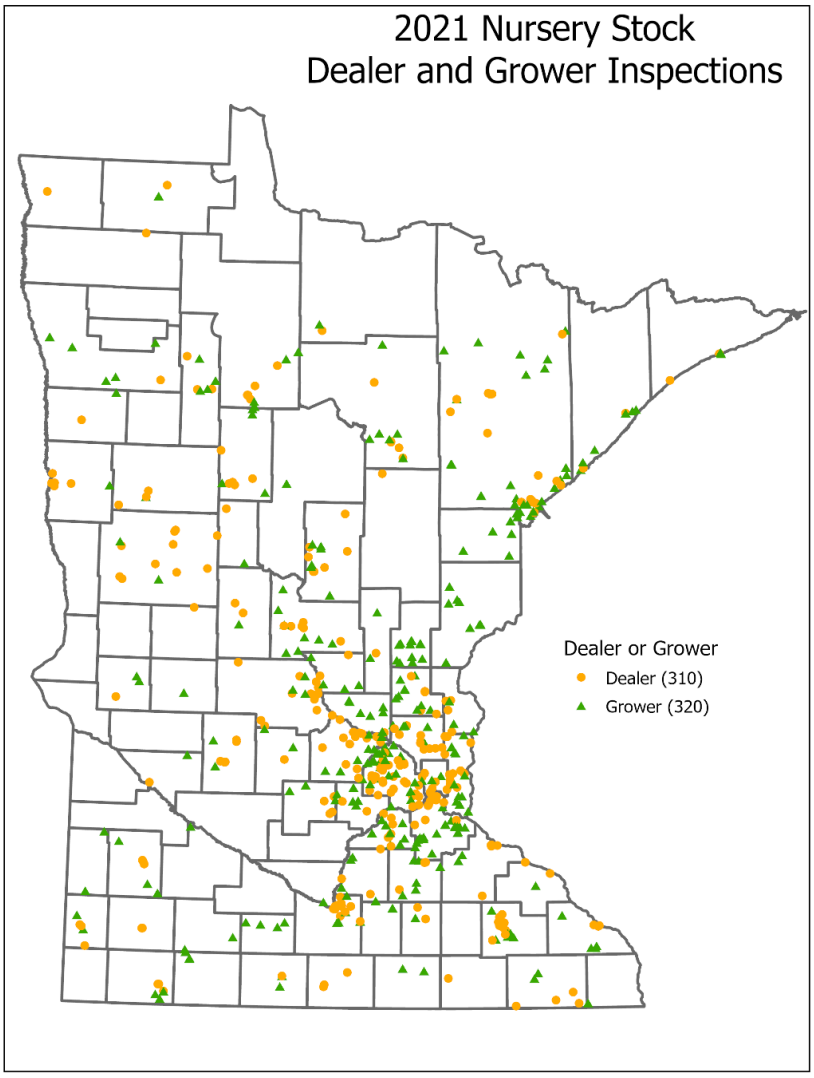

Figure 1. Locations of 2021 nursery stock dealer and grower inspections.

Plant Pest Incidents

The purpose of an inspection visit is to identify plants that are not certified for sale due to a plant pest, disease, or other health condition. Plants may be restricted until the appropriate regulatory response is completed allowing plants to be offered for sale. In 2021, inspectors reported 590 incidents involving 5,893 plants requiring regulatory action.

The most significant pests encountered during the 2021 season were boring insects. Stock infested with boring insects cannot be treated and must be removed and destroyed. Mites, though accounting for a very high number of plants involved, are generally not a significant impact on overall plant health. *Rhizosphaera* and *Stigmina* needlecast on spruce was reported as one of the top disease problems. These plants are treated to control the disease prior to sale.

Other issues encountered during the 2021 inspection season include general canker on deciduous trees and *Cytospora* canker on spruce. Cankers can be caused either by living organisms, including fungi, bacteria and insects, or by non-living things such weather events (hail or extreme heat or cold) or manmade wounds. Stock that does not meet the minimum requirements to be expected to grow with normal vigor must be restored to health before it can be offered for sale. Because of weather extremes and improper handling, abiotic or non-living causes made up a significant number of plants removed from sale.

Virus on hosta and other perennials was reported 45 times. The term “hosta virus complex” is used to describe a situation when more than one virus organism is commonly found causing similar symptoms and when more than one virus can be present. Hosta virus X along with impatiens necrotic spot virus and tomato ringspot virus has been found on hosta. Symptoms may vary based upon the cultivar of hosta and may look different at various stages of development or time of year. When found, infected plants must be destroyed. Growers are encouraged to submit samples for laboratory testing and plants may be allowed to be sold based upon negative results. In addition to hosta virus complex, tobacco rattle virus is commonly found on *Dicentra* (bleeding heart).

Figure 2. Tobacco rattle virus on Dicentra.

Figure 3. Virus symptoms on a rose plant.

Table 3. Top disease incidents

Top Diseases	Species	Incidents	Number of Plants Affected
General Cankers	Various	79	255
Viruses	Various	43	386
Needle Cast Complex	Spruce	25	410
Powdery Mildew	Various	14	135
Hosta Virus Complex	Hosta	12	262
Cytospora Canker	Various	11	54
Nectria Canker	Honey locust	9	14
Phytophthora Root Rot	Various	8	18
Bacterial Leaf Blight	Various	6	25
Cedar Apple Rust	Crabapple	5	145

Table 4. Top abiotic incidents

Top Abiotic	Species	Incidents	Number of Plants Affected
Non-Viable	Various	81	279
Moisture Stress	Various	34	129
Chlorosis	Various	7	23

Insect borers are a pest problem routinely found during inspections. Bronze birch borer on birch, red oak borer on oak, flat-headed apple tree borer on maples, and others can be very destructive. Trees infested with borers must be removed and destroyed. It is recommended that remaining trees be treated with insecticides to protect them from attack. Borers can be difficult to detect since they feed under the bark. Sawdust like frass, sap flow, raised ridges of bark, and exit holes are the obvious signs of borer attack. However, early detection can be difficult and may require cutting into the bark to confirm borer activity.

Figure 4. A tree removed from sale due to boring insect damage.

Table 5. Top insect incidents

Top Insect Pests	Species	Incidents	Number of Plants Affected
General Borers	Various	37	290
Bronze Birch Borer	Various Birch	22	131
Spider Mites	Various	20	1134
White Pine Weevil	Spruce	13	25
Two-Lined Chestnut Borer	Oaks	11	44
Oak Borer	Red Oak	10	31
Scale	Various	11	244
Flat Headed Apple Borer	Various trees	5	19
Spruce Gall Midge	Spruce	4	13

Violations

The Nursery Inspection and Certification Program issued 81 Reports of Violation to Nursery Stock Dealer and Grower Certificate holders. Some of Minnesota's specially regulated noxious weeds have signage requirements and accounted for 34 of the reports. For example, Amur maple and Norway maple must be labeled with instructions to plant only in areas where seedlings will be controlled and at least 100 yards from natural areas.

Figure 5. Amur maple fall color. Photo by T. Davis Sydnor, The Ohio State University, Bugwood.org

Seventeen violations were issued for plants with mislabeled cold hardiness zones based on the Cold Hardiness List on the MDA website. Six violations were for selling restricted noxious weeds Siberian pea shrub or black locust. The current Minnesota Noxious Weed List can be viewed on the MDA website.

Seven violations were for packaged plants that had not been stored properly and were non-viable. These plants are sold in early spring and must be kept in a dormant state to maintain viability. Once they break dormancy, they must be planted immediately or they will likely not survive.

All Reports of Violation were forwarded to the MDA's Plant Protection Division Compliance Officer for further action and regulatory penalties.

Table 6. Reports of Violation

Violation Type	Incidents	Number of Plants Affected
Specially Regulated Plants	34	446
Non-Hardy	17	374
Mislabeled Plants	17	251
Restricted Noxious Weed	6	63
Dormant Packaged Plants	7	192

Pollinator Sampling

To help protect pollinators, Minnesota Statute 18H.14 Labeling and Advertising of Nursery Stock prohibits the advertisement or labeling of plants as beneficial to pollinators if those plants have been treated with a systemic insecticide and have a concentration of insecticide in its flowers above the United States Environmental Protection Agency (EPA) level established for mortality of adult honeybees.

The MDA collected flower tissue from retail plants advertised as beneficial to pollinators. Samples were submitted for testing for nine of the most used systemic insecticides in Minnesota. Four new systemic insecticides were added this year due to their increased use; Acephate, Cyantraniliprole, and Abamectin B1. These were added to the insecticides Acetamiprid, Clothianidin, Dinotefuran, Imidacloprid, Pymetrozine, and Thiamethoxam.

Nursery retail locations were sampled, with the bulk of the samples coming from the Twin Cities metropolitan area. Inspectors collected 22 official flower samples from plants advertised as beneficial or attractive to pollinators. Eight of the samples were found to contain a level of systemic insecticide more than EPA levels deemed lethal to honeybees. Of the retail locations sampled, 46% tested positive compared to 26% in 2020. In addition, 40% of the samples in 2021 tested at levels above the EPA limits compared to 19% last season. Worth noting is one of the new systemics being tested for, Cyantraniliprole, accounted for 37% of this season's positive results.

Figure 6. Pollinator friendly signage.

Plant varieties sampled were: Asiatic lily, Black-eyed Susan, blanket flower, butterfly bush, cat nip, coneflower, dianthus, foxglove, giant hyssop, Joe Pye weed, milkweed, pepper, *prunella*, scallion, sedum, shasta daisy, sunflower and tomato. Plants testing positive in 2021 were: Black-eyed Susan, blanket flower, butterfly bush, coneflower, giant hyssop, and sunflower.

Jumping Worms (*Amynthas spp.)*

Jumping worms (*Amynthas spp*) are a type of earthworm native to Asia. No earthworms are native to Minnesota and other northern states. They are called “jumping worms” because of their unusual behavior when disturbed – they move like a snake and sometimes appear to be jumping. A light-colored ring extends around the body and may be more prominent than in other earthworms. Jumping worms refers to multiple species, including the genus *Amynthas*. Jumping worms live and feed in the leaf litter layer on the soil surface and in the top few inches of the soil, but they do not create burrows. They produce cocoons in late summer and early autumn. Then the adults die, and the cocoon stage survives through the winter. Cocoons hatch in early spring and adults mature in summer. *Amynthas* are able to survive a variety of conditions including cold winter temperatures.

People spread jumping worms throughout North America by moving potted plants, soil, compost, mulch, and fishing bait. In 2021, the MDA received several reports of jumping worms in plant material and at nursery and landscape sites. The MDA ordered the infested plants be withheld from sale and best management practices were implemented at the sites to minimize future movement.

Jumping worms were first identified in Minneapolis in 2006 and since that time have been confirmed in 18 counties. However, few reports were ever reported in nursery facilities until this year. Best management practices have been developed with the University of Minnesota Extension and appear to be the best response to this pest.

Figure 7. Jumping worm in mulch.

Figure 8. Mulch pile with jumping worms at a nursery facility.

Elongate Hemlock Scale (*Fiorina externa*)

Elongate hemlock scale (*Fiorina externa*) is believed to have been introduced from Japan and is currently established in the eastern United States. It is reported to develop and reproduce on 43 species of conifers. Primary hosts include hemlock, fir, and spruce. Once established, infestations can cause premature needle drop and make crowns of infested tees have a thin appearance. Currently, Minnesota does not have any documented established populations of elongated hemlock scale; however, cut holiday greenery and Christmas trees from infested regions of the U.S. pose a risk for transporting this pest to Minnesota. The MDA inspects holiday greenery annually to protect Minnesota from elongate hemlock scale and other damaging pests and diseases.

Holiday greenery inspections over the past three years have identified multiple locations that receive shipments of Christmas trees and wreaths infested with elongate hemlock scale. Infested trees (Figure 9) could be resold if they were properly reconditioned by removing infested branches, or the trees could be returned to sender or destroyed. Heavily infested trees that could not be reconditioned were immediately removed from sale and destroyed (Figure 10).

Figure 9. Only nine trees infested with EHS.

Figure 10. Destruction of EHS infested material.

In 2019, several locations were ordered to stop selling over 1,500 cut Frasier fir Christmas trees and hundreds of holiday wreaths. In 2020, the MDA detected elongate hemlock scale on Frasier fir Christmas trees shipped from the Mid-Atlantic region to a large redistribution site. In 2021, the same large retailer chose to replace all Mid-Atlantic sourced trees with other sources before the start of the holiday season and no elongate hemlock scale was detected at the site.

After finding over a thousand cut Christmas trees infested with elongate hemlock scale in 2019, the MDA began an intensive outreach campaign to retailers reminding them that elongate hemlock scale and other invasive pests can be transported in holiday greens and Christmas trees. Reatilers were targeted in 2020 and 2021 with information as they prepared to order for the holiday seasons. The MDA also reached out to partner agencies and stakeholders to communicate a clear, consistent message regarding early detection and proper disposal options.

The MDA created a holiday greenery best management practices webpage as a one stop shop for early detection and disposal guidance. Holiday greenery buyers from chain stores were contacted by the MDA before stock began to move to provide plant pest quarantine documents for stock they planned to ship. Along with these requests, outreach materials were sent encouraging buyers to forward to retail stores. At least one location printed, laminated, and posted the proper disposal poster at their site (Figure 11).

Figure 11. EHS outreach material at a chain store advising consumers to dispose of their tree properly to avoid possible plant pest introductions.

In 2021, holiday greenery inspections resulted in fewer observed problems compared to the two years prior. The MDA conducted 163 surveys, which included both site visits and phone inquiries. Of those, 115 were field visits. Elongate hemlock scale was found at only six locations, and 76 pieces of holiday greenery were infested with elongate hemlock scale. Infested products included 44 cut Christmas trees and 32 wreaths and swags. After two years of intensive outreach to the industry and targeted inspections, the number of pest introductions on holiday greenery products has been reduced substantially from thousands of infested products to less than a hundred.

Overall, significant and beneficial changes are taking place in the holiday greenery industry where mutual stakeholders have an interest in limiting holiday greenery pest introductions. At the national level, regular discussions are underway on what is needed to keep pests like elongate hemlock scale from impacting state agricultural industries. Growers, distributors, and retailers are more aware of the problems holiday greenery pests present. In the Upper Midwest, nursery inspector observations are that stock is much cleaner this year as well. Subsequently, more retailers are sourcing their materials locally and have fewer problems and pest risks.

Japanese Beetle Certification

Japanese beetles are highly destructive plant pests that attack foliage, flowers, and fruits of more than 300 ornamental and agricultural plants. Several regulatory issues and the dramatic spread of Japanese beetle in the United States required the creation of the U.S. Domestic Japanese Beetle Harmonization Plan in 1998 to slow the spread of Japanese beetles across the United States.

Each state is evaluated for its level of Japanese beetle infestation. Category 1 states are Japanese beetle free and have external quarantines to prohibit the entry of Japanese beetle into their state. These states are generally west of the Rocky Mountains. Category 2 states have some level of Japanese beetle but are considered un-infested or only partially infested. They have quarantines and protocols to eliminate or contain the insect to its current locations in the state. Category 3 states are generally or partially infested and do not regulate Japanese beetle within the state. Category 4 states are unlikely to become infested due to environmental factors and the state does not plan to take any measures to limit the introduction of Japanese beetle into the state because of the low risk.

Figure 12. Japanese beetle on rose. Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org

Due to increased numbers of Japanese beetles found, Minnesota is a Category 3 state. This means that Japanese beetle certification is required to ship regulated articles to all Category 1 and 2 states. Regulated articles include any plants with soil or growing media because Japanese beetle grubs live in the soil. In general, bareroot material is exempt due to the lack of soil.

Japanese beetle certification can be obtained via different methods, depending on the category of the destination state. Popular methods include a trapping survey, soil sampling, and treatment of plants prior to shipment. More details regarding Japanese beetle certification can be found on the National Plant Board website.

Each company desiring Japanese beetle certification needs to sign an MDA compliance agreement with the Export Certification Program. In 2021, there were 28 compliance agreements signed with Minnesota companies. The compliance agreement, along with survey or other documentation, allows the MDA to issue a Japanese beetle certificate to accompany all shipments to Category 1 and 2 states. The Nursery Inspection and Certification Program supports the Export Certification Program by conducting most of the Japanese beetle trapping and soil sampling activities which are used to verify site eligibility.

2021 Japanese Beetle Survey

Trapping

Trapping was conducted at 16 sites for 11 companies to determine if adult beetles were present at the site. Once positive, a site cannot use survey via trapping again and must implement alternative options for Japanese beetle certification. Four sites were found positive, three of which are owned by companies that have had other positive sites in the past. There was only one new site in Meeker County, which was the first documentation of the insect establishment in the county.

Soil Sampling

Soil sampling was conducted at 11 sites for seven companies to determine if there were Japanese beetle grubs in the soil because traps had shown a population of adult Japanese beetle in the area. There were no grubs found in soil samples in 2021.

Boxwood Blight

In June 2020, the MDA was alerted by the Illinois Department of Agriculture to an interception of boxwood plants found infected with boxwood blight originating from an Oregon nursery. A list of potential Minnesota sites was developed using nursery stock source data provided by growers and dealers on Nursery Stock Certificate applications. The MDA contacted the 24 Nursery Stock Certificate holders that had listed the Oregon nursery as a stock source. One site had received boxwood plants from this source but did not have any plants remaining in their inventory, the other 23 sites had not received boxwood plants. Accurate stock source information provided with Nursery Stock Certificate applications and accurate record keeping by growers and dealers ensures that the MDA can respond quickly to plant pest emergencies.

Figure 13. A boxwood wreath for sale at a retail location in Minnesota.

Nursery inspectors look for boxwood blight during inspections. This year, during a routine inspection, one sample with possible boxwood blight symptoms from a non-related source was sent to the University of Minnesota Plant Disease Clinic for diagnostics and came back negative for boxwood blight.

Lymantria dispar (Formerly Known as Gypsy Moth)

Lymantria dispar (formerly known as gypsy moth) is a federally regulated plant pest in the eastern United States and Canadian provinces. Populations in Minnesota exist in the far northeastern region of the state. Cook and Lake counties are quarantined for *Lymantria dispar* and it is not widely established in the state. Annually the MDA's survey program places over 20,000 early detection traps to monitor for isolated populations. Due to the insect's ability to hitchhike on outdoor materials, the MDA conducts targeted monitoring at nursery locations across Minnesota that bring in nursery stock from sources in areas where *Lymantria dispar* is established. In 2021, the MDA placed 696 traps at 211 nurseries across Minnesota and had eight positive sites. Only one positive site resulted in finding an established population.

Figure 14. Female Lymantria dispar with egg mass on nursery stock.

A nursery stock dealer in southern Minnesota was ordered to conduct a treatment for *Lymantria dispar* in the spring of 2021. The nursery had a positive trap catch in 2020, the MDA identified *Lymantria dispar* on infested stock and the business was placed into a compliance agreement to ensure no further sale of infested and possibly infested stock continued. Two treatment applications occurred in late May and were successful at eradicating *Lymantria dispar* from the nursery site.

In mid-July, the MDA identified positive trap catches of *Lymantria dispar* at a nursery stock dealer in Hennepin County. The MDA and the USDA responded immediately by conducting additional field surveys at the site and were able to identify and document an isolated infestation of *Lymantria dispar*. *Lymantria dispar* egg masses, live moths, and pupa cases were found during the inspection. It is likely this pest entered Minnesota by hitchhiking on certified nursery stock.

As a result of the find, the MDA issued a stop sale of all nursery stock until a compliance agreement could be put in place. All stock must be inspected prior to leaving the site and all upright conifer nursery stock must stay on-site until eradication treatments can occur in the spring of 2022. The nursery was trained in self-inspection and are operating under an MDA compliance agreement. The MDA will order and work with the nursery on treatments for 2022 to eradicate this pest from the site.

The MDA establishes compliance agreements with entities that wish to move regulated articles out of *Lymantria dispar* quarantine areas. Most regulatory activities occur in Cook and Lake counties, which were quarantined in July 2014. Cook and Lake counties are also under a parallel federal quarantine for *Lymantria dispar*. Since there are currently no nursery growers, only nursery dealers located in these counties, much of the MDA's focus is with the timber and holiday greenery industries.

The MDA regularly reviews and audits *Lymantria dispar* quarantine compliance throughout Minnesota by assuring nursery stock received from *Lymantria dispar* quarantine areas arrive with proper certification to assure it is free from *Lymantria dispar* prior to entering non-quarantined areas of Minnesota. In 2021, there were no violations resulting from non-certified stock arriving without proper certification. However, as noted above, in rare circumstances, certified product can arrive infested and thus careful inspections should occur when nursery operations receive regulated stock prior to unloading.

Chrysanthemum White Rust

Chrysanthemum white rust (*Puccinia horianaII*) is a destructive disease on cultivated chrysanthemum plants. This disease originated in eastern Asia and is now established in the Far East, Europe, Africa, Australia, Central America, and South America. There have been outbreaks in Canada and the United States, but the disease has been eradicated when found. In August, the MDA was alerted by the USDA to a confirmed case of chrysanthemum white rust in North Carolina. In order to determine the source of the disease, shipping documents were reviewed and it was determined that the North Carolina site received plants purchased by a broker that had brought in plants from multiple nursery operations across the U.S. One possible source of infected plants was a supplier in Minnesota. The specific mum cultivars with confirmed cases of chrysanthemum white rust were the Mamoth™ series. The supplier was contacted by the MDA and it was determined that no plants remained on site in Minnesota. The MDA followed up with shipments from this Minnesota source that were shipped to other Minnesota locations and no evidence of chrysanthemum white rust was found. It is unlikely the North Carolina positive chrysanthemum white rust case was associated with plant material from Minnesota.

Figure 15. Leaf showing symptoms of Chrysanthemum white rust. Florida Division of Plant Industry, Florida Department of Agriculture and Consumer Services, Bugwood.org

Regulated Noxious Weeds

The MDA also inspects for invasive plants being offered for sale. Plants found on the Minnesota Noxious Weed List must be removed from sale and can result in fines or penalties. Specially regulated plants are noxious weeds that have specific management criteria. They may be sold but have restrictions that can also require enforcement.

Amur maple (*Acer ginnala*) and Norway maple (*Acer platanoides*) are specially regulated plants that have demonstrated economic value, but also have the potential to cause harm in non-controlled environments. Specific rules or management plans, developed by the MDA under Minnesota Statute 18.771(e), requires that these plants be accompanied by a label detailing how to distance planting from native areas and be controlled by mowing or other means to avoid further disbursement. Each plant must have the specially regulated language affixed as an instruction tag for the consumer. Notice of Violations are issued if this information is absent, plants are removed from sale until the labeling is corrected, and fines or penalties may apply. Winged burning bush (*Euonymus alatus*) is also included as a specially regulated plant under a three-year production phase-out period, after which sale of this species will be prohibited and the species will move to the restricted plant list in 2023.

Nursery inspectors are annually given a survey list to observe if certain new plant species of concern, that are under review by the Noxious Weed Advisory Committee, might be offered for sale. This proactive survey aids the Noxious Weed Advisory Committee in determining what is available in the nursery industry and a chance to evaluate species that may potentially have invasive characteristics. Consideration may be a three-year process and is determined based on the plant's threat to the environment.

Figure 16. Winged burning bush. James H. Miller, USDA Forest Service, Bugwood.org

Cold Hardiness

To assure that consumers are not being misled by plant labels regarding accurate cold hardiness claims, the MDA requires that labels be consistent with the Cold Hardiness List on the MDA website. The Cold Hardiness List is reviewed annually by the MDA and stakeholders for changes in hardiness zones, addition of new plant cultivars, and other updates as necessary. The list is published online each September for the following growing season. The current Cold Hardiness List can be found on the MDA website. Changes for 2021 included the addition of new plants and minor changes to existing cold hardiness designations. All 2021 changes are listed in Appendix A at the end of this report.

Figure 17. Cold hardiness zones of Minnesota.

Nursery Exports

Nursery stock and plants being exported must meet certain phytosanitary conditions for entry into foreign countries, including an inspection and the witnessing of official treatments. The MDA issued 162 Federal Phytosanitary Certificates for nursery stock, the majority of which were for shipments to Canada. The MDA has eight employees that are accredited certification officials qualified to issue phytosanitary certificates and five employees that have been trained to conduct export inspections on behalf of the USDA Animal Plant Health Inspection Service (APHIS).

2021 Phytosanitary Certificates for Exports

- 749,030 plants
- 120,460 bulbs
- 3,665 tubers
- 6 cuttings

Figure 18. MDA preparing bare root nursery stock for export.

Wildflower Permits

To protect the state flower and other endangered wildflowers, Minnesota Statute 18H.18 Conservation of Certain Wildflowers prohibits the sale of certain wildflowers without written permission from the property owner and a permit from the MDA. Protected plants must be placed into cultivation for a minimum period of one growing season and cannot be sold directly after being collected. This year two permits were issued.

Figure 19. Lady slipper wildflowers. J. Burington

Barberry Black Stem Rust and Noxious Weed

Barberry is the alternate host of black stem rust of wheat and other small grains. As such, only barberry plants that have been tested at the USDA Cereal Rust Lab, are found resistant, and are propagated asexually can be offered for sale in protected cereal producing states, including Minnesota. Inspectors have a list of those approved, named cultivars. Inspectors found a cultivar not listed on the approved USDA list being offered for sale in Minnesota. The supplier was contacted, and it was determined that a labeling error occurred. The identity of the plant was verified, and no further regulatory action was taken. Another barberry cultivar was found and was not on the list. It was a new introduction that had not been tested for resistance and was shipped by mistake.

Along with being the potential host of black stem rust, certain cultivars of barberry have been identified as invasive noxious weeds. There are 26 varieties of barberry that are restricted noxious weeds and cannot be offered for sale in Minnesota. Rose Glow barberry was found at a metro Twin Cities retailer. The shipper in Ohio was contacted and was aware of the restriction. All plants were ordered destroyed.

Post-entry Quarantine

Post-entry quarantine is a USDA APHIS program that is administered by the MDA. It is designed to enable importers to move planting stock representing a high risk of plant pest dissemination from designated foreign sources into the U.S. One nursery imported 50 *Hibiscus syriacus* plants from France in April 2020. These plants are required to be held in an approved quarantine site for a period of two years. Plants were inspected in 2020 and again in 2021. Thirty-one plants did not survive the winter. Written permission was given to dispose of the dead plants by deep burial in compliance with the import permit, and the pots were sanitized using Greenshield. The remaining 19 plants showed no evidence of plant pests of quarantine significance. These plants will be recommended for release after their two-year anniversary.

Firewood Heat Treatment Certification

The MDA offers a fee-based Firewood Certification Program for businesses or individuals interested in selling pest-free firewood that meets the USDA heat treatment standards for wood boring pests. This heat treatment certification kills a wide variety of plant pests that are commonly transported in firewood, including emerald ash borer which is regulated in at least 30 counties across Minnesota. Heat treatment certification allows hardwood firewood to move freely between emerald ash borer regulated and unregulated quarantine counties. There are 11 MDA certified companies within Minnesota. A list of Certified Firewood Producers is available on the MDA website.

Figure 20. Ash firewood with emerald ash borer larval galleries under the bark.

For More Information

Steven Shimek

Nursery Inspection and Certification Program Coordinator
651-201-6619
steven.shimek@state.mn.us

Appendix A. 2021 changes to the Cold Hardiness List

Genus, Species, Variety	Common Name / Cultivar / Trade Name	Change
Achillea millefolium	Milly Rock Red, Milly Rock Rose, Milly Rock Yellow	Addition
Achillea millefolium	New Vintage Red, New Vintage Rose, New Vintage Violet, New Vintage White	Addition
Agastache rugosa	'Little Ader'	Addition
Andropogon gerardii	'Dancing Wind', 'Indian Warrior','Lone Ranger', 'Lord Snowden','New Wave', 'Rain Dance', 'Red October', 'Wind Walker'	New Varieties
Armeria pseudameria	Dreameria Dream Clouds	Addition
Buddleia davidii	Pugster Pinker™ aka 'SMNHPPH	Addition
Catalpa ovata	Chinese Catalpa	Addition
Clematis	Issey™ aka 'EVIpo081'	Addition
Clematis	Vicki™ aka 'EVIPO114'	Addition
Clematis	Clematis - 'Evipo017' 'Angelique', 'Andromeda', 'Asao', 'Evipo033' Avant-Garde™, 'Belle of Woking', 'Blue Explosion', 'Evipo061' 'Boulevard Bernadine', 'Claire de Lune'™, 'Crystal Fountain'™, 'Evipo063', 'Corinne', 'Diana's Delight', 'Duchess of Edinburgh', 'Earthquake', 'Ernest Markham', 'Evipo023' Cezanne, 'Evipo024' Pickardy 'Evipo039' Diamantina, 'Evipo026' Diana's Delight, 'Evipo008' Franziska Maria™, 'Evijohill' Josephine™, 'Evipo016' Rebecca™, 'Evipo035' Reflections, 'Evipo002' Rosemoor™, 'Fireworks', 'Franziska Maria'™, 'Fujimusume', 'Henryi', 'Huldine', 'Innocent Blush', 'Isago', 'Jackmanii','Josephine', 'Kilian Donahue', 'Little Mermaid', 'Malaya Garnet', 'Montana Mayleen', 'Mrs. Robert Brydon', 'Multi Blue', 'Nelly Moser', 'Niobe', 'Piilu', 'Pink Fantasy', 'Rebecca', 'Red Cardinal', 'Red Star', 'Rhapsody', 'Rosemoor', Rouge Cardinal', 'The President', 'Veronica's Choice', 'Wildfire'	Addition
Clematis paniculata	Sweet Autumn Clematis	Addition
Cornus mas	Cornelian Cherry	Addition
Cornus sericea	Arctic Fire® Yellow	Addition
Dianthus hybrida	'Mountain Frost Silver Strike'	Addition
Dianthus hybrida	'Mountain Frost White Twinkle'	Addition
Echinacea purpurea	'Sombrero Fiesta Orange', 'Sombrero Poco Yellow', 'Sombrero Rosada', 'Sombrero Tres Amigos', 'Sombrero Summer Solstice'	Addition
Eupatorium purpureum	Euphoria Ruby	Addition
Helenium autumnale	'Salud Embers', 'Salud Golden', 'Salud Yellow'	Addition
Heliopsis helianthoides	'Double Sunstruck', 'Sunstruck'	Addition
Hemerocallis	'Double Pardon Me'	Addition

Genus, Species, Variety	Common Name / Cultivar / Trade Name	Change
Heuchera	Northern Exposure™ Red aka 'TNHEUNER'	Addition
Heuchera	Northern Exposure™ Amber aka 'TNHEUNEA'	Addition
Heuchera	Northern Exposure™ Black aka 'TNHEUNEB'	Addition
Heuchera x hybrida	'Carnival Black Olive'	Addition
Heuchera x hybrida	'Carnival Candy Apple'	Addition
Humulus lupulus	'Bianca', 'Nugget' Ornamental Hop	Addition
Hydrangea anomala	Climbing Hydrangea	Addition
Hydrangea macrophylla	'Cherry Explosion', 'McKay' PP28,757	Addition
Hydrangea paniculata	Limelight Prime® aka 'SMNHPPH'	Addition
Hydrangea paniculata	Little Hottie® aka 'Bailpanone'	Addition
Lavandula angustifolia	'Annet'	Addition
Leucanthemum superbum	'Whitecap'	Addition
Lonicera	Mandarin Honeysuckle	Addition
Lonicera caerulea	Honeyberry - 'Berry Blue', 'Borealis', 'Cinderella', 'Tundra'	Addition
Lonicera reticulata	Kintzley's Ghost® Grape Honeysuckle	Addition
Lonicera sempervirens	Honeysuckle - John Clayton	Addition
Lonicera x brownii	Dropmore Scarlet Honeysuckle	Addition
Lonicera x brownii	Honeybelle™ aka 'Bailelle' Honeysuckle	Addition
Malus	Triumph™ , MN80	Addition
Monarda didyma	'Balmy Purple', 'Balmy Lilac', 'Balmy Pink', ‘Balmy Rose', 'Prelude Blue'	Addition
Nepeta faassenii	'Whispurr™ Blue', 'Whispurr™ Pink'	Addition
Nepeta x	'Cat's Pajamas'	Addition
Panicum virgatum	'Apache Rose', 'Blue Fountain', 'Cape Breeze', 'Hot Rod', 'Purple Tears', ‘Winds of Change'	Addition
Parthenocissus inserta	Woodbine	Addition
Parthenocissus quinquefoilia var. engelmannii	Engelman Ivy (Virginia Creeper)	Addition
Penstemon digitalis	'Midnight Masquerade'	Addition
Perovskia atriplicifolia	'Crazy Blue'	Addition
Phlox paniculata	'Ka-Pow Lavender', 'Ka-Pow Pink', 'Ka-Pow Purple', 'Ka-Pow White, 'Ka-Pow White Bicolor'	Addition
Phlox paniculata	'Super Ka-Pow Fuchsia', 'Super Ka-Pow Lavender', 'Super 'Ka-Pow Pink', 'Super Ka-Pow White'	Addition

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Prunus x nigrella	Muckle Plum	Addition
Pyrus	Pear - Juicy jewel™ , MN121	Addition
Rosa	'Petite Knock Out® 'Meibenbino' PP30,811	Addition
Rosa	'Sitting Pretty™ 'Radbeauty' PP32,456	Addition
Rosa	Pretty Polly™ Series, Pretty Polly™ Pink 'Zlepolone' PP31,644, Pretty Polly™ White 'Zlepoltwo' PP31,106, Pretty Polly™ Lavender 'Zlepolthree' PP31,642	Addition
Rosa	'Blushing Drift® 'Meifranjin' PPAF	Addition
Rosa	Patriot Dream aka Baildre	Addition
Rosa	The Finest™ aka Bailnest	Addition
Rosa	The Finest™ aka Bailnest	Addition
Salvia nemorosa	'Blue by You', 'Blue Marvel', 'Lyrical White', 'Rose Marvel', 'Sky Blue Marvel'	Addition
Schizachyrium scoparium	'Blue Lagoon', 'Blue Paradise', 'Little Luke', 'Prairie Munchkin','Smoke Signal', 'Standing Ovation'	Addition
Schizophragma hydrangeoides	'Moonlight' Japanese Hydrangea Vine	Addition
Sedum rupestre	'Prima Angelina'	Addition
Sorgastrum nutans	'Indian Steel', 'Saint Louis', Sioux Blue',	Addition
Spiraea japonica	'Empire Ice Dragon' aka IceconspirPPAF	Addition
Spiraea japonica	Empire Northern Lights aka 'DAVCOP01' PP31,996	Addition
Spiraea japonica	Yeti aka 'Conspiyet' PP28,999	Addition
Syringa vulgaris	New Age Lavender, aka 'G13099' PPAF	Addition
Syringa vulgaris	New Age White, aka 'G13103' PPAF	Addition
Vaccinium	'Pink Popcorn' MNPink	Addition
Veronica longifolia	'Forwever Blue'	Addition
Veronica hybrida	'Moody Blues Mauve Improved'	Addition
Viburnum dentatum	'All That Glitters®	Addition
Viburnum dentatum	'All That Glows®	Addition