Invasive Species Program 2003 Annual Report to the Legislature

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Minnesota Department of Agriculture Agronomy and Plant Protection Division Invasive Species Unit



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INVASIVE SPECIES PROGRAM 2003 ANNUAL REPORT TO THE LEGISLATURE

MINNESOTA DEPARTMENT OF AGRICULTURE Agronomy and Plant Protection Division Invasive Species Unit

PREFACE

Each year, by January the 15th, the Department of Agriculture (MDA) is required to prepare a report for the Legislature that summarizes the status of management efforts for terrestrial invasive species under its jurisdiction. Minnesota Statutes, Chapter 18, specifies the type of information this report must include: expenditures; accomplishments; effectiveness of management activities conducted in the state; outreach and education; participation of state and local units of government; shade tree protection efforts; cooperation and coordination with other states and Canada; and future management needs.

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MISSION STATEMENT

"To manage the economic, ecological and human impacts of invasive species affecting Minnesota."

VISION STATEMENT

"Minnesota ecosystems, agriculture and human habitats unburdened by the presence of new, preventable introductions of invasive species."

GOALS

- To detect, respond rapidly and control invasive species populations in a cost effective and environmentally sound manner.
- To monitor invasive species populations accurately and reliably.
- To review current research on invasive species and develop technologies to prevent introductions.
- To promote public education on invasive species and methods to address them.
- To evaluate risks associated with the introduction and spread of invasive species.
- To identify, monitor and interdict pathways involved in the introduction of invasive species.
- To provide leadership to other agencies to resolve problems associated with invasive species.
- To document, evaluate, and monitor the impacts of invasive species on the economy, environment and human health.



New MDA Detections of Terrestrial Invasive Species in Minnesota 1990-2003

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INTRODUCTION

Executive Order #13112 on Invasive Species issued 2001, the Minnesota Department of Agriculture initiated February 1999 by President Clinton, defines invasive species as nonnative to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. This order was needed to prevent the introduction of invasive species, provide for their control, and to minimize the economic, ecological and human impacts that invasive species cause. The Order is complementary to other policies presently focused on invasive species management including the National Environmental Policy Act of 1969, the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, the Lacey Act, the Federal Plant Pest Act, the Federal Noxious Weed Act of 1974 and the Endangered Species Act of 1973.

Invasive species have impacted every state and ecosystem in the United States. Their success is due to highly competitive reproductive mechanisms, an ability to acclimatize and disperse, tolerance to a wide variety of environmental conditions, lack of local predators and/ or competitors and pathways for further movement or combinations of all of the above. The economic and environmental costs incurred from invasive species continue to skyrocket and some species directly impact human health. Invasive species can cause extinctions, and alter nutrient cycling, hydrology and fire regimes. Some technical reviews estimate that invasive species are partly responsible for the loss of 35-46 percent of all species presently listed as threatened or endangered in this country. Invasive species, in the form of plants, mammals, birds, amphibians and reptiles, fish, arthropods, mollusks and microbes cost Americans billions of dollars every year.

Currently, the United States has a mix of federal and state laws that cover the importation and distribution of potential invasive species. Preventing introductions and controlling the spread of invasive species presents social, political, scientific and ethical challenges. This challenging responsibility is increasing in Minnesota due to our state's burgeoning global economy with 400 tons of goods moving through the state each year.

In 1995, the Minnesota Department of Agriculture initiated an Invasive Species Program. There are presently five full-time professional staff working on invasive species management and up to 30 seasonal field staff trapping and documenting invasive species locations in Minnesota. As a response to President Clinton's order, in

the Minnesota Invasive Species Advisory Council with members from a diverse array of local, state, and federal agencies and private industry and non-profit organizations. A coordinated approach to Minnesota's invasive species problem is a goal of the Council and is critical to statewide invasive species program and management success minimizing the spread and impact of invasive species to Minnesota.

In 2003, the MDA Plant Protection Section developed and passed the following legislation in response to the invasive species crisis:

Sec. 11. [18G.12] [INVASIVE SPECIES MANAGEMENT AND INVESTIGATION.]

Subd. 1. [PLANT PEST AND INVASIVE SPECIES RESEARCH.] The commissioner shall conduct research to prevent the introduction or spread of invasive species and plant pests into the state and to investigate the feasibility of their control or eradication.

Subd. 2. [STATEWIDE PROGRAM.] The commissioner shall establish a statewide program to prevent the introduction and the spread of harmful plant pest and terrestrial invasive species. To the extent possible, the program must provide coordination of efforts among governmental entities and private organizations.

Subd. 3. [INVASIVE SPECIES MANAGEMENT PLAN.] The commissioner shall prepare and maintain a long-term terrestrial invasive species management plan which may include specific plans for individual species. The plan must address:

- (1) coordination strategies for detection and prevention of accidental introductions;
- (2) methods to disseminate information about harmful invasive species to the general public and appropriate agricultural and resource management agencies or organizations;
- (3) coordination of control efforts for selected harmful terrestrial invasive species; and

(4) participation by local units of government and other state and federal agencies in the development and implementation of local management efforts.

Subd. 4. [REGIONAL COOPERATION.] The commissioner shall seek cooperation with other states and Canadian provinces for the purposes of management and control of harmful invasive species.

Subd. 5. [INVASIVE SPECIES ANNUAL REPORT.] By January 15 of each year, the commissioner shall submit a report on harmful terrestrial invasive species to the chairs of the legislative committees having jurisdiction over environmental and agricultural resource issues. The report must include:

- detailed information on expenditures for administration, education, management, inspections, surveys, and research;
- (2) an overview of accomplishments achieved during the prior calendar year;
- (3) an analysis of the effectiveness of management activities;

- (4) information related to the participation of other state and local units of government;
- (5) information about shade tree protection efforts and results;
- (6) an assessment of future management needs; and
- (7) proposed goals for the coming year.

The Minnesota Department of Agriculture is committed to detecting and monitoring invasive species throughout the state minimizing the inevitable impacts on our agriculture, natural resources and human health. We are developing strategies to prevent and control invasive species and adapting policy and management decisions to reflect the best possible information. Our biggest challenge and greatest asset however, will be an informed and involved public. Base funding for the MDA Invasive Species Program is derived from general fund dollars. Additional short term revenue is received from federal sources such as the USDA Cooperative Agricultural Pest Survey Program, the USDA Forest Service and the national gypsy moth Slow the Spread Foundation. These dollars are not represented in the following chart as they vary by year and we may not receive funding from these sources every year. The majority of the general fund expenditures for management of invasive species are used for coordination and actual survey and detection efforts across the state.

MDA Invasive Species Program Expenditures



ACCOMPLISHMENTS IN 2003

III

- Detected gypsy moth nursery breaches in 4 sites.
- Detected one small gypsy moth infestation in Edina. Treatment planned for 2004.
- Set 15,500 gypsy moth detection traps on all eastern edge counties in MN. Detected 529 moths in 2003, up from 118 in 2002.
- · Houston and Winona counties moved into the National "Slow the Spread Program" for gypsy moth.
- Completed filming for an "Invasive Species of the Midwest" video highlighting emerald ash borer, gypsy moth and Asian long-horned beetle.
- Checked 18,000 trees in 38 counties for emerald ash borer.
- Developed a Tree Care Registry requiring companies and people who remove trees, limbs, branches, brush or shrubs for hire to register with MDA. This information will be used to alert companies of new pest outbreaks and quarantines within the state.
- Completed a sudden oak death survey with 304 samples collected from 25 nurseries.
- Worked cooperatively with the Montana Department of Agriculture to monitor bark beetles in western larch log railroad shipments to MN.
- Conducted a subterranean termite educational workshop for homeowners.
- Developed a poster entitled "Arrest the Pest Campaign," listing three insects, four plant diseases and six terrestrial plants as some of Minnesota's most unwanted species.
- Developed a new brochure, Quarantine Pest Alert for Gypsy Moth, for the nursery industry on gypsy moth awareness in Minnesota.
- Invasive species and nursery inspection staff coordinated activities to sample 19 nurseries for *Ralstonia solanacearum*. Through this cooperative effort, geranium samples were quickly processed providing a rapid response to the nursery industry.
- The Minnesota Invasive Species Advisory Council (MISAC) chaired by MDA/DNR developed lists of the invasive species most threatening to Minnesota.
- MDA and DNR cooperatively developed a database for entering invasive species locations throughout the state. Anyone looking for data on species locations will now be able to find out which counties contain documented invasive species.

INSECTS

- Bark beetles (Tomicus piniperda, Pityogenes chalcographus, Dendroctonus armandi, Dendroctonus micans, Ips typographus, Dendroctonus pseudotsugae)
- Gypsy moth
- Exotic wireworms
- Emerald ash borer
- Brown marmorated stinkbug
- Soybean aphid
- Soybean looper
- Mexican bean beetle
- Soybean pod borer
- Cereal leaf beetle.

PLANTS

- Cut-leaved teasel
- Japanese knotweed
- Multiflora rose
- Phragmites australis
- Barberry

PATHOGENS

- Sudden oak death (Phtyophothora ramorum)
- Karnal bunt
- Ralstonia solanacearum
- Potato wart
- Goss' wilt
- Stewart's wilt
- Soybean rust

-

Nematodes

• Comprehensive survey for 24 nematode species

SURVEY RESULTS - PESTS FOUND IN THE STATE FROM THE ABOVE SURVEYS:

- Gypsy moth
- Soybean aphid
- Cereal leaf beetle
- Cut-leaved teasel
- Japanese knotweed
- Multiflora rose
- Phragmites australis
- Barberry
- Ralstonia solanacearum eradicated
- Spiral Nematode, Dagger Nematode, Root Lesion Nematode, Stunt Nematode, Pin Nematode, Stem or Bulb Nematode, Lance Nematode, Stubby Root Nematode

Fortunately, not all of the invasive species surveyed for in 2003 were found. This negative data and documentation is very important however, for meeting export requirements to other states and countries and justifies the time and energy required to conduct these statewide surveys.

А. Gypsy Мотн

Kimberly Thielen Cremers, Gypsy Moth Program Coordinator

Val Cervenka, Trapping Program Coordinator

Erich Borchardt, Research Analyst Intermediate - GIS

GENERAL SURVEY PROGRAM

The Minnesota Department of Agriculture (MDA) was the lead agency for gypsy moth management in Minnesota during the 2003 gypsy moth detection survey program. Other cooperators included USDA, APHIS, PPQ; USDA, FS; DNR and the Three Rivers Park

ne 2003

District in the Twin Cities metro area. Staff in the cooperative program

Female gypsy moth.

set approximately 17,790 delta traps across the state, and 535 male moths were recovered. This was a 453 percent increase from 2002, when 118 male moths were recovered.

MDA hired 26 seasonal staff that set and monitored 14,243 traps, overing 22 standard trapping routes. Routes consisted of approximately 650 traps each. In addition to the standard routes, MDA had four lead workers, setting an average of 114 traps of their own and overseeing 5 or 6 trappers each. USDA, APHIS hired five seasonal staff that set and monitored 3385 traps. Three Rivers Park District monitored 91 traps at 14 parks throughout the Twin Cities metropolitan area.

Traps were set at 1 trap per square mile in areas considered high-risk for the introduction and establishment of gypsy moth due to human activity levels, preferred habitat for gypsy moth, and the advancing gypsy moth front from Wisconsin. Areas designated high-risk included the sevencounty Twin Cities metro area extending north through the city of St. Cloud, counties bordering Wisconsin in southeastern Minnesota including Fillmore and Olmsted county, and two townships inland from the shoreline of Lake Superior including the entire city of Duluth.

The remainder of the state received traps at one trap per four square miles (1/4) on a four-year rotation, with approximately one-third of the state receiving traps annually. The entire eastern half of Minnesotawastrapped in 2003 including the counties of Aitkin, Benton, Carlton, Cass, Chisago, Crow Wing, Isanti, Itasca,



Kanabec, Mille Lacs, Morrison, Pine, and a portion of Sherburne.

Additional traps were set at state parks, and high risk mills and nurseries within the standard trapping grid. Thirtyeight of Minnesota's 68 state parks were within the grid and received 1-2 additional traps. Mills are considered highrisk if they have out-of-state sources and if they are within 60 miles of Wisconsin counties trapping fifty or more moths. There are 63 high-risk mills throughout Minnesota and three mills are under federal Compliance Agreements for gypsy moth. A Compliance Agreement is designed to decrease the risk of gypsy moth establishment and allows mills to transport logs from gypsy moth-rantined areas for milling or pulpwood. One hundred seventy nurseries are considered high/moderate-risk. Nurseries either reporting stock sources from gypsy moth-quarantined areas, who are wholesale dealers, or who have a history of pest problems are considered high/moderate-risk.

Trapping for Asian gypsy moth was conducted at the northern Minnesota seaports of Duluth (MDA) and International Falls (USDA, APHIS). Any moths collected at the seaports or in St. Louis, Lake, and Cook Counties are sent to the USDA OTIS



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Laboratories for Asian gypsy moth DNA analysis. No Asian gypsy moths were identified. In this gypsy moth species the females can fly allowing for much more rapid spread across the country if it became established.

USDA, FOREST SERVICE TRAPPING

The USDA, FS provided funding to MDA to trap all other National Forest land and Bureau of Indian Affairs land within MDA's standard trapping grid. Grand Portage Reservation, Fund du Lac Reservation and the Superior National Forest had traps in 2003.

Other federal cooperators under monitored 64 traps at six different locations across Minnesota. These cooperators included the US Department of Defense, US Department of Interior Fish and Wildlife Service and the National Park Service. Sites trapped include the Mississippi River Project, Agassiz, Big Stone, and Tamarack National Wildlife Refuges, Pipestone Monument and Voyageurs National Park.

EGG MASS SURVEY RESULTS

Egg mass surveys are conducted at sites where high male moth numbers are found in traps. Three egg mass surveys were conducted in 2003. One site was near the Southdale Mall in Edina and the other south of Hugo in White Bear Township. The third site was in rural Winona County near Rollingstone, MN.

Egg masses were found only at the Edina site with more than a dozen egg masses found on two large oak trees. A USDA-FS trained tree climber assisted in removing 30 egg masses from these two oak trees in an attempt to limit the number of caterpillars hatching in 2004. This site will receive a treatment in the spring of 2004.

REGULATORY INCIDENTS – QUARANTINE BREACHES

2003 turned out to be a busy year for gypsy moth regulatory incidents. In early July, MDA received a message from the Iowa Department of Agriculture that Colorado blue spruce shipped from another Midwestern state to an Iowa nursery was infested. MDA investigated Minnesota nurseries for stock possibly received from the Midwestern state. One local nursery had received stock and three spent egg masses were discovered. A Stop Sale Order was issued but was suspended the next day when no other life stages were found.

During gypsy moth flight in late July, multiple males were caught in survey traps at four Minnesota nurseries. All four businesses were issued Stop Sale Orders. Inspections

at the four sites revealed multiple gypsy moth life stages, and as a Destroyed balled and burlapped nursery stock result, each of the nurseries entered into formal compliance agreements with MDA and USDA, APHIS. One provision of the compliance agreements was that the nurseries must treat for gypsy moth in the spring of 2004, and all conifer material must be held off-sale until treatments have been completed. Further investigation into the source of the infested material indicated three separate nursery quarantine breaches from three different states within the federal gypsy moth quarantine, WI, MI, and NY. Surprisingly, all material arrived in Minnesota with the proper gypsy moth free certification paperwork.

Unfortunately, two of the Minnesota nurseries received infested stock several months before the quarantine breach was discovered, allowing for possible crosscontamination of other stock on site. The majority of the potentially infested stock had already been sold to other nursery dealers, landscape contractors, or homeowners by the time MDA learned of the breach. Follow-up surveys are being conducted across Minnesota to determine if stock sold to secondary customers was indeed infested; egg masses were found in October during one of these surveys.

In response to the growing problem of receiving stock from gypsy moth quarantined areas and the difficulty in tracking material once it arrives; Minnesota's new nursery law requires that "stock distributed into Minnesota must be conspicuously labeled on the exterior with the name of the consignor, the state of origin, and the name of the consignee." Labeling will assist in quickly identifying and isolating high-risk stock, preventing further dispersal of all quarantined pests through the nursery trade.



Multiple gypsy moth life stages, and as a Destroyed balled and burlapped nursery stock.

MINNESOTA ENTERS THE NATIONAL SLOW THE SPREAD (STS) PROGRAM FOR GYPSY MOTH

The USDA Forest Service along with State and Federal cooperators has implemented the National Gypsy Moth Slow the Spread (STS) Project across the 1,200 mile gypsy moth frontier from North Carolina through Wisconsin. The Project uses novel integrated pest management (IPM) strategies in order to reduce the rate of gypsy moth spread into uninfested areas. Implementation of STS will:

- decrease the new territory invaded by the gypsy moth each year from 15,600 square miles to 6,000 square miles,
- protect forests, forest-based industries, urban and rural parks, and private property, and
- avoid at least \$22 million per year in damage and management costs.



The STS project focuses on low-level populations in the transition zone between areas considered generally infested and generally uninfested. This IPM strategy is dependent upon intensive monitoring of low moth populations coupled with timely control of growing isolated populations.

In 2003, Minnesota received money from the Slow-the-Spread Foundation (STS) to help offset the costs of the four gypsy moth lead worker positions, to build program infrastructure in preparation for STS protocols, and to incorporate STS data collection methods into the state trapping program through the use of global positioning system (GPS) receivers. GPS data is collected from gypsy moth trap locations and sent to STS to be included in the national decision model. In the fall of 2003, the STS action zone moved into the Southeast corner of Minnesota due to high moth counts in Houston and Winona counties. In 2004, protocols for trapping and reporting data will be implemented according to STS standards.

B. TERRESTRIAL INVASIVE SPECIES PROGRAM

Peter Dziuk, Terrestrial Invasive Species Program Coordinator

Jeff Siira, Agricultural Advisor

WOODBORER/BARK BEETLE SURVEY

In 2003, surveys were conducted for wood boring and bark beetles at nineteen locations associated with solid wood packing material (SWPM) and other sites possibly receiving shipments of raw wood. Principal targets species included *Tomicus piniperda*, *Dendroctonus micans*, *Dendroctonus armandii*, *Ips typographus*, and *P. chalcographus*. These sites include manufacturing facilities, warehouse receiving and storage sites, industrial centers, paper mills and major transportation entry points.

In addition, specific trap locations were selected based on presence of coniferous host species surrounding the facility that a target pest species could established in. Frequently the site pathway association has no conifer presence within the immediate site. For this reason traps may have been place up to several blocks from the target site.

Each target location typically received five 12-16 funnel Lindgren traps. Thee five traps at each location two were baited with ultra-high release alpha-pinene (general attractant for wood boring insects in coniferous hosts), one was baited with a 3-component exotic bark beetle lure, one with a two component lure specific to exotic *Dendroctonus* species and one trap baited with lure specific to *Pityogenes chalcographus*. Eight additional traps were added to the survey route that targeted stands of eastern tamarack. Trap collection cups contained Vapona strips for quick knock down of specimens entering the



traps. Traps were placed the first two weeks of April then checked and serviced weekly through the end of August.

None of the target species were detected in this survey. Weekly collections were sorted by field staff. This first level of screening was limited to removal of non-insect debris and non-beetle species (i.e. leaves, catkins, carrion flies, tent caterpillar adults and larvae, etc.). A second level of screening was done by unit supervisor, Anne Selness. Final screening and identification was performed by Dr. John Luhman of the MDA.

This was the second year of Minnesota's exotic bark beetle pathway target trapping. Commercial/industrial or shipping/receiving centers in Minnesota are considerably reduced in size compared to many eastern industrial centers or ports. Minnesota industry is more dispersed and therefore somewhat more difficult to target. Also many of our identifiable industrial centers are situated in areas of the state with highly fragmented coniferous forest cover type. Though it is not surprising that all survey data has come out negative, good survey coverage for small exotic bark beetle infestations is till a concern. Besides being negative, this data has provided a baseline of representative species and a reference collection of beetles that are frequently caught in baited funnel traps.

SOYBEAN PEST SURVEY

A soybean pest survey was conducted in Houston, Fillmore, Winona, Olmsted, Wabasha and Goodhue counties. Five fields in each county were selected and landowners contacted prior to field entry and survey. Field surveys began in late June due to late field planting this season caused by wet weather conditions. Fields were surveyed with insect sweep nets. Sampling frequency was 100 sweeps at 10 field points at a minimum of once per week. Net samples were collected in plastic bags and ice chilled in the field. At the end of each day specimens were frozen and stored in the MDA Plant Protection Lab facility.

Pest species targeted for detection included the brown marmorated stinkbug, soybean looper, Mexican bean beetle, soybean pod borer and soybean rust. Field survey staff were not responsible for screening any samples in the field other than being trained to observe for symptoms of soybean rust and take samples for testing. No soybean rust were collected and submitted this season. Field samples were initially screened by Blane White, MDA's apiary program coordinator. Blane sorted out all lepidoptera and coleoptera species needing further identification by Dr. John Luhman from MDA's Ag Development Division. No target species were detected in the 2003 Soybean Survey.

EMERALD ASH BORER SURVEY AND DETECTION

During the summer of 2002 the Emerald Ash Borer (EAB) was discovered in southeastern Michigan. The nonnative pest from Asia was discovered among ash trees in several counties that had been declining and dieing over several years. This insect is similar to our native bronze birch borer and two-lined chestnut borer. both which kill weakened trees. The EAB however, kills apparently healthy ash trees. In Michigan, whole streets



Emerald Ash Borer - appr. size of a penny

and yards are now lined with dead ash trees in heavily infested areas.

The EAB has not been detected in Minnesota. We are concerned, however, since ash was a common replacement (15% of all state-funded shade tree program replacement trees) for elms lost to Dutch elm disease in urban settings between 1977 and 1982. In forested settings, ash trees are the second most common hardwood tree in Minnesota. All ash trees native to Minnesota are also susceptible to infestation. This new exotic pest has the potential to significantly harm rural and community forests and the economic welfare of our state.

MDA's Invasive Species Program pursued a number of avenues to survey for the possibility of emerald ash borer (EAB) presence in Minnesota and increase public awareness of the threat. Unlike many other insect pest surveys such as gypsy moth, Japanese beetle or bark beetles, there are no detection tools, like traps or semiochemicals, available for EAB. Detection is strictly limited to direct observation of signs in symptomatic trees.

As part of the Cooperative Agricultural Pest Survey (CAPS), high risk sites were visited by seasonal survey staff. Selection criteria for these sites included the possibility of infested ash wood either coming into or moving through the site. Campgrounds and parks were targeted because of their association with firewood. Sawmills may bring in ash saw logs and nurseries could potentially bring in live infested trees.

An information package that included identification aids on the symptoms and signs associated with infested trees as well as the general history and biology of EAB was distributed to these sites. The package also provided additional information resources on EAB, as well as how to report possible infected trees. While on site, survey staff scrutinized all ash present for any symptoms or signs of EAB. From late June through the end of August, MDA survey staff contacted and visited nearly 450 sites across thirty eight eastern counties. An estimated 18,000 trees were directly observed for symptoms of EAB infestation.

In another effort, MDA is coordinating efforts by all of the state's municipalities and city foresters to monitor urban ash populations and report any suspected EAB symptoms. As part of this survey communities were also asked whether they had any knowledge of ash nursery stock having been imported into their community. Of the nearly 800 communities contacted, 26 responded back with having surveyed their urban forest ash component, however nearly 70 responded back to having knowledge of ash import activity in their area.

Another area of high risk is the nursery industry. While nursery licensing records indicate few if any ash trees get shipped from eastern sources to Minnesota, MDA's nursery inspectors have increased their focus on ash during routine nursery inspections. For this year's survey activities, all data has come back negative.

INVASIVE PLANT SURVEY



MDA summer survey staff trained were in the identification of the following invasive plant species: cut-leaved teasel, Dipsacus laciniatus, Japanese knotweed, Fallopia japonica, multiflora rose, Rosa multiflorus, European common cane, Phragmites australistypeM, and common barberry, Berberis vulgaris. Most of this detection work was performed while staff was involved in other survey activities. Included in the training were summer gypsy moth trappers and emerald ash borer staff.

The most concentrated activity occurred from the metro area down throughout the SE counties. Packages of invasive plant fact sheets were distributed to landowners and farm chemical cooperatives.

From the information collected, of greatest concern is the expansion of cut-leaf teasel populations in Winona and Houston counties and the spread of multiflora rose throughout Houston county. For another species, common barberry, revisits to several former eradication sites in Olmsted and Washington counties revealed no evidence of re-colonization.

EXOTIC WIREWORM SURVEY

As part of rotational detection survey, six exotic wireworm traps were set at random field locations in Isanti, Chisago, Sherburne and Hennepin counties. Sites were selected within the routes developed for bark beetle survey. Traps were set in early June and monitored through the end of August.

Three species of exotic wireworms are established throughout both the Northeastern and Northwestern United States and adjacent Canadian Provinces. Possible high risk pathways associated with movement of nursery stock have been targeted in past years. To date, no exotic wireworms have been detected in Minnesota.

PLANT PATHOGEN SURVEYS

In 2003, surveys were conducted in Nicollet, Sibley, Renville, McLeod, Wright, Meeker, Stearns, Pope, Swift, and Kandiyohi counties for Stewart's wilt and Goss' wilt of corn. Five fields per county were sampled and the MDA lab did the leaf analysis for both species. All samples were negative. Potatoes were sampled in Ottertail, Hubbard, Clay, Wadena, Todd, Becker, Mahnomen, and Norman counties for potato wart and nematode pests. Five fields per county were sampled and samples submitted to the Idaho Department of Agriculture for testing. All samples were negative for potato wart. Several non-regulatory nematode species were identified in the state.

Douglas Fir Beetle

For the past two years the Invasive Species Unit has been closely monitoring and surveying for an exotic bark beetle called Douglas Fir Beetle. This beetle is



Douglas Fir Beetle

Cut-leaved teasel



a serious pest in western forests especially on western Though still unclear, there is a tamarack species. potential danger that this exotic western forest pest could attack native eastern tamarack species. The introduction of this insect was occurring from the movement of large quantities of western logs being imported from Montana to a site in Cloquet, Minnesota. Working closely with the DNR and US Forest Service, populations and movement of the insect have been closely monitored. In 2003, staff negotiated a compliance agreement with the Minnesota company importing these infested logs. Strict sanitation provisions and shipping standards were implemented. In Montana, the Montana Department of Agriculture assisted MDA by inspecting logs prior to shipment to ensure compliance with the agreement. Trapping results thus far have thus far greatly exceed our expectations with only a single beetle being trapped for the year, compared to 118 beetles last year. We are guardedly optimistic that the compliance agreement with the Minnesota business and the extensive partnerships with DNR,

USFS and Montana Dept. of Agriculture may have addressed or significantly reduced a potentially serious forest pest introduction into Minnesota. The Invasive Species Unit of the Plant Protection section will continue surveying and monitoring for this serious pest. Funds have been secured from the US Forest Service for additional research into the situation in 2004.



Kalispell, MT. Logs on the left were cut in April. Logs on the right are two years old.

The Montana Department of Agriculture has been a great asset in helping with this project by inspecting the logs before they are shipped to Minnesota. Montana staff visit the log holding areas and verify the age of the logs prior to loading on railcars for shipment to Minnesota. Montana staff photograph the holding areas and logs and send these to MDA electronically.

EFFECTIVENESS OF MANAGEMENT ACTIVITIES

A. GYPSY MOTH TREATMENT SUCCESS

Exactly 18 months after taking action to combat two of the largest gypsy moths infestations ever found in the state, the Minnesota Department of Agriculture announced in 2003 the complete eradication of the tree pests from the affected areas of Minneapolis and Golden Valley. Considered America's number one tree pest, gypsy moth caterpillars feed on more than 300 trees and woody plant species. In the summer of 2001, the MDA's statewide gypsy moth monitoring program detected two massive infestations - one in Minneapolis just south of Lake Harriet and the other in Golden Valley east of Highway 100. To prevent the moths from spreading, the MDA conducted aerial treatments in May 2002. MDA confirmed the success of these treatments through extensive follow-up trapping at the two sites. The Lake Harriet site had no moth detections after the 2002 treatment and the MDA found three moths at the Golden Valley site in the summer of 2002, but none in 2003. MDA's efforts wouldn't have been as successful without the terrific support from the U.S. Department of Agriculture and local officials from Hennepin County, Minneapolis and Golden Valley.



Despite the encouraging news, the treatments provided Minnesota only a temporary reprieve. Gypsy moths have established themselves from the East Coast all the way to western Wisconsin, and are expected to become entrenched in Minnesota within five years. To postpone the invasion as long as possible, the MDA and its partner agencies aggressively control start-up moth populations detected by MDA's monitoring network. Every year MDA postpones moth arrival saves the state millions of dollars, but we won't be able to hold them off forever. It's like a forest fire approaching from the east. Right now we're able to stomp out all the sparks, but eventually we'll be overwhelmed.

B. FOLLOW UP ON QUARANTINE BREACH MATERIAL Reveals another Gypsy Moth Infested Site

A follow up survey of 2003 nursery stock planting destinations, conducted as a result of gypsy moth infestations at four MN nurseries, revealed a gypsy moth egg mass on a 6' Black hills spruce in Oakdale. Follow up surveys are conducted on nursery stock that was purchased from four MN nurseries, two of which are large re-wholesalers, to determine if and where potentially gypsy moth infested material was planted across the state.

In late July early August the gypsy moth survey traps placed at high risk nursery locations across the state revealed four MN nurseries infested with gypsy moth life stages. Further investigation reveled that infested nursery stock, certified as gypsy moth free, had made its way into MN. The infested stock originated from three separate nurseries in three different states within the federal gypsy moth quarantine: Wisconsin, Michigan, and New York.

Apparently, the infested nursery stock hitch hiked its way into MN in late spring to early summer in the egg mass stage. It appears that the caterpillars emerged from the egg masses here in MN and fed upon the stock at the nurseries.

It is difficult to determine how many egg masses or life stages were introduced but MDA staff removed close to 200 different life stages at the four nurseries. Another difficulty is determining the final destination of all the potentially infested nursery material that was sold prior to finding the infested nurseries. MDA has followed up on as many high risk sites as possible, but it is virtually impossible to inspect every site. There were thousands of trees brought into MN from the three out-state nurseries in question. When the material arrived at the

MN nurseries it was intermixed with other non-infested material on site, so there is likely cross contamination. The material was then sold to multiple landscapers, individual customers, or other nurseries who then sold to other landscapers or individual customers. The significance of the 2003 quarantine breach situation signifies the need for Minnesota to conduct a survey program that covers the entire state instead of only a third of the state on an annual basis.

C. EGG MASSES REMOVED AT THE 2004 EDINA TREATMENT SITE

In October, 2003 Gypsy Moth Program Coordinator, Kimberly Thielen Cremers and Marc Roberts from the US Forest Service who is trained in tree climbing, removed between 30-40 egg masses from two very large Oak trees in Edina. Earlier this season our trapping survey revealed high moth numbers near an apartment complex in Edina. A follow up fall egg mass survey identified over a dozen egg masses on two isolated trees just south of Hwy. 62 and west of France. The egg mass removal was an effort to significantly reduce the number of gypsy moth caterpillars that would hatch in early to mid May, 2004. The goal was to bring the population numbers down to significantly increase our chance of successfully treating the site next spring.

D. DOUGLAS FIR BEETLE COMPLIANCE AGREEMENT

The Douglas Fir Beetle trapping results in 2003, with only one beetle found, were very encouraging. The Compliance Agreement developed with the Cohasset business seems to be working. The Agreement included a large sanitation program at the core site, monitoring age of logs to avoid transport of specific insect life stages and prior to notifying MDA of log shipment dates. An expanded trapping program in 2004 will be used to confirm our 2003 findings. The Compliance Agreement will be looked at again in early 2004 to see if any adjustments need to be made. The company has been very helpful and we are extremely pleased with the significant drop in the number of beetles found this year.



OUTREACH AND EDUCATION

GYPSY MOTH BROCHURE FOR THE NURSERY INDUSTRY

The Minnesota Department of Agriculture has introduced a new brochure especially for the nursery industry on gypsy moth awareness in Minnesota. The full-color trifold, called Quarantine Pest Alert for Gypsy Moth, has on the 19 states with counties currently under the gypsy moth federal quarantine, how to handle stock from quarantined counties, and what will happen if gypsy moth is found in a nursery during an MDA inspection. The brochure also includes a description of the gypsy moth, the survey traps used to detect it, and why MDA has a trapping survey program. In addition, simple steps nursery owners can take to protect stock from a gypsy moth infestation are listed. Along with clear, helpful photos illustrating gypsy moth life stages, the new publication includes a practical pullout time-line of the gypsy moth life cycle in Minnesota to post wherever it's convenient. The Quarantine Pest Alert for Gypsy Moth was distributed to nurseries in 2003 and is also available on our website at: www.mda.state.mn.us.

INVASIVE SPECIES POSTER AVAILABLE

The Minnesota Department of Agriculture has a new poster available on invasive species. This poster shows the exotic pests that we currently consider the greatest threat to our state's economy, environment and agriculture. Some of the pests are already in the state, but others we would like people to be on the look for and to call our hotline if located. We are also looking for locations of pest already in the state including: gypsy moth, multiflora rose, teasel, Grecian foxglove, Japanese knotweed and silver banner grass. The other pests featured on the poster have not been found in the state but invasive species staff are actively searching for include: emerald ash borer, Asian longhorned beetle, sudden oak death, soybean rust, potato mop top virus, karnal bunt and yellow star thistle. The poster lists what people can do to help stop the spread of invasive species in Minnesota. Posters are available by calling the Arrest the Pest Hotline at 651-296-MOTH or Toll-free at 1-888-545-MOTH.

TERMITE MANAGEMENT WORKSHOP FOR HOMEOWNERS

A termite educational workshop was held in Windom in July with almost 75 people in attendance. This program was requested by the City of Windom to follow-up on a project that was originally started in 1998 by MDA and U of M staff. Anne Selness organized the workshop which included bringing in experts from Nebraska to teach the program. Kathy Minnehan (MDA) gave a presentation on termiticide use in Minnesota and properly reading the label. Jeff Hahn, Extension Educator from the U of M also attended. Three Extension Educators from the University of Nebraska conducted the workshop which dispelled many misnomers floating around the community about termites. City residents went away with the confidence to hire a private pest control applicator to treat their home, how much this should cost, how to calculate their own costs, what to look for on the termiticide label and what to look for during the treatment. Windom residents were still hoping that funding would be available to treat the entire community for termites. Clyde Ogg from the University of Nebraska let residents know that this is not a "community" problem but a house by house case and no where in the country are funds provided to exterminate termites. It costs \$1700-\$3000 to treat one average sized home and treatments need to be done by a professional pest control applicator.

NEW INVASIVE SPECIES VIDEO AVAILABLE

The Minnesota Department of Agriculture with a grant from the US Forest Service completed filming for a new video on invasive species of the Midwest region. The video is titled "Invaders at Our Doorstep." The new educational video highlights emerald ash borer, gypsy moth and Asian longhorned beetle. The video will be used for public meetings and educational events throughout Minnesota and the Midwest and will be shown on public television. Scientists and experts from Wisconsin, Michigan and Minnesota are featured in the video.

INVASIVE PLANT FACT SHEETS

Invasive plant fact sheets have been developed for cutleaved teasel, multiflora rose, Japanese knotweed and other invasive plants. Packages of invasive plant fact sheets were distributed to landowners, foresters, nonprofit groups and farm chemical cooperatives.

EMERALD ASH BORER FACT SHEET

An information package that included identification aids on the symptoms and signs associated with trees infested with emerald ash borer, the general history, and biology of this pest were distributed to municipalities, nurseries and forester in Minnesota. The package also provided additional information resources on EAB, as well as how to report possible infected trees to the MDA.

A. The Minnesota Invasive Species Advisory Council

(MISAC) was initiated in response to President Clinton's Executive Order #131129 February 1999 stating that states need to start Invasive Species Council. This council was started by Anne Selness (MDA) and is now co-chaired with Jay Rendall (DNR). The purpose of the Minnesota Invasive Species Advisory Council is to review information concerning the current status, management and spread of terrestrial and aquatic invasive insect, plant, animal and pathogen species into Minnesota natural systems; to work cooperatively in identifying and locating invasive species; to share strategies and to address existing needs to maximize available resources in managing invasive species in Minnesota.

MISAC has 30 members representing 20 different organizations, state and local units of government, and private industry groups. Representation on the Council includes the Minnesota Department of Agriculture, the USDA Animal and Plant Health Inspection Service, the USDA Forest Service, the Minnesota Department of Natural Resources, the University of Minnesota, Minnesota Nursery and Landscape Association, The Nature Conservancy, Minnesota Native Plant Society, Bailey's Nursery, the Minnesota Department of Transportation, U.S. Fish and Wildlife Service, Leech Lake Band of the Ojibwe, Minnesota Crop Improvement Association and other interested individuals.

Subcommittees have completed lists of Minnesota's most threatening invasive species and a statewide database was developed so that MISAC members and others could add data on invasive species locations in the state. In addition, the Council is writing a statewide invasive species management plan listing responsibilities for all state and federal agencies involved in working on invasive species in Minnesota. In 2003, MISAC hosted Randy Westbrooks, weed expert and National Invasive Plant Coordinator with the U.S. Geological Survey in North Carolina. Dr. Westbrooks spoke to council members on Minnesota's role in establishing an early warning and rapid response system (EWRR) for invasive species in our state. His visit also gives Minnesota national recognition for our state council efforts and stated that Minnesota has become a national leader in invasive species management.

B. The Gypsy Moth Program Advisory Committee

(GMPAC) is composed of state and federal staff working cooperatively to plan for the management of gypsy moth in Minnesota and to assist partner agencies in carrying out their established authorities by providing a forum to review and coordinate the implementation of gypsy moth related activities. This committee is chaired by Anne Selness and met twice in 2003. Committee members discuss trapping plans and annual and long term strategies for gypsy moth management. Eight Task Forces were formed in the following categories: 1) Regulatory and Quarantine 2) Surveys 3) Treatments 4) Silviculture 5) Biological Control 6) Research 7) Public Affairs and Outreach and 8) Funding. The scientific and education subcommittees met to provide suggestions for management strategies and the Gypsy Moth State Executive Committee (GMSEC) also met twice in 2003.

C. Cooperative Surveys

State and local units of government also cooperated with the MDA on surveys for gypsy moth and emerald ash borer. Gypsy moth treatments require cooperation from municipalities, city foresters, local, state and federal agencies as well as the homeowners themselves.

VII.

SHADE TREE PROTECTION EFFORTS AND RESULTS

Rich Hauer, Shade Tree Program Coordinator

Jeff Siira, Agricultural Advisor

TREE INSPECTOR TRAINING

In 2003, the Tree Inspector Training sessions which had been conducted by MDA for the past 28 years were transferred to the University of Minnesota Extension Forest Educators. This move freed up MDA staff time to pursue surveying for exotic forest pests such as emerald ash borer, exotic bark beetles and sudden oak death. The University of Minnesota will advertise and conduct the training workshops and MDA will continue to certify tree inspectors. Workshops are now held in the spring and fall in seven different locations. Full-day workshops teach biology and control of Dutch elm disease and oak wilt, tree and firewood identification, general plant problem diagnosis, and pest program rules and regulations and new exotic forest pests. Tree inspectors remain certified by attending a tree inspector recertification workshop each year.

There were 572 inspectors who were recertified in 2003 and 15 recertification opportunities were offered. Certificates are issued by the MDA at the end of the year after all workshops are completed. In order to accommodate those who cannot attend any workshops, home study opportunities have been developed.

SUDDEN OAK DEATH SURVEY

Sudden oak death (SOD) is a highly lethal disease of oaks trees. In California and Oregon, infestations have been found and causing widespread ecologic and financial damage. Even though the disease has not been isolated outside of those two states, the forest and nursery industries nationally are very concerned of the implications of transport beyond infested areas and financial impact. In response, nationally conducted forest and nursery surveys are being conducted this year. The State of Minnesota is well positioned to survey for SOD as it was one of only a few states that was able to implement a pilot survey in 2002 to develop survey and detection protocols. The SOD survey project was initiated and successfully implemented in the fall of 2002 as a direct result of cooperative support within MDA (Agronomy and Plant Protection and Laboratory Services) and among external

agencies (University of Minnesota, USDA Forest Service State and Private Forestry, U of MN Department of Plant Pathology Plant Disease Clinic, and USDA Forest Service North Central Forest Experiment Station). The fall survey received national praise.

In 2003, a spring survey was conducted as a follow up at 25 locations and one garden center that grow plant material and also purchase plants from Oregon and or California. In response to a new discovery of SOD in a nursery in Oregon, the MDA expanded sampling from 140 to 300 samples. Samples were selected based on leaf characteristic consistent with SOD or bleeding cankers on oak stem tissue. The survey was completed in early July at areas considered to be high risk. As with last fall, standard culturing for the disease occurred and follow-up PCR analysis of suspect cultures was completed. Final analysis once again showed that Minnesota was free of SOD.

TREE CARE COMPANIES NOW REQUIRED TO REGISTER

In 2003, Minnesota Governor Pawlenty signed into law legislation that requires companies and people who remove trees, limbs, branches, brush or shrubs for hire to register with the State of Minnesota. Through this legislation, companies and people must provide contact information (accurate and up-to-date business name, address, and telephone number) and a complete list of all Minnesota counties in which they work. Further, tree care companies may also list within the registry employees who are currently certified arborists. The law further requires the Minnesota Department of Agriculture (MDA) to provide registered tree care companies with information on existing or potentially regulated forest pests within the state. The MDA is the agency instructed to maintain the tree care registry. The official language is found within the Plant Protection and Export Certification law located within Section 7 of Chapter 18 of state statutes. The specific language is listed on page 19:

Subd. 1. [CREATION OF REGISTRY.] The commissioner shall maintain a list of all persons and companies that provide tree care or tree trimming services in Minnesota. All tree care providers, tree trimmers, and persons who remove trees, limbs, branches, brush, or shrubs for hire must provide the information to the commissioner: (1) accurate and upto-date business name, address, and telephone number; (2) a complete list of all Minnesota counties in which they work; and (3) a complete list of persons in the business who are certified by the International Society of Arboriculture.

Subd. 2. INFORMATION DISSEMINATION.] The commissioner shall provide registered tree care companies with information and data regarding any existing or potential regulated forest pest infestations within the state.

Companies may register electronically at: www.mda. state.mn.us/tcr or by calling 651-296-8328. Each person within a tree care company is not required to register. Rather, company registration covers all individuals within a company.

The threat of exotic tree pests is increasing and the potential affects on urban and rural forest is real. Numerous and serious exotic forest pests such as gypsy moth, emerald ash borer, and Asian long horned beetles are inadvertently

introduced into non-infested areas by the movement of infested wood, branches, logs and brush. Thus, prompt notification and communication with tree care companies and tree trimmers will greatly enhance the capability of the Department to limit or restrict the movement of such infested material. The MDA will use the tree care registry to inform companies where quarantines for gypsy moth and other exotic pests exist, the time period they are in effect, and other pertinent information to minimize the impact on tree care operations and further reduce the risk of inadvertent movement of exotic pests. Over the next ten years it is expected that state and federal quarantines, such as for gypsy moth, will increase in frequency within Minnesota. To date, over 160 companies and 95 arborists have registered.

WOOD UTILIZATION SURVEY

In 2003, MDA produced a new survey to determine wood use practices by the log home industry, log furniture companies, sawmills, pulp and paper companies, OSB engineered wood products, and veneer mills in Minnesota. This survey will help us plan pest surveys throughout the state in an effort to protect the forest industry from new pest invasions. Currently, survey information is being compiled to determine which states wood is coming from and if there are wood products arriving from quarantined areas.

VIII.

For over 20 years Minnesota has managed to hold the line against gypsy moth (the single most destructive forest pest in North America) and a number of other invasive species that threaten Minnesota's environment, our agriculture and our natural resources. The intensity and frequency of these threats has dramatically increased as has the possibility of bioterrorism.

- In 2003, Minnesota detected 4 major nursery stock quarantine breeches involving several thousand contaminated trees. The full impact and consequences of this quarantine breech may not be known for several years and will require considerable resources and effort for MDA follow-up.
- Survey results from 2002 and 2003 indicate several possible gypsy moth "hot spots" that have the potential to flare into infestations requiring eradication efforts. These "hot spots" require close surveillance and monitoring.
- Gypsy moth surveillance in Wisconsin indicates that the movement across Wisconsin toward Minnesota accelerated at an alarming rate of approximately three times faster then historical averages, resulting in the gypsy moth front now being within 1 or 2 counties of Minnesota, with a bulge of the front now entering the extreme southeast corner of the state.
- In 2002, MDA initiated treatments to eradicate 3,000 acres of gypsy moth. This was the largest eradication ever conducted in Minnesota.
- In Michigan, 5 million trees in a 13 county area of Detroit have been killed by the newly introduced Emerald Ash borer, with an estimated 700 million ash trees threatened in the state. These 13 counties were quarantined by USDA APHIS in October of 2003. The economic impact to the nursery industry alone is estimated to be \$10 million. Minnesota urban forests and natural northern forests have a large ash tree component that would be destroyed if this insect was introduced into the state and was not detected and eradicated in a timely manner.

- Sudden Oak Death a serious fungal disease attacking oaks and 24 other hosts was discovered in the US in 1995 and has spread to 13 California counties and 1 Oregon County. The disease is carried by numerous horticultural crops and represents a significant threat to Minnesota oak forests and the nursery industry.
- USDA APHIS PPQ and the Dept. of Homeland Security have identified that agriculture and the environment may be threatened by terrorists utilizing the introduction of exotic plant pests or pathogens as a method of attack. MDA has obtained significant increases in funding to monitor for possible introduced pests. (\$5,000 to \$75,000) These homeland security efforts require a 50% match from the state.
- Numerous private and public entities including MN Nursery and Landscape Association, MN Shade Tree Advisory Council, Minneapolis Parks and Recreation, Bailey Nursery, MN Turf and Grounds Foundation, and the lumber industry formed a small work group in late 2003 in an effort to respond to these very pressing threats to Minnesota.

MDA plant protection receives approximately \$400,000 annually to fund our Gypsy moth program and an additional \$300,000 for general invasive species work. These funds help support the following: 1 Unit Supervisor, 1 GM coordinator, 1 GIS specialist, 1 GM trapping coordinator, 1 invasive species specialist, 1 clerical and approximately 30 summer survey staff. These resources are sufficient to provide GM surveillance for approximately 1/3 of the state. Limited and targeted trapping and surveillance is also conducted for a variety of exotic plant pests threatening the state. Additional resources are needed to fund the following:

- A public information specialist to ensure that the public is well informed and understands the activities of the department be it surveillance or eradication and to solicit the publics assistance with this effort.
- A research scientist or plant pathologist to provide desperately needed analytical capability and capacity to respond to threats such as Sudden Oak death, ralstonia disease, etc.
- Survey and detection personnel to expand the area of the state that is monitored for the presence of forest and agricultural pests.
- Increased treatment/eradication cash reserves (current reserve is \$50,000) to enable the MDA to respond to emergency plant pest infestations such as the 2002 situation which required approximately \$200,000 for the GM eradication.

Summary of Additional Resources needed:

1 Information Officer - \$45,000

1 Research Scientist/Pathologist - \$50,000

10-15 Seasonal survey and detection staff - \$100,000

Additional treatment reserve - \$50,000

Public Outreach materials and supplies - \$5,000

Staff supplies, equipment and support - \$50,000

This expertise and capacity is simply not available within the agency. Without these additional resources the MDA is able to monitor a limited portion of the state for gypsy moth and other exotic plant pests. Plant pest introductions which are not detected early and are allowed to go untreated or unmanaged can quickly escalate in size and severity eventually causing millions of dollars in damage and containment costs.

IX.

- » Treat gypsy moth start-up population in Edina.
- » Conduct statewide surveys for: sudden oak death, emerald ash borer, Douglas fir beetle, karnal bunt, nematodes, invasive plants and exotic bark beetles.
- » Implement the national Slow the Spread gypsy moth protocols into our trapping regime.
- » Show the Invasive Pests of the Midwest video at outreach and educational events.
- » Continue adding invasive plant locations to the state database.
- » Distribute the invasive pest lists developed by MISAC members and experts to the appropriate people for informational purposes.
- » Finalize the Rapid Response and Action plan for Emerald Ash Borer.
- » Research and develop a list of potential pathways for invasive species to Minnesota.
- » Research ways to document, evaluate and monitor the impacts of invasive species on the economy, environment and human health.
- » Conduct Cooperative Agricultural Pest Surveys as required.
- » Develop a statewide Invasive Species Management Plan cooperatively with MNDNR, MNDOT, The Nature Conservancy and others.