



Gypsy Moth in the Western U.S. Successful Prevention of its Establishment

prepared by the Western Forest Health and Invasive Species Committee
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Introduction

The gypsy moth, *Lymantria dispar*, is one of North America's most devastating forest pests. The species originally evolved in Europe and Asia and has existed there for thousands of years. In 1869, the gypsy moth was brought to the U.S. near Boston, MA in a failed attempt to research for a silkworm industry. The insect escaped and about 10 years after this introduction the first outbreaks occurred in this neighborhood. In 1890 the State and Federal Government began their attempts to eradicate the gypsy moth. These attempts ultimately failed and since that time, the range of gypsy moth has continued to spread. Every year, isolated populations are discovered beyond the contiguous range of the gypsy moth, but these populations are eradicated or they disappear without intervention. It is inevitable that gypsy moth will continue to expand its range.



Gypsy moth caterpillar

When gypsy moth densities reach high levels, large quantities of foliage are consumed and partial or total defoliation of the forest canopy may occur. Gypsy moth outbreaks often extend over hundreds of miles and the defoliated areas may be extensive. The gypsy moth is extremely polyphagous; it is known to feed on hundreds of different tree species in North America. However, within most forests in the Eastern U.S., there are some species that are highly preferred by the gypsy moth and other species that are immune. Numerous tree species have been identified as susceptible throughout the western U.S. Efforts at containing and slowing the spread of gypsy moth cost the USDA Forest Service over 13 million dollars in fiscal year 2006.

Gypsy Moths in the West

Introductions of European and occasionally Asian gypsy moths are discovered every year somewhere in the western United States. These discoveries are made possible via a cooperative detection program. Thanks to these early detections, often aggressive, large-scale treatments are not required and simpler, more cost-effective efforts are adequate to stop gypsy moth establishment. When these larger efforts are needed, the eradication efforts have been successful. Continued vigilance and implementation of this cooperative early detection and rapid response will help prevent the establishment of gypsy moths in the west.

The large populations discovered in the western U.S. were found in Lane County, Oregon, Tacoma, Washington and Salt Lake City, Utah. These infestations have been successfully eradicated. Numerous other smaller detections have been made across the west and have either been eradicated through treatments or did not establish a sustainable population

Examples of Cooperation and Success

Early detection of gypsy moth introductions is essential to the successful prevention of its establishment. Each western state has a cooperative program in place for the early detection of gypsy moth which allows for a rapid response and eradication. The program usually involves Federal (APHIS and USFS) and state agencies (Departments of Agriculture and Forestry agencies). The detection program involves placement of



Cargo arriving at US port

pheromone-baited traps in areas of introduction and establishment risk. These are areas of high human population or significant visitation, and host material. In addition, the USDA APHIS and USDA Forest Service are working together with several Asian countries to implement a monitoring cooperative for Asian gypsy moth to reduce the likelihood of its transport on ships or cargo to the U.S.

Successful Prevention in Utah

The Utah Department of Agriculture is the lead agency for the gypsy moth detection program in Utah. Agencies involved in the eradication program included: USDA APHIS, USDA Forest Service, Utah Department of Agriculture, Utah Department of Natural Resources-Division of Forestry, Fire, and State Lands.

Gypsy moths were initially detected in 1988 in Salt Lake City on the University of Utah campus. An aerial application program started in 1989, treating nearly 1,200 acres with biological insecticides. Surveys in 1989 identified additional infested areas east of the city. Areas received aerial treatments from 1990 to 1993 with the largest area, nearly 30,000 acres, being treated in 1991. In addition to aerial treatments, the program included mass trapping and quarantine, see Figure 1.



Aerial spraying for gypsy moth

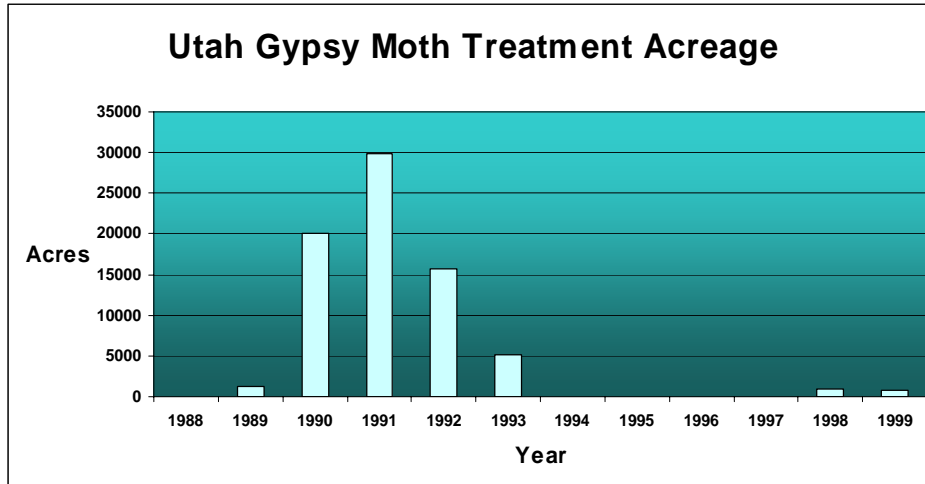


Figure 1

A detection and delimitation trapping program has continued since 1988. Traps are arrayed depending on terrain and vegetative characteristics. Difficult terrain makes implementing detection trapping on a grid impossible. Currently, a gypsy moth risk assessment model (Logan et al. 2007) is used for trap placement to minimize costs and maximize detection efficiency.

In 1998 and 1999, about 800 acres were treated for new introductions of gypsy moth in the Salt Lake City area. These were not considered holdovers from the original detections in 1988. Seven single adult moths were trapped in 1999, but only one was found in a previously treated area. These did not require treatment. No additional gypsy moths have since been detected in the Salt Lake City area.

Successful Prevention in Washington and Oregon

In 1991, nine Asian gypsy moth males were caught in the vicinity of Tacoma, Washington, and one was caught in North Portland, Oregon.

The Oregon Department of Agriculture is the lead agency for the gypsy moth detection program in Oregon, and the Washington Department of Agriculture is the lead agency for gypsy moth detection in Washington. Agencies involved in the eradication program included: USDA APHIS, USDA Forest Service, Washington Department of Agriculture and Oregon Department of Agriculture and private timber companies.

An aerial application program was conducted in 1992 treating about 132,700 acres with biological insecticides in Washington, and 11,500 acres in Oregon. The cost of the eradication project was about \$9,800,000. Pheromone trapping in 1992 was greatly intensified around all ports, and along all waterways in both Oregon and Washington. Trapping intensity was lessened further away from



Gypsy moth trap

the ports and waterways, but still more were placed than normal trapping patterns. With all the increased trapping intensity, and the very intense trapping in the eradication treatment areas, the 1992 trapping costs were almost as high as the eradication project. Trapping in 1992 through 1994 resulted in no moths being caught, thus further insecticide applications were unnecessary.

A more intensive detection trapping program around ports and waterways has continued since 1994. Traps are arrayed depending on likelihood of introduction and vegetative characteristics. Difficult terrain makes implementing detection trapping on a grid difficult.

Three gypsy moths were initially detected in 1983 in the town of Lowell, Oregon when four moths were captured. In 1984 an intensive trapping program was instituted and over 1,900 moths were caught in the greater area around Lowell.

Aerial applications started in 1985, treating nearly 225,000 acres with biological insecticides. Surveys in 1985 identified additional infested areas in the same general area. Areas received additional aerial treatments the following two years. In addition to aerial treatments, the program included mass trapping and quarantine. Trapping in 1987 resulted in no moths being caught, thus further insecticide applications were unnecessary.

A more intensive detection and delimitation trapping program has continued since 1987. Traps are arrayed depending on likelihood of introduction and vegetative characteristics. Difficult terrain makes implementing detection trapping on a grid difficult.

The Future for Gypsy Moth in the West

With early detection of gypsy moth introductions we have successfully prevented its establishment in the western U.S. Cooperative programs are an essential reason for this success. Each western state has such a program in place for the early detection of gypsy moth which allows for a rapid response and eradication. As the west is also facing challenges from other invasive pests expanding their range from the East, much can be learned from this example of cooperation and success.

For more information on Gypsy Moth in your area, contact your state department of agriculture, or U.S. Forest Service, Forest Health Protection staff.

Resources:

<http://www.fs.fed.us/ne/morgantown/4557/gmoth/>

http://www.aphis.usda.gov/plant_health/plant_pest_info/gypsy_moth

For more information please contact:
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