

Gypsy Moth in North America

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 either 1868 or 1869, the gypsy moth was accidentally introduced near Boston, MA by E. Leopold Trouvelot. About 10 years after this introduction, the first outbreaks began in Trouvelot's neighborhood and 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 into the future.

The gypsy moth is known to feed on the foliage of hundreds of species of plants in North America but its most common hosts are oaks and aspen. Gypsy moth hosts are located through most of the coterminous U.S., but the highest concentrations of host trees are in the southern Appalachian Mtns., the

Ozark Mtns., and in the northern Lake States.

Gypsy moth populations are typically eruptive in North America; in any forest stand densities may fluctuate from near 1 egg mass per ha to over 1,000 per ha. When densities reach very high levels, trees may become completely defoliated. Several successive years of defoliation, along with contributions by other biotic and abiotic stress factors, may ultimately result in tree mortality. In most northeastern forests, less than 20% of the trees in a forest will die but occasionally tree mortality may be very heavy.

Forest Effects

Despite over 100 years of presence in North America, researchers are still at a loss to explain and predict the extent of the changes in forest vegetation likely to take place through gypsy moth disturbance. A major concern is the potential loss of economically critical and ecologically dominant oak species (*Quercus*, spp.). Most studies of forest compositional changes with gypsy moth defoliation indicate that less susceptible species will dominate the forest, so in effect, forests may have fewer gypsy moth problems in the future.

Natural Enemies

A variety of natural agents are known to kill gypsy moths in nature. These agents include over 20 insect parasitoids and predators that were introduced over the last 100 years from Asia and Europe. Small mammals are perhaps the most important gypsy moth predator, especially at low population densities. Birds are also known to prey on gypsy moths but at least in North America this does not substantially affect populations. A nucleopolyhedrosis virus usually causes the collapse of outbreak populations and recently an entomopathogenic fungus

species has caused considerable mortality of populations in North America.

Management:

Over the last 20 years, several millions of acres of forest land have been aerially sprayed with pesticides in order to suppress outbreak gypsy moth populations. Though some areas are treated by private companies under contract with land owners, most areas are sprayed under joint programs of state governments and the USDA Forest Service. Your local Extension Service can provide more detailed information about programs in your area.

The USDA, State and local governments also jointly participate in programs to locate and eradicate new gypsy moth populations in currently uninfested areas. Most of these projects focus on populations of European origin, but recently several Asian populations have been discovered and eradicated in the US and Canada.

In 1992, the USDA Forest Service began a pilot program to test the feasibility of slowing the spread (STS) of the gypsy moth in North America. STS pilot programs currently exist in North Carolina, Virginia, West Virginia, and Michigan.

Research:

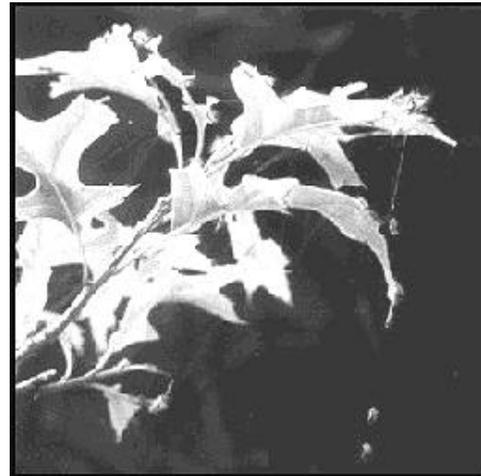
The gypsy moth has been intensively studied over the last 100 years in North America. Currently there are numerous groups around the country investigating various aspects of the biology, ecology, and management of the gypsy moth.

This work is funded by the USDA Forest Service, the USDA Agricultural Research Service, the USDA Cooperative State Research Service, the USDA Animal and Plant Health and Inspection Service, and numerous state and private Universities.

Gypsy Moth Life Cycle



First instar larvae (caterpillars) hatch in the spring from eggs laid the previous summer.



Newly hatched larvae hang by silken threads, are caught by the wind, and thereby disperse to other trees in the forest.

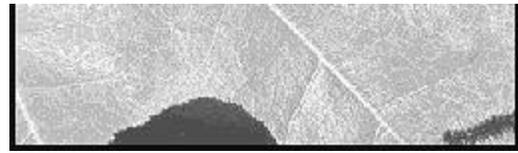
This material was prepared by Sandy Liebhold (sandy@gypsy.fsl.wvnet.edu), USDA (<http://www.usda.gov>), Forest Service Northeastern Research Station Forestry Sciences Laboratory (<http://www.fsl.wvnet.edu>).



Pupation occurs about 8 weeks after egg hatch. Pupae are usually located in bark crevices or other cryptic locations.



Small larvae begin feeding on newly expanded leaves.



Larvae go through 5 to 6 larval stages (instars). Between stages they molt by shedding their skin.



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After mating, the female lays eggs in a single mass covered with hairs from the abdomen. Most egg masses are located on tree trunks. The winter is spent in the egg stage.

Mo
Tree

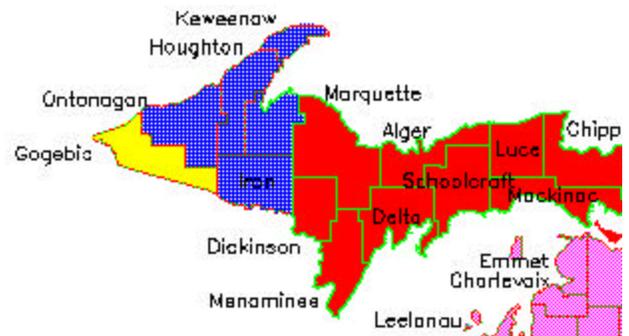
1. White Oak (*Quercus alba*)
2. Quaking Aspen (*Populus tremuloides*)
3. Northern Red Oak (*Quercus rubra*)
4. Black Oak (*Quercu velutina*)
5. Paper Birch (*Betula papyrifera*)
6. Basswood (*Tilia americana*)
7. Bigtooth Aspen
(*Populus grandidentata*)
8. Ironwood (*Ostrya virginiana*)

Facts About Gypsy Moth in the Upper Peninsula

- As of 1999, quarantined counties are: Alger, Chippewa, Delta, Dickinson, Luce, Mackinac, Marquette, Menominee, and Schoolcraft. All of the Lower Peninsula is also quarantined.
- As of 1999, quarantined counties in Wisconsin are: Calumet, Dodge, Fond du Lac, Kenosha, Marinette, Menominee, Milwaukee, Oconto, Outagamie, Ozaukee, Racine, Shawano, Sheboygan, Washington, Waukesha, and Winnebago
- Movement of forest products is regulated through the MDA by use of a permit. Contact John Diddams, in Marquette, at 906-228-9998. USDA determines which counties are quarantined, not the MDA, DNR, or other State office.
- Movement of wood products among quarantined counties is not regulated. Regulation only kicks-in when wood is moved to (or through) non-quarantine counties.
- In 1999, larva or egg masses were found in the counties Delta, Dickinson, Marquette, Menominee, and Schoolcraft. However, we are not in the middle of an epidemic. Nevertheless, male moth counts are on the rise in the eastern and central U.P.
- Females cannot fly. They emit chemical attractants called “pheromones” that attract male moths, which can fly. The green traps placed throughout the U.P. are pheromone traps that catch male moths.
- Reports of male moth catch counts do NOT indicate the presence of female moths, egg masses, larvae, or infected areas.

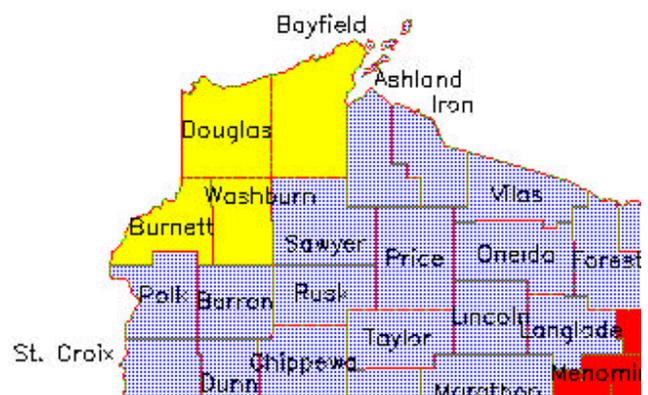
- Common look-a-likes are forest tent caterpillar and eastern tent caterpillar. At this time, it's unlikely you will find a gypsy moth, unless you're in of the few small infected areas.
- Forest product trade is only ONE way in which gypsy moths can be potentially transported by people. Most of the U.P. infected areas were probably caused by hitch-hikers on cars, RVs, and trailers

1999 Quarantined Count



<http://ceris.purdue.edu/napis/pests/egm/imap/mi.html>

1999 Quarantined Counties in V





**EASTERN TENT
CATERPILLAR**

Malacosoma americanum

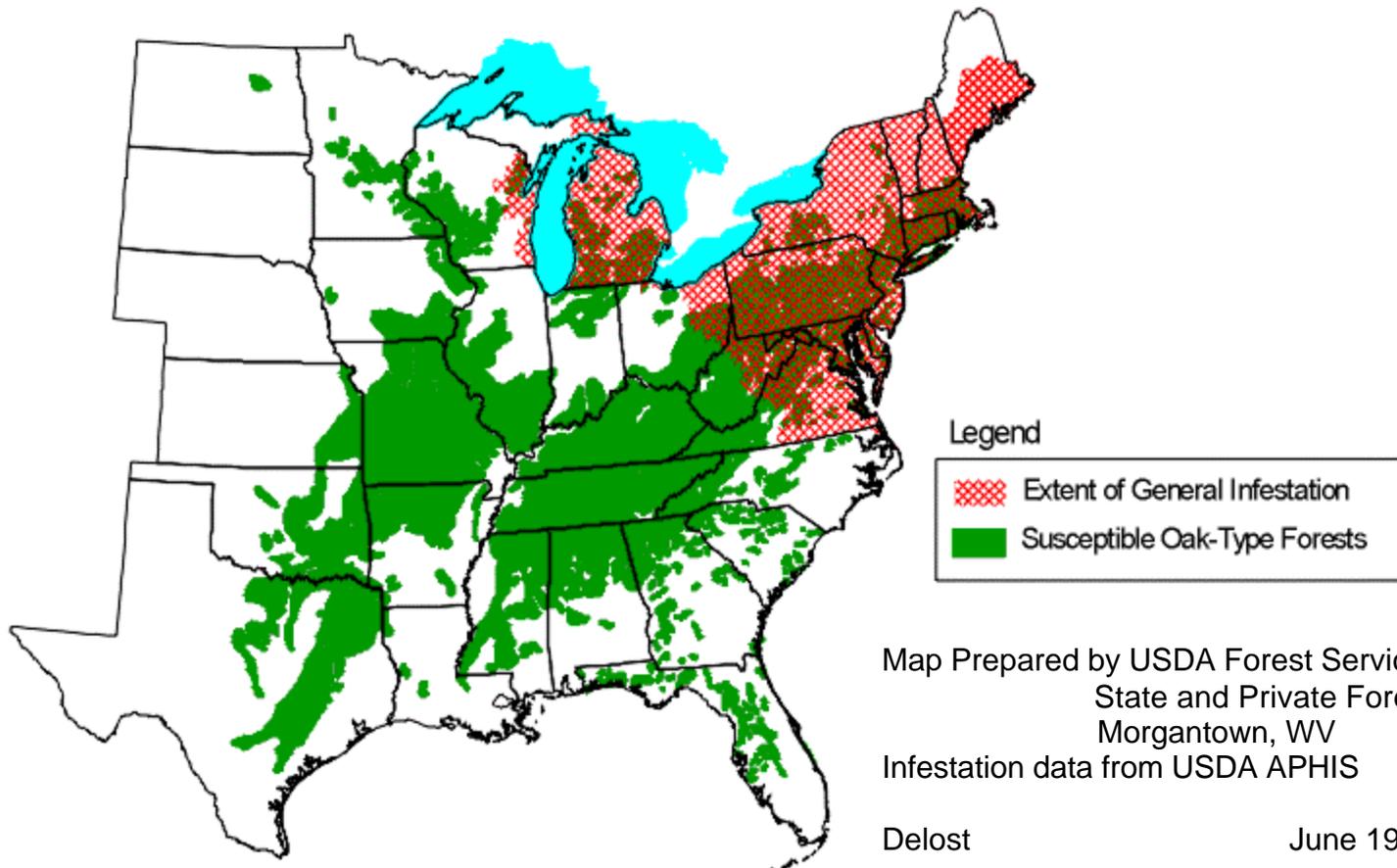
**FOREST TENT
CATERPILLAR**

Malacosoma disstria

**GYPSY
MOTH**

Lymantria dispar

Gypsy Moth Infested Area of the Eastern U.S., 1998



Map Prepared by USDA Forest Service
State and Private Forestry
Morgantown, WV
Infestation data from USDA APHIS

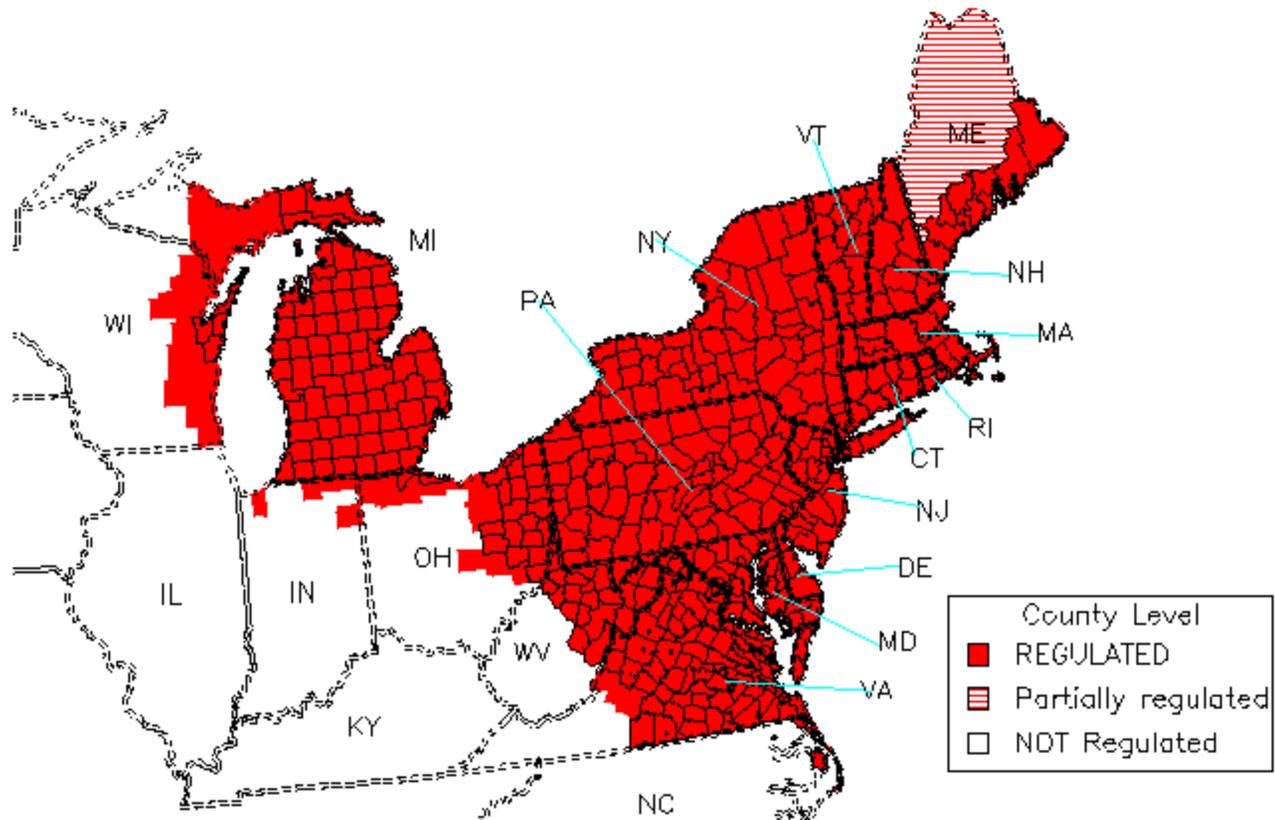
Delost

June 1998

<http://fhpr8.srs.fs.fed.us/wv/gmdigest/maps/maps.htm>

1999 REGULATED areas for European Gypsy Moth, *Lymantria dispar*

1999-07-23 Data from 1999 7-CFR Part 301.45-3 & 64 FR 40500



<http://www.ceris.purdue.edu/napis/pests/egm/mgif/egmregs.gif>