

## Gypsy Moth: Slow the Spread Program

Since its introduction into the United States in 1869, the gypsy moth (*Lymantria dispar*), a pest of trees, has defoliated thousands of acres of hardwood forests across the Northeastern United States.

Originally introduced into Massachusetts, the gypsy moth has slowly spread north to Maine and south to North Carolina, infesting 19 States and the District of Columbia. Despite State and local control efforts, the infestation continues to move south and west.

In 1992, the U.S. Department of Agriculture's (USDA) Forest Service (FS) and Animal and Plant Health Inspection Service (APHIS), along with the Department of Interior's National Park Service and eight State and university partners embarked on a pilot project called "Slow the Spread." The project's goal was to slow the rate of natural spread of the gypsy moth by using integrated pest management strategies.

The project demonstrated that it is feasible to significantly reduce the spread of gypsy moth and that this can be accomplished in a cost-effective and environmentally viable manner using current technology.

In 1999, following successful completion of the pilot project, the National Gypsy Moth Slow the Spread program was implemented along the entire 1,200 mile gypsy moth frontier from North Carolina through the upper peninsula of Michigan.

### Slow the Spread Program

By implementing Slow the Spread across the 1,200-mile gypsy moth frontier from Wisconsin to North Carolina, Federal and State participants expect to do the following:

- 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 program area is located ahead of the advancing front of the gypsy moth population. The program focuses on early detection and suppression of the low-level populations along this advancing front, disrupting the natural progress of population buildup and spread. Each year, the Slow the Spread

program reduces the rate of natural spread of the gypsy moth by approximately 40 percent, from 12 1/2 to 7 1/2 miles per year. Participants use the most environmentally sensitive control tactics to meet the program's objectives.

Slow the Spread has three main thrusts:

**Trapping**—Officials monitor gypsy moth populations by placing a grid of pheromone-baited traps to allow early detection in areas thought to be uninfested. Once officials determine the extent of an infestation, they can conduct control efforts.

**Suppression**—A number of treatment options are available for suppression of the insect. Options include mating disruption with pheromone flakes, which contain the female sex attractant; mass trapping; and spraying with *Bacillus thuringiensis* (Bt), diflubenzuron (except in Michigan), or Gypchek®.

Pheromone flakes interfere with population buildup by disrupting normal gypsy moth mating. Mass trapping involves the intensive use of pheromone-baited traps to capture most of the males in the area. Commonly found in the soil, Bt is a naturally occurring bacterium that causes caterpillars to stop feeding, resulting in starvation. Diflubenzuron interferes with the natural development of gypsy moths, causing death. Gypchek® is a naturally occurring virus that kills the pest by attacking its internal tissue.

Mating disruption, mass trapping, and spraying Gypchek® are strategies that affect only the gypsy moth. Diflubenzuron has no known effect on vertebrates but does affect most invertebrates. Bt has a broader range of impacts, as it can affect the caterpillars of other moths and butterflies. It has no known direct effect on animals other than insects.

**Regulatory Work**—Human movement of infested articles is a major factor in the spread of gypsy moth. Therefore, a key component of the Slow the Spread program is the intensification of regulatory actions to ensure that people comply with regulations when they move host materials. In 1999, this enhanced regulatory effort was expanded to all States participating in Slow the Spread.

Slow the Spread participants conduct active public awareness campaigns designed to prevent the artificial movement of gypsy moth. In addition, participants focus their outreach efforts on establishments that receive regulated articles and are located in the Slow the Spread action zone.

Participants conduct intensive monitoring at locations within the program area that present a high risk for moving gypsy moths. High-risk locations include campgrounds, parks, tourist attractions (e.g.,

theme parks), large commercial construction sites, shipping and receiving companies, and log, timber, and lumber-processing facilities.

### **Life Cycle and Appearance**

The gypsy moth life cycle has four stages: egg, larva, pupa, and adult moth.

The female moth lays egg masses in July and August in clusters of 100 to 1,000. While most eggs are laid on the bark of trees, females will also lay clusters in any sheltered location, including homes, vehicles, firewood, playground equipment, and stone walls. Egg masses are beige and about the size of a quarter.

Larvae (caterpillars) emerge the following April or May and begin devouring leaves. The caterpillar stage lasts for 10 to 12 weeks. Caterpillars are 1 to 2 inches long when fully grown, with hairlike structures along the entire length of their body. Grayish, with five pairs of blue spots and six pairs of red spots along their back, the caterpillars have yellow markings on their head.

Transformation from caterpillar to moth takes place during a 10- to 14-day period. From June to August, larvae enter the pupal, or resting, stage. Pupae are reddish-brown. Male pupae are about 3/4 inch long; females, about 1 inch long.

Male moths have a wingspread of about 1 inch. They are light tan to dark brown and have blackish wavy bands across their forewings with arrowhead markings near the leading edge. Female moths are nearly white with faint, dark wavy bands on the forewings. With a wingspread of up to 2 inches, female moths are much larger than males, but they do not fly. The antennae have a feathered appearance in the males but are long and thin in the females. Adult moths do not feed and live for only a few days.

### **Gypsy Moth Damage**

In its caterpillar stage, the gypsy moth can feed on more than 500 different species of trees and shrubs. The pests can defoliate millions of acres in a season. In 1981, gypsy moths defoliated a record 12.9 million acres.

Heavy gypsy moth defoliation for even 1 year can cause some tree mortality; defoliation for 2 or more years in a row in one area often kills most of the affected trees. The amount of tree mortality depends on the health of the tree at the time of defoliation. Other factors affecting mortality include tree species, soil moisture, and other stresses. Trees stressed by drought or other poor growing conditions are less likely to recover after repeated defoliation.

In heavy infestations in forested residential areas, the crawling and overrunning of homes by caterpillars can be a nuisance.

### **History**

Gypsy moths are native to Europe, Asia, and North Africa. They were brought to America in 1869 by a French naturalist trying to breed them with silkworms. Some of the larvae escaped during his experiments in Medford, MA. Within a few years, the gypsy moth became established in the surrounding woodlands. The first major outbreak occurred in 1889.

Today, the gypsy moth infests all of Connecticut, the District of Columbia, Illinois, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. Parts of Illinois, Indiana, Maine, Michigan, North Carolina, Ohio, Virginia, West Virginia, and Wisconsin.

### **Slow the Spread Areas**

Ten States are involved in the Slow the Spread program: Illinois, Indiana, Kentucky, Michigan, Minnesota, North Carolina, Ohio, Virginia, West Virginia, and Wisconsin.

### **Additional Information**

For more information about gypsy moth or Slow the Spread, visit [www.ento.vt.edu/STS](http://www.ento.vt.edu/STS), or contact USDA:

USDA-FS  
Forest Health Protection  
P.O. Box 2680  
Asheville, NC 28802  
[www.fsl.wvnet.edu/gmoth](http://www.fsl.wvnet.edu/gmoth)

USDA-APHIS  
4700 River Road, Unit 134  
Riverdale, MD 20737-1236  
[www.aphis.usda.gov/oa/pubs/gmbro.pdf](http://www.aphis.usda.gov/oa/pubs/gmbro.pdf)

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