Proposed Treatment for Gypsy Moth in Indiana

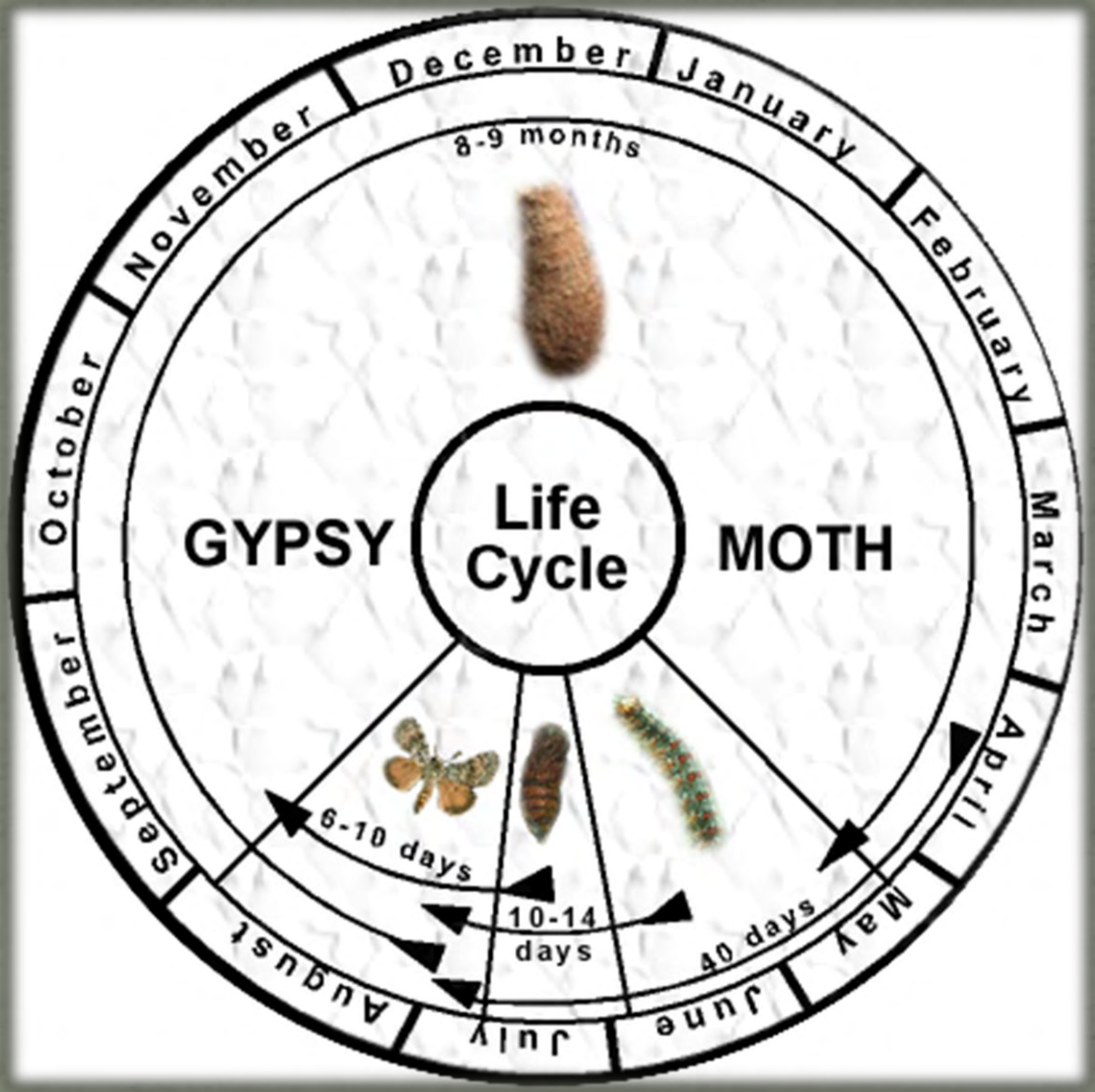
Indiana Dept. of Natural Resources
USDA Forest Service
Purdue University

Agenda

- Biology
- Damage
- Survey
- Treatment Options
- Proposal
- Questions and Comments

Biology

Gypsy Moth Life Cycle



Egg Masses

- Present from July – April
- Larvae hatch in late April
- Each female can produce between 500 and 1000 eggs

Hatching caterpillars

- **Hatch in late April**
- **Move to the tree canopy immediately after hatching**
- **Produce silk threads that allow them to blow onto other trees (“ballooning”)**
- **Begin to feed on young leaves soon after hatching**

A recently hatched caterpillar

Ballooning

Feeding caterpillars

- Feed heavily from late April through June

Feeding gypsy moth caterpillars

- Marked with pairs of 5 blue dots followed by 6 pairs of red dots along back

Feeding habits

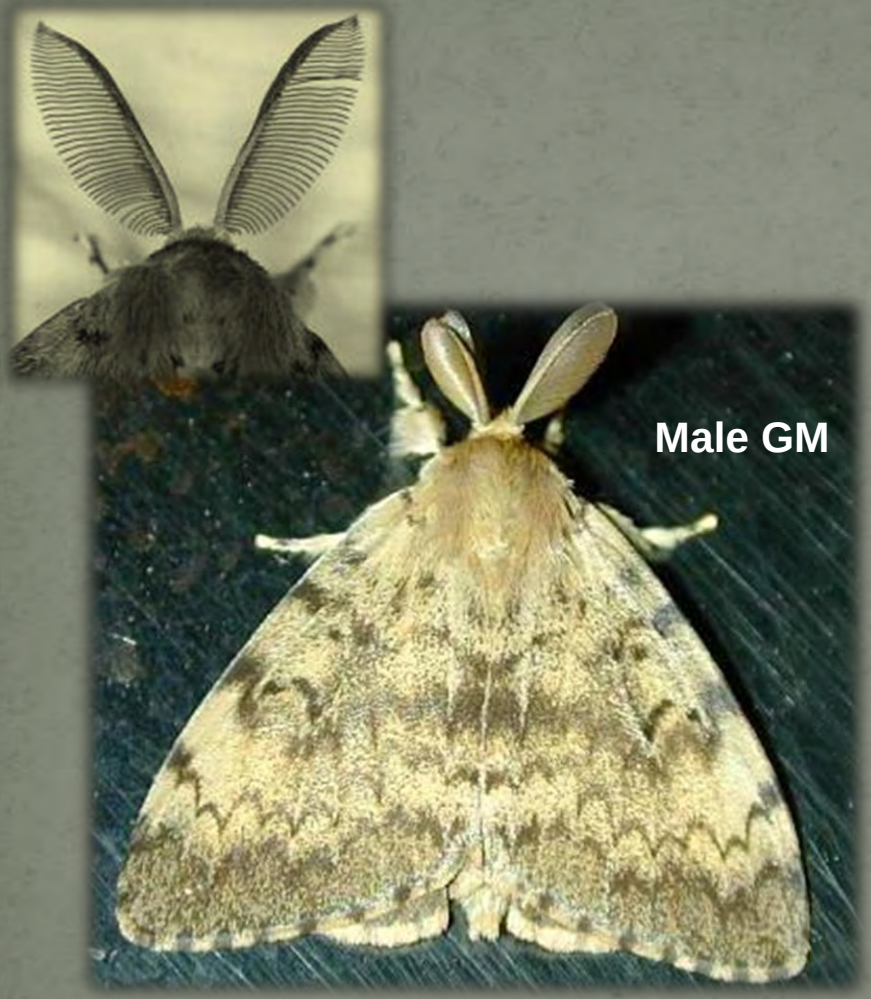
- Very young caterpillars feed during the day
- Older caterpillars feed at night and seek shelter during daylight
- The oldest caterpillars feed non-stop, 24 hours a day.

Burlap banding to reduce caterpillar populations

Pupae

- **Present during June through July**
- **During the last weeks of June, larvae stop feeding and change into pupae**

Adult moths



USDA APHIS PPQ Archive, USDA APHIS PPQ, Bugwood.org

Males emerge first and usually start flying in early July. Female gypsy moths cannot fly.

A female GM depositing an egg mass

Damage

Concerns About Gypsy Moths

- Gypsy moths feed on over 500 kinds of plants; prefer oak trees
- Spread easily by both natural and artificial means; populations increase quickly
- Since GM is not native to North America there are few natural enemies
- Costs of management can be high

Host Range (over 500 species)

Most Preferred	Somewhat Preferred	Least Preferred
Oak	Black Walnut	Arborvitae
Apple/Crabapples	Cherry	Catalpa
Poplar	Hickory	Dogwood
Birch	Elm	Honey locust
Blue Spruce	Maple	Rhododendron
American Beech	Paw Paw	Tulip tree poplar
Hawthorn	Sassafras	Viburnum
White Pine	White/ Norway Spruce	Ash

Defoliation

Reduces ability of trees to produce and store food, causing tree decline.

Weakened trees are susceptible to disease and other insect pests.

Tree death can occur after just two years.

Damage to Forests

- Decline and death of established trees
- Reduces timber value
- Opens forest canopy
- Change in forest tree species
- Increases fire load
- Reduces recreation use and value

Gypsy Moths in Urban Landscapes

Loss of trees:

- Lowers property values
- Reduces shade; increases energy costs
- Increases noise
- Reduces enjoyment of outdoor activities
- Shelter for wildlife reduced

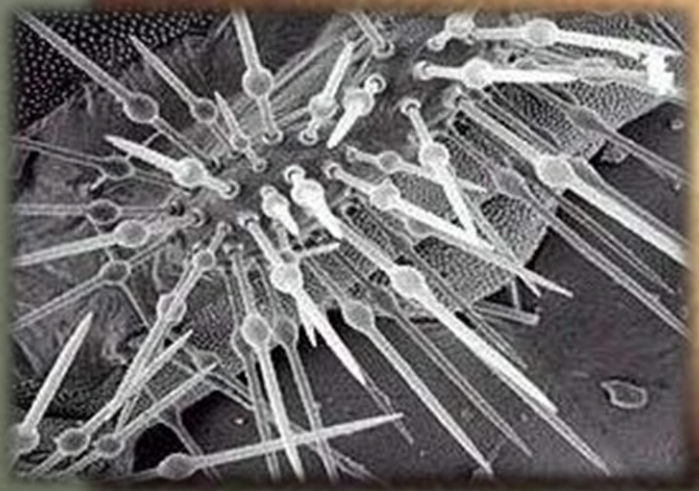
Homeowners are liable for:

- Damage from fallen limbs
- Tree removal costs
- Replacement costs

Gypsy moth caterpillars coating a house

Gypsy moth larvae and their waste products can make outdoor activities unenjoyable.

“Hairs” from larvae can cause allergic reactions in sensitive individuals



ARS USDA

Surveys

Gypsy moth surveys provide information about..

- Accidental introductions
- Infestations
- Population movement
- Treatment evaluation

Gypsy Moth Traps

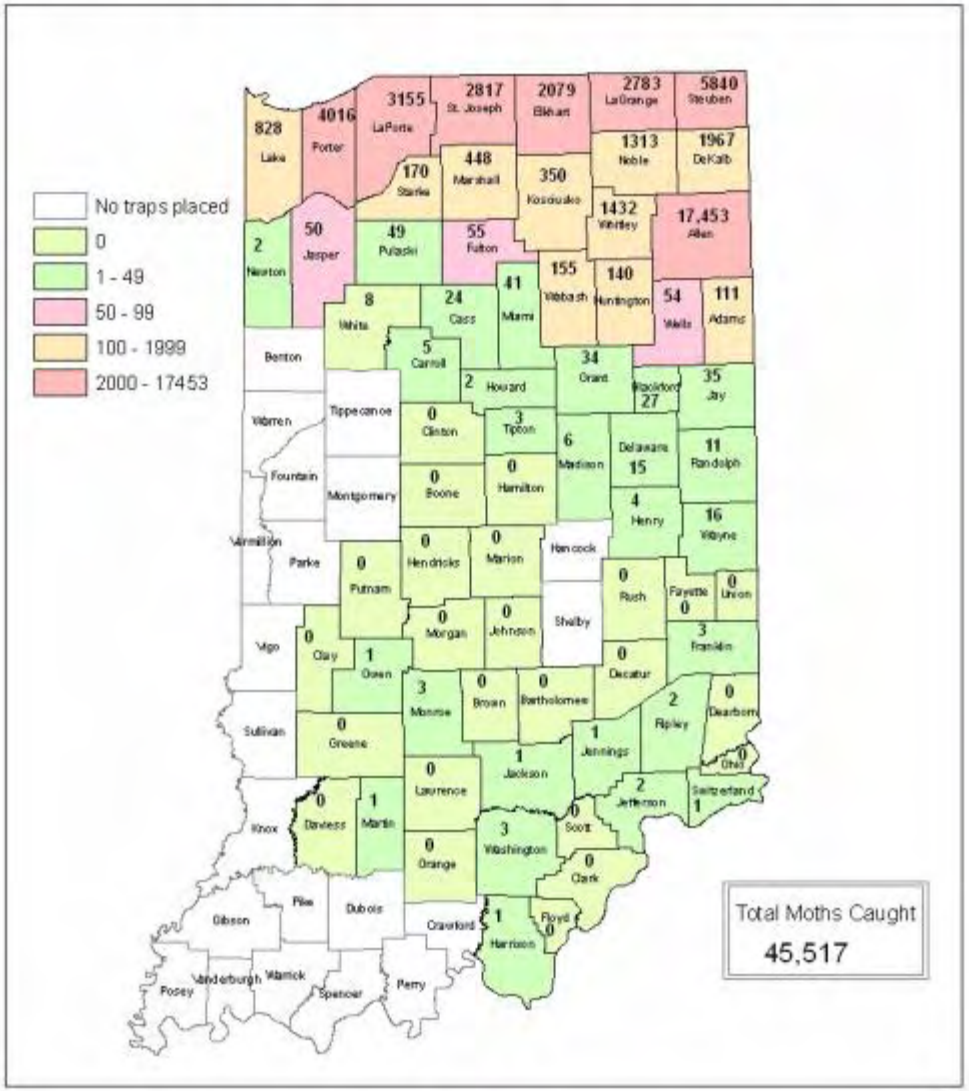
For detection and monitoring of adult male moths

Traps by themselves do not reduce GM populations

Lure made of GM female pheromone

Indiana 2009 Gypsy Moth Data

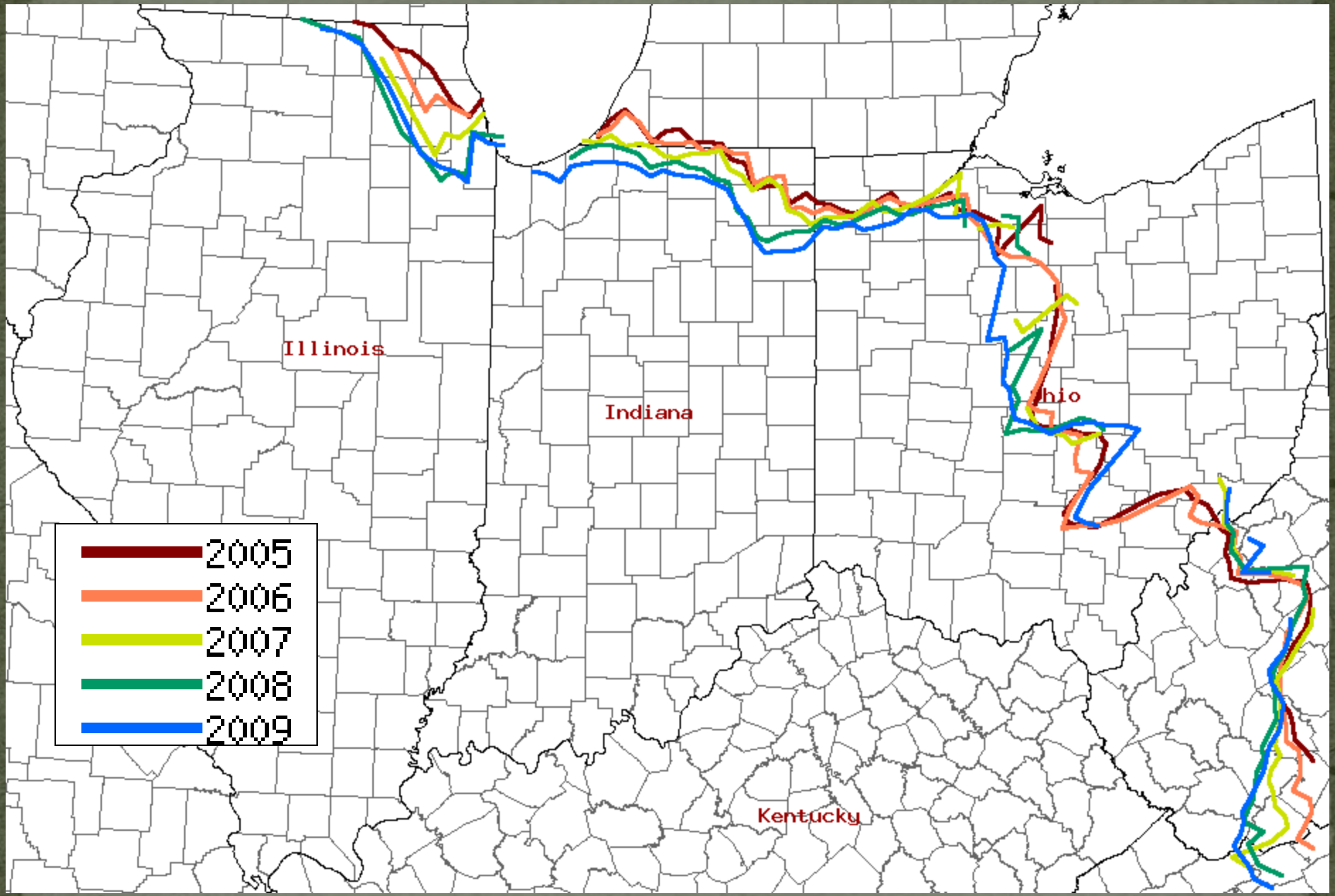
Moth Catch per County



Surveys for egg masses

Females deposit egg masses in hidden places so they can be found almost anywhere.

Treatment Options


Illinois
Indiana
Ohio
Kentucky
2005
2006
2007
2008
2009

Slow the Spread

- Indiana participates in the Slow the Spread Program.
- Gypsy moth will never become totally eradicated in Indiana.
- New technology is becoming available
- This allows time for the build up of natural enemies.

Natural Enemies of Gypsy Moth

Predators

Pathogens

Parasitoids

Treatment Options

For IDNR

1) No action
2) Mechanical controls

   Mass trapping, burlap banding and egg mass spraying
3) Biological treatments
   - •Btk
   - •Mating disruption

For Homeowners

1) No action
2) Mechanical controls

   (Trapping excluded)
3) Chemical
   - •Several available
4) Biological treatments
   - •Btk

Proposals

Possible Treatments

Mass Trapping

- Low number of male moths trapped in small area

- Used in small areas of less than 40 acres

Btk

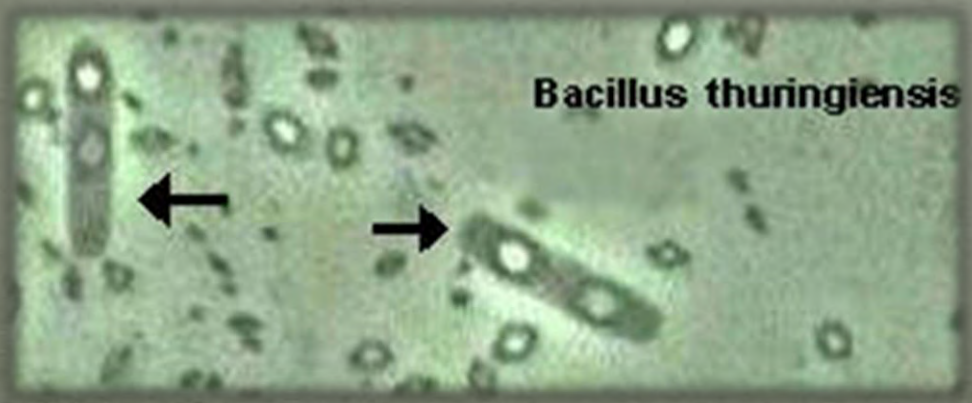
- Low level populations and other life stages

Mating Disruption (Disrupt® II and SPLAT®)

- Very low level populations

Bacillus thuringiensis (Btk)

- Natural bacteria found in soil; used in organic farming
- Forms a crystal that ruptures the caterpillar's gut
- Most efficient when applied from the air
- Excellent safety record over four decades of use



Roger Zerillo, USDA FS

Mating Disruption (Disrupt® II and SPLAT® GM)

Aerially-applied female sex pheromone to disrupt mating of adults

- **Disrupt® II:** gypsy moth pheromone embedded in tiny plastic flakes. About one cup of flakes is spread by airplane during late June.

- **SPLAT® GM:** an alternative delivery system for gypsy moth pheromones. It involves aerial application of small, waxy droplets infused with the pheromone into the tree canopy. About 7 ounces of the product are used per acre.

Attracts only, male gypsy moths looking for mates.

Pheromone treatments are only effective on very low level populations

Security Precautions for Aerial Treatments

- Material is secured before, during, and after the operation
- The aircraft is also secured
- DNR personnel monitor flights from the ground and also at the airport

Comments

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