

# Spongy Moth

Department of Entomology

## THE SPONGY MOTH IN INDIANA

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The spongy moth, formerly known as the gypsy moth, is the most serious forest defoliator in the United States. In 2021 it defoliated over 9 million acres of forest in the United States, with nearly one million acres of defoliated forests in Michigan, alone. Oak leaves are their preferred food, but spongy moth caterpillars can eat the foliage of 500 species of trees and plants. While most trees will produce new leaves after defoliation, repeated annual defoliation may kill trees in two to four years.

Spongy moths are not native to the United States. Since their accidental introduction to Massachusetts in 1869, they have spread steadily westward. In 1998 spongy moth became established in Steuben County, Indiana, and by 2022 it has spread to the northern tier of counties and further south in the north eastern part of the state.

Because adult female spongy moths in North America cannot fly, natural spread of the spongy moth occurs by other means. Young caterpillars crawl to treetops and are blown by the wind. People can increase the rate of spongy moth spread when they unknowingly carry them from infested areas. You can help reduce losses from spongy moth as they move through Indiana in the following ways.

**Slow the spread.** Learn the spongy moth's biology, how to recognize its life stages, and where it can be found so you do not transport it to uninfested parts of the state or country.

**Maintain tree health.** Keep trees watered, particularly during dry periods in the summer. Apply a 2-inch mulch of composted hardwood chips around the base of your trees to avoid wounding trunks with lawn mowers or weed trimmers.

**Diversify your new plantings.** When designing new plantings, be sure to include a few trees that are less preferred by spongy moth. (See tree species preference list on page 2.)

### SPONGY MOTH MANAGEMENT APPROACH

The battle to rid the Midwest of the spongy moth was long ago. Treating isolated infestations with insecticides outside the generally infested area will slow the spread of spongy moth. But spraying insecticides will only temporarily reduce the numbers of caterpillars. The wide range of insects, diseases, and animals that feed on spongy moth provide more long-lasting control. These natural enemies are the reason that trees and forests still thrive in areas where this pest has been present for over 100 years.

Where spongy moth has already been established in Indiana, environmentally safe tools that foster and conserve the natural enemies of spongy moth will be used to maintain the appearance of urban forests and the health of woodland ecosystems. Where it's not yet established, the Indiana Department of Natural Resources will continue the trapping program it began in 1973 to detect man-made introductions.



Spongy moth caterpillars can completely defoliate oaks and other deciduous trees in early summer. (Photo Credit: Elizabeth Barnes)

**SPONGY MOTH BIOLOGY AND IDENTIFICATION**

The spongy moth goes through four developmental stages during its life: egg, caterpillar, pupa, and adult.

**Eggs**—After mating, female moths lay eggs on any convenient surface. They will hide their eggs just about anywhere. This could be a branch, firewood, a picnic table, a tent, a recreational vehicle, or an automobile. Between 500 and 1000 eggs are laid in a mass that is covered with tan or buff-colored hairs. Eggs do not hatch until the following spring.

**Caterpillars**—In late April, small black-headed caterpillars hatch from eggs and climb to treetops, where they feed on foliage or dangle from silk strands until they are blown to other trees. After establishing themselves on a tree, caterpillars molt into a second instar that is nearly 1/2-inch long and largely black, with irregularly shaped yellow marks visible on the upper body surface. Older caterpillars (4th - 6th instars) have distinct color markings on their backs, with five pairs of blue dots followed by six pairs of red dots. Each caterpillar consumes 11 square feet of foliage over the course of its life. Most of the feeding occurs at night. Caterpillars move to the base of the tree during the day, protecting themselves from extreme heat and predation by birds.

**Pupae**—By early June, caterpillars stop feeding and change into pupae, their transition stage from caterpillars to adult moths. Pupae are dark brown shell-like cases that are about 2 inches long and sparsely covered with hairs. They do not spin webs or make a cocoon.



Adult Stage (male)

**Caterpillar**



**Egg Mass**



**Pupa**



**Adult**

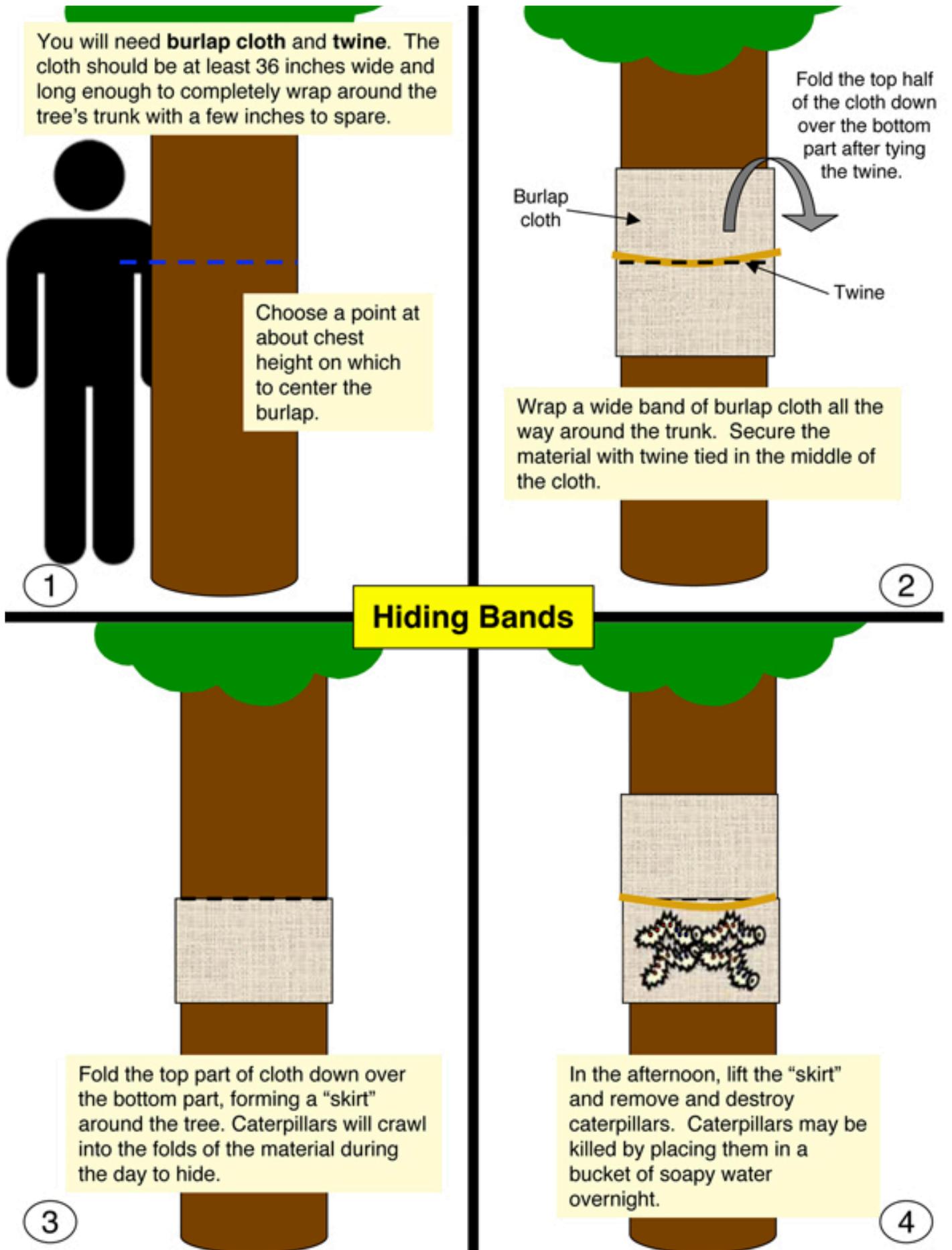
(Photo Credit: John Obermeyer)

**Adults**—Adults emerge from pupal cases in July and August. Females have creamy white wings, a tan body, and cannot fly. Males are smaller, dark brown, and have feathery antennae. Both have a distinct inverted V-shape mark that points to a dot on their wings.

**Spongy Moth Preference for Common Indiana Trees**

Most Preferred	Somewhat Preferred	Least Preferred
Aspen ( <i>Populus</i> )	Alder ( <i>Alnus</i> )	Arborvitae ( <i>Thuja</i> )
Apples and crabapples ( <i>Malus</i> )	Balsm fir ( <i>Abies</i> )	Ash ( <i>Fraxinus</i> )
Birches ( <i>Betula</i> )	Black walnut ( <i>Juglans</i> )	Azalea ( <i>Azalea</i> )
Blue spruce ( <i>Picea</i> )	Butternut ( <i>Juglans</i> )	Black locust ( <i>Robinia</i> )
American beech ( <i>Fagus</i> )	Cherry ( <i>Prunus</i> )	Catalpa ( <i>Catalpa</i> )
Basswood ( <i>Tilia</i> )	Eastern hemlock ( <i>Tsuga</i> )	Dogwood ( <i>Cornus</i> )
Hawthorn ( <i>Crataegus</i> )	Easter redbud ( <i>Cercis</i> )	Eastern red cedar ( <i>Juniperus</i> )
Hazlenut ( <i>Corylus</i> )	Elm ( <i>Ulmus</i> )	Horsechestnut ( <i>Aesculus</i> )
Oaks ( <i>Quercus</i> )*	Hickory ( <i>Carya</i> )	Lilac ( <i>Syringa</i> )
Poplar ( <i>Populus</i> )	Honeylocust ( <i>Gleditsia</i> )	Rhododendron ( <i>Rhododendron</i> )
Sweetgum ( <i>Liquidambar</i> )	Hophornbeam ( <i>Ostrya</i> )	Tuliptree poplar ( <i>Liriodendron</i> )
Serviceberry ( <i>Amelanchier</i> )	Hornbeam ( <i>Carpinus</i> )	Viburnum ( <i>Viburnum</i> )
Mountain ash ( <i>Sorbus</i> )	Maples ( <i>Acer</i> )	
Witch hazel ( <i>Hamalelis</i> )	Paw paw ( <i>Asimina</i> )	
White pine ( <i>Pinus</i> )	Plum ( <i>Prunus</i> )	
	Sassafrass ( <i>Sassafrass</i> )	
	White and Norway spruce ( <i>Picea</i> )	

\*Oaks are most preferred of all hosts



## DISTINGUISHING SPONGY MOTHS FROM OTHER FUZZY CATERPILLARS

### Time of Year

Spongy moths are only in the caterpillar stage from late April through early June. Other common caterpillars present at this time of year do not have the spongy moth's distinctive pairs of blue and red dots.

### Presence of Webs

Several web-producing caterpillars have been fairly abundant in recent years, so it is particularly important not to confuse them with the spongy moth. Spongy moths do not produce extensive webbing.

Eastern tent caterpillars are present in April and May, but, unlike the spongy moth, they spend their days in masses of white webs in the centers of trees. Eastern tent caterpillars have a distinctive white stripe on their backs and lack the spongy moth's paired blue and red dots.

The fall webworm is a white hairy caterpillar with black dots that will web branch ends and is commonly visible in late summer from roadsides.

## MOVING OUT OF GENERALLY INFESTED AREAS

People moving to uninfested parts of the country or state from generally infested areas are required to inspect their household items prior to moving. They can either do the inspection themselves or hire a Qualified Certified Approved Inspector (QCA). Guidelines for self-inspection are detailed in USDA APHIS Program Aid 1329, "Don't Move Gypsy Moth." This guide and a list of QCA Inspectors can be obtained from the Indiana Department of Natural Resources 1-317-232-4120.

## FREQUENTLY ASKED QUESTIONS

### Will spongy moth kill my trees?

Not always. If an oak or other hardwood tree is completely defoliated during the summer, it may look like it's dead. If the trees are affected by other stress factors, such as drought, disease, or poor growing conditions, there is a good chance that they will die.

In contrast, healthy hardwood trees can have a greater chance of surviving complete defoliation. These trees will produce a second set of leaves, usually in late July or August, that will help the tree produce enough energy for it to survive the winter. Repeated complete defoliation can kill even healthy trees.

If coniferous trees, like pines and spruces, are completely defoliated, they will die. Partial defoliation may not always kill them.

### Can the spongy moth ever be eliminated from Indiana?

No. The spongy moth is already established in parts of Indiana. Current efforts focus on slowing the spread to uninfested areas.

### Can I get a trap for my lawn to control the spongy moths in my yard?

No. The only traps available are sex pheromone traps. These attract males and do not kill enough moths to protect your trees.

### How can I protect my trees from the spongy moth?

You are the first line of defense for protecting your trees. Learn what the spongy moth looks like, and inspect your yard for egg masses hidden on trees, firewood, and outdoor structures. Destroy what you find. Use cloth or barrier bands to trap and kill spongy moth caterpillars as they crawl up and down the trunks of your trees.

Barrier Bands Burlap bands can be wrapped around tree trunks to collect caterpillars that hide during the day. Caterpillars can be collected in the afternoon and disposed of to reduce the spongy moth population.

- Cut a strip of burlap or medium weight dark cloth about 12 to 18 inches wide and long enough to completely encircle the tree.
- Wrap the burlap around the tree at chest height.
- Tie string or twine or wrap wire around the burlap 6 inches from the top edge. Then fold the top part of the cloth down over the bottom half, creating a tent-like area for caterpillars to hide in.
- Check the bands every afternoon. Wear gloves or use tweezers to collect the trapped caterpillars and drop them into a bucket of soapy water (use dish washing liquid).
- Let caterpillars soak in the soapy water a day or so before discarding them to make sure they are dead.

## Pesticides

Foliar sprays of biological insecticides like *Bacillus thuringiensis* when caterpillars are less than 1-inch long can protect the health of valued trees in your landscape without harming beneficial insects. Other products that kill caterpillars and are relatively safe to beneficials include azadirachtin, chlorantraniliprole, indoxacarb, spinosad, and tebufenozide. Commonly available, broad spectrum insecticides that kill beneficial insects and caterpillars include, acephate, bifenthrin, carbaryl, cyantraniliprole, cyfluthrin, fluralaner, lambda-cyhalothrin, malathion, or permethrin when applied in accordance with label directions. Trunk injections of emamectin benzoate, or acephate, or soil applications of acephate can also effectively kill caterpillars.

## Do insecticides used to control spongy moth harm bees and other pollinators?

*Bacillus thuringiensis* will only kill the caterpillar stage of spongy moth and other butterflies and moths. It spares the other pollinators including bees, beetles and flies. All of the other pesticides will kill bees if allowed to forage on flowers within a day after treatment. Avoid applying these products on trees with a canopy that is over flowers that are actively blooming. Chlorantraniliprole also does not harm bees.

## How will the spongy moth change the forest?

The first wave of defoliation will cause the most substantial changes to the forest. Changes include:

- Reduction in numbers of preferred trees, like oaks, in the forest.
- Increased surface water runoff in areas where large numbers of trees have been killed.
- Forest regeneration in open areas.

Subsequent spongy moth outbreaks will occur and continue to change the forest to a lesser extent. However, despite regular incidences of spongy moth infestation, parts of the country that have had spongy moth for over 100 years still have a thriving forest. Forests will continue to be prominent features of Indiana landscapes long after the spongy moth has become established.

## How will the spongy moth change urban areas?

As with forests, the first wave of spongy moths will cause the most shocking effects. Although much of the urban forest can be protected during an outbreak, spongy moth will be a nuisance. Expect an abundance of caterpillars dropping fecal material from trees, allergic reactions to airborne caterpillar hairs, and pupae and egg masses plastered to homes and outdoor items.

When large numbers of spongy moths are killed by diseases or pesticide applications, the abundance of unsightly decaying caterpillars and their associated odor will add to the nuisance. Fortunately, because spongy moth populations cycle, these problems will not be a permanent feature of any one landscape.

## My county has been quarantined for spongy moth. What does this mean?

Counties become quarantined after spot infestations of spongy moth can no longer be eradicated. This action is designed to prevent accidental shipment of live spongy moths to uninfested counties.

Outdoor items, including lumber, Christmas trees, and nursery stock, will need to be inspected and certified to be free of spongy moth before they're shipped to uninfested counties. Shipment within the area regulated for spongy moth is not restricted. See map of infested counties: <https://www.aphis.usda.gov/aphis/maps/plant-health/european-gypsy-moth-quarantine>

## TO REPORT SPONGY MOTH

- Download and use the Great Lakes Early Detection Network App for Android or iPhone.
- Contact the Indiana DNR at 1-866-NO-EXOTIC.

## FOR MORE SPONGY MOTH INFORMATION

- Visit Purdue Extension Entomology's Gypsy Moth Information Web Site to download free GM series bulletins and get the latest information.
- Order the GM series bulletins at your Purdue County Extension office.
- Contact the Department of Entomology, Purdue University, W. Lafayette, IN, 47907-1158, 1-765-494-4554, or Indiana Department of Natural Resources at 1-317-232-4120.

READ AND FOLLOW ALL LABEL INSTRUCTIONS. THIS INCLUDES DIRECTIONS FOR USE, PRECAUTIONARY STATEMENTS (HAZARDS TO HUMANS, DOMESTIC ANIMALS, AND ENDANGERED SPECIES), ENVIRONMENTAL HAZARDS, RATES OF APPLICATION, NUMBER OF APPLICATIONS, REENTRY INTERVALS, HARVEST RESTRICTIONS, STORAGE AND DISPOSAL, AND ANY SPECIFIC WARNINGS AND/OR PRECAUTIONS FOR SAFE HANDLING OF THE PESTICIDE.

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