

Battling Gypsy Moths

BY RITA HICKMAN

Summer is almost here, but those leafy oak trees that for years have provided shady beauty may be the next targets of a small army of predators that have been on the move for the past several years.

Beware of one of the newest Illinois environmental threat — gypsy moths. If you work for a park, recreation or conservation agency in Northern Illinois, there is a good chance you have already heard of — or have had to deal with — gypsy moths. But, if you live further south, and the national trend holds — they have been moving from the northern United States to the southern United States — these pests will work their way toward you. Lake County, Illinois was quarantined in August 2000. Cook, DuPage, Kane and Will were treated by the USDA “Stop the Spread” program in Summer 2004, and, this summer, state agriculture officials will concentrate on the leading edges where the tree-destroying moths are spreading, DeKalb, Winnebago and Ogle counties.

How do you know if the gypsy moths have arrived in your area? Take a good look at trees, particularly oaks that reside on your agency’s property. Do you see hundreds of blue and red spotted hairy caterpillars? Day by day, do your trees have fewer leaves? Do the remaining leaves have chew holes in them?



Do the trees neighboring the park, recreation or conservation area have the same problem? If so, there is a good chance you have gypsy moths. Why should your agency be concerned? What can you do about it? Why should you consider the environmental impacts of how to deal with the problem?

Choosing Passive or Aggressive Management

Gypsy moths are not new. They have just taken them a while to reach Illinois. Now that they are here, you cannot eradicate them, instead you can only limit their damage and spread.

There are two sides to the debate on how best to manage a gypsy moth infestation. One camp suggests that gypsy moths are a natural menace that will hit hard the first few years and then balance out because their natural enemies will follow them. The other camp believes that gypsy moths must be constantly controlled to keep them from destroying trees.

Both are camps are correct. The health of your trees and the land around your trees will determine which gypsy moth strategy is right for you.

If your area is healthy, with lots of natural areas with native plants and animals and biodiversity, and if your area is relatively free from such stresses as impacted soil, lack of water or lack of root space etc., then your



When gypsy moth densities reach high levels, large quantities of foliage are consumed and partial or total defoliation of the canopy may occur.

trees will be hit hard at first. But then nature will balance out the damage, because wherever gypsy moths go, their natural pathogens, predators and parasites follow, and they eventually keep the moths in check. In a healthy area, you can relax and just monitor the moths. The healthier the tree, the better it will survive defoliation. Keep the tree watered and fertilized, aerate the soil and consider giving the tree some breathing room from lawn mowers, trimmers and other human stresses.

However, if your ecosystem isn’t healthy (lots of pavement or mowed areas, many ornamental trees and plants, and pets, along with such stressors as soil compaction, chemical damage or drought), then you should take steps to protect your trees.

Points of Attack

Every year, moths have four life stages:

1. egg
2. caterpillar
3. cocoon, and
4. adult.

There are environmentally effective methods to deal with gypsy moths at all life stages, but since the infestation is usually not noticeable until the caterpillar stage, the more popular management strategies are geared toward the caterpillar stage.

Managing the Caterpillar Stage with Sprays

The U.S. Department of Agriculture relies mainly on heavy aerial spraying of a bacteria known as Bt (*Bacillus thuringiensis*), or Btk (*Bacillus thuringiensis kurstaki*) sold as Bioprotec, Safers BTK biological insecticide, Foray and Thuricide. Bt infests and kills the gypsy moth in its caterpillar stage. Many people partner with the U.S. Department of Agriculture to split the cost of spraying or independently hire someone to treat their trees.

However, there are many drawbacks to using Bt.

First, successful use of Bt formulations requires application to the correct target species at a susceptible stage of development, in the right concentration, at the correct temperature (warm enough for the insects to be actively feeding) and before the insect pests bore into the tree where they are protected. Young larvae are usually most susceptible. This means that Bt must be applied heavily and must be eaten in large quantities. It is deactivated by sunlight within one to three days, washes off in wet weather and is not insect specific.

Second, other moth and butterfly caterpillars will be affected. You should avoid spraying near natural areas because Bt will kill native butterfly and moth species.

Third, Bt is expensive estimated at \$20- \$34 per acre. Many sites need multiple applications for effective control. Counties on the leading edge of the infestation may partner with the USDA's Stop the Spread program to help subsidize aerial Btk applications.

Other Means of Infestation Management

The Crystal Lake Park District has used several methods the last three summers to combat the invasion of gypsy moths into McHenry County. We work to control the moths not only at the caterpillar stage, but at its other developmental stages as well.

Egg Stage Management Strategies

When the insect is in egg stage, it appears in egg masses. In Northern Illinois, you can see them in early spring through the late summer late summer (May through July). Spring is a good time to combat the eggs. We use regular soybean oil to saturate the egg masses. This saturation suffocates what is inside. You can add a surfactant, such as soap, to make the oil



Use regular soybean oil to saturate the egg masses.

stick better to the egg masses. To get into the treetops, we have used super soaker squirt guns, which can reach up to 150 feet.

Caterpillar Stage Management Strategies



If the eggs hatch (and many will) we tie burlap around the tree trunk. The caterpillars climb down the tree during the day to find cooler places in the grass. At night, they climb back up the tree.

If you have a folded piece of burlap tied around the tree (open side facing the ground) the caterpillars will get trapped between the burlap layers. Most find their way back out, but it does slow them down enough to allow you to spray them with insecticidal soap (or even regular soap) at least daily. Regular or insecticidal soap works by dehydrating the caterpillars, so saturate them and the burlap well. You can also pick them off and step on them.

This spring we have found some egg casings in our woodlands adjacent to our nature preserve. Because we cannot spray Bt near the preserve, we will attempt individual tree injections of general insecticide. We are only planning on injecting five to six trees that are suffering from oak wilt and have egg casings on them. The trees with oak wilt are less likely to recover from an infestation. We hope the injections will slow the spread of gypsy moths into the woods.



Moth Stage Management

If the caterpillars survive to build cocoons and turn into moths (and many will), you can use pheromone traps to confuse them. You can find these at local commercial pesticide dealers. Female gypsy moths can't fly well. To find a

mate, they give off strong pheromones, and the males fly to them. If you place pheromone traps in areas without female gypsy moths, the moths will have more problems finding each other, mating and laying viable eggs.

Lessons in Moth Management

These are some of the ways Crystal Lake Park District in McHenry County has dealt with the onset of gypsy moths. The park district has many natural areas, so only the trees in mowed areas near the roads have significant damage. In addition, two of our affected parks have Illinois Nature Preserves. We were not comfortable using BT in areas that were high quality ecosystems because of the potential damage to other butterflies and moths.

Besides finding effective, environmentally friendly ways to deal with gypsy moths, our park district learned two valuable lessons.

We recommend that if a tree dies in your park or you cut down a tree, you do not transport it off site. It will probably have eggs on it, and you can spread gypsy moths to another park or homeowner. Burning it is the most effective method of disposal, but you can also saturate it with soybean oil and leave it lay.

Our second piece of advice is to be wary of mail order wasps touted to kill gypsy moth larvae. Gypsy moths have natural predators but we have never found these for sale. There are companies that advertise wasps that kill gypsy moths. These advertisements have been investigated by the U.S. Department of Agriculture and the Illinois Department of Natural Resources and have been determined false. Distributing these unidentified wasps into your community could create new unknown problems.

Gypsy moths are in Illinois to stay. The best that state and individual organizations can do is slow their progress and limit tree defoliation. Proactive measures, such as keeping your most valuable trees healthy and slowing the mating, laying and hatching of more eggs, will keep your trees alive through the infestations.

RITA HICKMAN

is the manager of natural resources for the Crystal Lake Park District and served as the IPRA Environmental Committee chair in 2004.

Nature's 3 Ps for Gypsy Moths

Predators, parasites and pathogens — gypsy moths' natural enemies — do not normally control the gypsy moth population during outbreaks, but they do help keep sparse gypsy moth populations at low levels. The three Ps may also help extend the period of years between outbreaks. After gypsy moths have moved in, these natural pathogens are right behind. They won't rescue your trees from defoliation. But once they arrive, they keep the damage to a manageable level.

Predators

Many larger animals use gypsy moths and other insects as food sources. Like most predators, some are particular about what life stage they will eat and others are simply opportunistic.

Some mammalian predators of the gypsy moth include white-footed mice, shrews, chipmunks, voles and squirrels. Shrews, which are often mistaken for mice, are voracious insect feeders that consume their own weight in prey each day. You may have a difficult time finding these predators in suburban settings because cats and a loss of woodland habitat keep their numbers low.

Nuthatches, chickadees, towhees, vireos, northern orioles, catbirds, robins and blue jays can keep sparse gypsy moth populations in check. Large numbers of gypsy moths will attract starlings, grackles, red-winged blackbirds and crows, which flock together and need a food source for the entire group.

Spiders, ants and daddy longlegs take care of most gypsy moth larvae and pupae that are near the ground. Ground beetle larvae and adults feed readily on gypsy moth larvae and pupae. These beetles will climb trees to find gypsy moth larvae and are very active. You will probably only notice the insect predators when there are many gypsy moths around. Normally, however, they usually work in the background, quickly and efficiently consuming their prey.

Parasites

There are about a dozen species of parasites that affect the gypsy moth in North America. These organisms live in the gypsy moth and use it as food during one stage of the parasite's life. The parasite only needs one host to complete its life stage, so you need as many parasites as you do gypsy moths.

Ooencyrtus kuvanae, a small wasp species, attacks the eggs leaving small pinholes in the egg casing. In addition, the wasp species *Apanteles melanoscelus* attacks and kills small larvae, and *Brachymeria intermedia* stings gypsy moth pupae, but is most effective only when gypsy moth population is at defoliating levels. Beware of "gypsy moth experts" trying to sell you wasps to control your infestation. Many organizations have spent good money on secret wasp species only to find they were victims of fraud. Natural wasp species will move in on their own, and, because they are parasites, only have limited effectiveness.

Parasetigena agilis, a fly species, lays its eggs near the head of the larvae. The fly larvae, maggots, consume the gypsy moth larvae and pupa, leaving behind the gypsy moth pupae casings.

Pathogens

Pathogens, or diseases like bacteria, fungi or viruses, are the most effective natural way to control gypsy moth larvae.

Nucleopolyhedrosis virus (NPV) has the most dramatic effect on gypsy moth infestations, causing entire gypsy moth outbreaks to hang as liquefied bags in the trees. These bodies are dark, flaccid, feel gooey and are seen in the hundreds, if not thousands. This virus will eliminate most outbreaks.

Entomophaga maimaiga, a fungi, is found in most established gypsy moth populations. It appears similar to NPV but effects both small and large infestations of gypsy moths.



Want More Detail?

For information on how the caterpillar looks, where it came from and when or where the Department of Agriculture is spraying, try the following web sites.

United States Department of Agriculture
Combined Forest Pest Research and Development Program
Home and Garden Bulletin – Gypsy Moth Handbook
<http://www.fs.fed.us/na/morgantown/fhp/gm/gmhb.htm>

Illinois Department of Agriculture
<http://www.agr.state.il.us/Environment/Pest/gypsymoth.html>

U.S. Department of Agriculture Forest Service
Forest Insect & Disease
Leaflet 162
<http://www.na.fs.fed.us/spfo/pubs/fidls/gypsymoth/gypsy.htm>

Cooperative Agriculture Pest Survey program
<http://www.ceris.purdue.edu/napis/pests/egm/>

Wisconsin Department of Natural Resources
<http://www.dnr.state.wi.us/org/land/forestry/fh/GM/>

USDA Forest Service Gypsy Moth Links
<http://www.fs.fed.us/ne/morgantown/4557/gmoth/links.html>