

# GYPHY MOTH: A FUTURE WISCONSIN CRANBERRY PEST?

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The gypsy moth, *Lymantria dispar*, which is native to Europe and Asia, was purposefully brought into Massachusetts in 1869 by a Frenchman who wanted to cross it with the silkworm to improve the fledgling U.S. silk industry. Not only was this a foolish and impossible venture, the gypsy moths escaped and became established. It has since spread throughout the northeastern United States and adjacent Canada, where it has become a serious pest. In recent years, significant numbers have been found in eastern Wisconsin.

Gypsy moth is normally considered to be a pest of trees, especially deciduous trees. Areas most vulnerable to gypsy moth attack are forests, parks, recreational areas, and urban forests (street and home yard trees). The gypsy moth larvae are known to feed on over 300 types of trees and shrubs, including nursery stock and fruit crops. In Massachusetts and New Jersey, gypsy moth is an occasional pest of cranberry, and has the potential of causing significant injury, especially in those years during an outbreak period, when growers must routinely monitor for activity in the beds and be prepared to apply appropriate controls. This paper summarizes the biology of gypsy moth, its status in Wisconsin, and its potential threat to the cranberry industry.

## BIOLOGICAL CHARACTERISTICS

The gypsy moth is a relatively large insect. The male is dark brown, with a wingspan of about 1.5 inches. The female has white wings with thin, wiggly dark stripes; her wingspan is about 2 inches. Although she has fully developed wings, the female is flightless, but males are strong fliers. Adults occur in July and August. The female produces a sex pheromone for luring the male. Immediately after mating she begins to lay a single large egg mass that may contain up to 1,000 eggs. The egg mass is covered with buff-colored hairs from the female's body. Because the female doesn't fly, the eggs are laid wherever she happens to be. This is usually on the trunk or branches of a tree, but may also be on rocks, walls of buildings, vehicles, or any other surface. The insect remains in the egg stage through the remainder of the summer, fall, and winter. Hatching occurs in May about the time oak leaves start to develop. Gypsy moth larvae are densely hairy caterpillars that grow to about 2-3 inches long. Down the back of the caterpillar there is a double row of 5 blue spots followed by a double row of six brick-red spots. Several other large, hairy caterpillars are confused with the gypsy moth. Most frequently, eastern tent caterpillar, which makes dense silken webbing, is thought to be gypsy moth, but gypsy moth does not produce webbing. Larvae feed until mid to late July, and then pupate in protected areas on or at the base of trees. Adults emerge about two weeks later, completing the one generation per year.

## STATUS OF GYPSY MOTH IN WISCONSIN

Because of the serious nature of gypsy moth, it is a quarantine pest in the United States. Forest and nursery products produced in quarantined areas must be inspected and, if necessary, treated, before they can be shipped to uninfested areas. Furthermore, federal and state agencies monitor gypsy moth activity throughout the United States. The primary method of monitoring is the use of pheromone traps similar to those used for monitoring cranberry pests, but baited with the gypsy moth pheromone. When males are captured in a new area, an intensive search is conducted the following year for more males or other life stages.

Gypsy moth is appropriately named. Adult males can fly into trucks, vans, boxcars, trailers, or automobiles and be transported hundreds or even thousands of miles. Therefore, if a single isolated male is captured, it is often just a "hitchhiker" with no significant consequences. However, multiple catches in the same area usually indicate the start of an infestation. Not only is the male moth likely to move around, so are the egg masses, especially when the eggs are laid attached to vehicles or objects about to be moved across country. Because a single egg mass can produce several hundred larvae, this is by far the most important method of spread of gypsy moth. Once a federal or state agency identifies a new small infestation in an uninfested area, the first approach is to eradicate the infestation using a pesticide. In Wisconsin and many other areas, the pesticide of choice is one containing the active ingredient *Bacillus thuringiensis* (Bt). It is important to note that, as long as there is possibility of eradicating or greatly slowing the spread of an infestation, responsibility and authority for control resides with state and federal agencies. However, once the decision has been made that eradication is not going to be successful, then control is the responsibility of the property owner.

Gypsy moth males were first trapped in southern Wisconsin in the 1970s. Since then, some have been trapped each year. Throughout this period, numerous positive infestations have been identified, often traceable to the movement of vehicles, merchandise, or household belongings. In the late 1980s lower Michigan was declared to be generally infested, and eradication efforts ceased. Since that time, gypsy moth activity has significantly increased in Wisconsin, especially in, but not limited to, the northeastern corner of the state (Door and Kewaunee Counties), and south along the shore of Lake Michigan. Two theories have been proposed to explain the current area of activity: vacationers unknowingly transporting egg masses, and young larvae being blown across Lake Michigan from lower Michigan. In 1993, several thousand acres in Wisconsin were treated with Bt. It is likely that the Wisconsin infestation will continue to increase in size until regulatory agencies decide that the state is generally infested. How many years in the future this will be is anyone's guess. However, lower Michigan went from 8 acres defoliated in 1980 to 750,000 defoliated in 1993. (Defoliation is defined by visual loss of foliage when viewed from the air, equivalent to at least 60% leaf loss.)

Although the state of Wisconsin is putting most of its monitoring efforts into the eastern side of the state, and in vulnerable areas such as port cities, some trapping is done throughout the state. Thus far, most trap catches have been in the southern and eastern parts of the state, but there have also been small numbers captured in central and northern counties. In 1993, approximately 70,000 traps were operated throughout the state. From

1990 to 1992, approximately 10-15,000 males were trapped annually; that number rose to 36,000 in 1993.

## **POTENTIAL THREAT TO WISCONSIN CRANBERRY PRODUCTION**

The potential success of gypsy moth in Wisconsin can only be conjectured. It has ample favored hosts (such as oaks and poplar) and many acceptable hosts (even including conifers) throughout the state. One question regarding its success here relates to its tolerance of our harsh winters. Gypsy moth eggs cannot survive temperatures below about -18 degrees F. However, many egg masses may be laid close to the ground where they may be protected by snow. We won't really know how well gypsy moth will survive and prosper in the state until it actually becomes established here.

In the eastern United States, gypsy moth can present a problem to cranberry at two points in its larval growth. Very young hatchling larvae tend to spin a small amount of silk and allow the wind to carry them into new areas; this is the primary natural way of gypsy moth dispersal. If there are infested woods near cranberry, prevailing winds can blow young larvae into the beds, where they will feed on the new, young foliage and the terminal growth, effectively destroying the flowering potential of that upright. In the eastern United States gypsy moth goes through outbreak periods where millions of acres of forest are completely stripped of all foliage. When the larger caterpillars no longer have food to eat in the trees, they begin wandering in search of food elsewhere. Large numbers moving into a cranberry bed can do significant damage to uprights, buds, and flowers. Many beneficial natural enemies of gypsy moth have been introduced into the United States from Europe and Asia and are now permanently established. Some native beneficials will also attack gypsy moth. Biological controls are very important in suppressing gypsy moth populations, but are not currently able to keep the insect under permanent, economic control. However, federal and state scientists continue to look for natural enemies of gypsy moth throughout its native range of Europe and Asia.

Gypsy moth can be controlled in cranberry beds with both chemical (Orthene) and microbial (Bt) insecticides. Other insecticides aimed at fireworm or other insects will also control gypsy moth larvae. Insecticides will be most effective if targeted against young (1/2 inch) larvae.

## **CONCLUSION**

It is likely that gypsy moth will eventually become established throughout Wisconsin. How long that will take is unclear, but it may happen before the turn of the century; the speed of its development in Michigan may serve as a model of what to expect. Also, it won't be possible to tell how serious of a pest it will be until it does become firmly established. If it does build up to numbers large enough to cause damage, it will be the responsibility of individual property owners to conduct whatever control they desire. The Wisconsin cranberry industry is fortunate to have adopted Integrated Pest Management practices including routine pest scouting. Thresholds for gypsy moth larvae, based on sweep net counts, have been established in Massachusetts. Pheromone traps are available. And both chemical and microbial insecticides are registered and effective. Gypsy moth may

be another critter to contend with in the future, but it is not going to pose insurmountable problems, especially if growers and consultants continue to be diligent about pest scouting.

*For more information on the Wisconsin gypsy moth program, contact Mr. Steve Krause, Gypsy Moth Program Coordinator, Wisconsin Department of Agriculture, Trade, and Consumer Protection, Madison, at (608) 266-7136.*