

Asian Gypsy Moth

The Asian gypsy moth (AGM, including *Lymantria dispar asiatica*, *Lymantria dispar japonica*, *Lymantria albescens*, *Lymantria umbrosa*, and *Lymantria post-alba*) is an exotic pest not known to occur in the United States. Although in many ways similar to the European gypsy moth, AGM larvae feed on a much broader range of plant species, covering over 100 botanical families. This broad range of possible host plants, combined with the female's ability to fly long distances, could allow AGM to spread rapidly. Large infestations of AGM can completely defoliate trees, leaving them weak and more susceptible to disease or attack by other insects. If defoliation is repeated for 2 or more years, it can lead to the death of large sections of forests, orchards, and landscaping. Any introduction and establishment of AGM in the United States would pose a major threat to the environment and the urban, suburban, and rural landscapes.

Since 2009, the U.S. Department of Agriculture (USDA), in partnership with the Canadian Food Inspection Agency, has worked with foreign trading partners to monitor populations of AGM and inspect ships before they leave to certify that they are free of AGM life stages. Ships are also inspected for AGM when they arrive at U.S. ports. Although these preventive measures are effective, occasional introductions of AGM have occurred. When AGM is detected, USDA works with other Federal and State agencies to evaluate the infestation and take appropriate actions to keep it from spreading.

Background

AGM was first identified in North America in late 1991 near the Port of Vancouver in British Columbia, Canada. Moths were discovered shortly thereafter in Washington, Oregon, and British Columbia. Ships infested with AGM egg masses from ports in eastern Russia probably introduced the pest to North America while visiting ports on the West Coast. Scientists believe that, while the ships were docked, larvae hatched from the eggs and were blown ashore. USDA and State officials eradicated these infestations in the Pacific Northwest through trapping and treatment activities.

In 1993, another infestation, this time in Sunny Point, NC, occurred after moths emerged from a ship carrying infested cargo containers from Germany and then flew into the surrounding area. AGM was

not known to occur in Europe until tracebacks of this introduction provided evidence of other populations there. Between 1991 and 2012, AGM was detected and eradicated on at least 20 occasions in locations across the United States.

The most recent AGM detections occurred in 2013 and 2014 when male moths were caught in survey traps, one moth each year in Pittsburg County, OK and one moth in 2014 in the port community of North Charleston, SC. Survey work in 2015 will help determine whether infestations are present and what followup actions may be needed to address them.

Several USDA pest risk assessments over the years have concluded that, because of similarities between Asian and North American ecosystems, left unaddressed, the AGM has great potential for colonization in North American forests.

Potential Damage

If established in the United States, AGM could cause serious, widespread damage to our country's landscape and natural resources. Each AGM female can lay hundreds of eggs in fuzzy egg masses that, in turn, yield hundreds of voracious caterpillars who feed on more than 600 species of trees and shrubs. AGM caterpillars can defoliate plants at an alarming rate. This defoliation can severely weaken trees and shrubs, killing them or making them more susceptible to diseases and other pests and destroying habitats for mammals and birds. Caterpillar silk strands, droppings, destroyed leaves, and dead moths would also be a nuisance in homes, yards, and parks.

Comparing Gypsy Moth Pests

The AGM is similar to the European gypsy moth found in the northeastern United States and southeastern Canada. Like the European gypsy moth, AGM prefers forest habitats and can cause serious defoliation and deterioration of trees and shrubs. The European gypsy moth has more than 250 known host plants but prefers oak. The AGM has a much broader host range, including larch, oak, poplar, alder, willow, and some evergreens.

In the eastern United States, European gypsy moths defoliate an average of 700,000 acres each year, causing millions of dollars in damage. If AGM were to become established in our country, the damage could be even more extensive and costly.

Unlike the flightless female European gypsy moths, AGM females are active fliers. Their ability to fly long distances makes it probable that AGM could quickly

spread throughout the United States. In contrast, the European gypsy moth has taken more than 140 years (since 1869) to spread throughout the United States from the Northeast to the Southeast and the Midwest.

Life Stages

The AGM matures through four life stages: egg, larva (caterpillar), pupa (cocoon), and moth. AGM egg masses may be found on tree trunks, limbs, or leaves, as well as on stones, walls, logs, lawn furniture, and other outdoor objects. Each egg mass can contain hundreds to more than 1,000 eggs. The mass is covered with buff or yellowish fuzz from the abdomen of the female. While the velvety egg masses average 1 ½ inches long and three-fourths of an inch wide, they are often as small as a dime.

AGM eggs begin hatching into caterpillars in the spring. All of the damage caused by the AGM happens during the caterpillar stage, as the insects feed on leaves during this active period of growth. Once AGM caterpillars stop feeding, they enter the pupal stage. This stage typically begins in June or July. Because egg hatch and pupation depend on weather and temperature, they may occur earlier or later in different areas. Adult moths emerge from their dark-brown pupal cases in 10 to 14 days. Adult males have grayish-brown wings and a wingspan of 1 ½ inches. Adult female moths are white and larger, with wingspans of 3 ½ inches or more.

AGM do not feed in the moth stage (which lasts 1 to 3 weeks); they only mate and lay eggs. Eggs are laid between June and September, depending on weather and location. The eggs remain dormant during the winter and develop and hatch the following spring.

How AGM Can Spread

AGM infestations spread in several ways. Adult female moths may fly to previously uninfested areas to lay eggs. Or, newly hatched AGM caterpillars may climb to tree crowns, where the wind picks up their silken threads and carries them to other areas.

In addition, people can inadvertently transport egg masses or pupae. AGM egg masses tolerate extremes in temperature and moisture and travel well on logs, lawn furniture, nursery stock, pallets, shipping containers, and the hulls and rigging of ships.

Protecting the Country From AGM

The first line of defense against AGM is USDA's work to prevent this pest from reaching the United States. In partnership with Canada, the USDA works with China, Japan, South Korea, and Russia to make sure AGM population levels are monitored at and near ports. Ships and cargo headed for the United States are inspected for AGM and certified as pest-free

before departing. On arrival, ships and cargo undergo another inspection to ensure that AGM is not present. These protective measures are highly effective but, on rare occasions, AGM introductions do occur. A robust survey program at and near ports of entry helps detect any possible introductions at an early stage—when eradication efforts are most effective and least costly.

Several treatment options are available to eradicate AGM. The most common method used against AGM is the naturally occurring bacteria, *Bacillus thuringiensis* (Bt), which produces a caterpillar-specific toxin. When sprayed on tree leaves, Bt disrupts the digestive system of caterpillars that ingest the leaves, suppressing their appetites. The caterpillars' movement then slows, and death results, generally in 7 to 10 days. Dimlin, an insecticide that inhibits AGM growth and development, is also frequently used. Another AGM eradication tactic is mating disruption—using the pheromone emitted by female AGM to attract mates. This mating pheromone is released at high levels in and around infested areas, overwhelming the pheromone signal emitted by the female AGM and, as a result, making it difficult for the male moths to locate the females and mate.

What You Can Do

You can support efforts to detect and manage AGM by:

- Reporting any findings of egg masses on trees, lawn furniture, fences, walls, or elsewhere to Federal or State agriculture officials.
- Cooperating with any restrictions in your local area that might be imposed because of an AGM detection.
- Allowing authorized agricultural workers access to your property to place and inspect insect-monitoring traps.

Learn More

For more information on AGM and associated Federal restrictions, contact your:

- Local Extension office (www.nifa.usda.gov/Extension),
- State Plant Regulatory Official (www.nationalplantboard.org/member), or
- Nearest USDA Animal and Plant Health Inspection Service office (www.aphis.usda.gov/planthealth/sphd).

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