

Forest Health Fact Sheet

Gypsy Moth

Identification

The gypsy moth, *Lymantria dispar* (L.), gets its name from a behavior of its larger caterpillars, which generally migrate each day from the leaves and down the branches and trunk to rest in shaded spots on the tree or objects on the ground. Tiny, black young caterpillars are windblown to their food plants, where they will feed day and night but older stages of the caterpillars feed only at night to avoid drying out in the hot sun or being eaten by predators. Mature gypsy moth caterpillars are dark and have dark hairs, but you can clearly see the five pairs of dark blue spots and six pairs of brick red spots along the back. They also have a thin yellow median stripe along the length of their back.



Larva growth stages



Mature gypsy moth larva

Lifecycle

Gypsy moth has one generation per year, and includes egg, caterpillar, pupa and adult stages. Female moths lay egg masses on tree boles, branches, vehicles, houses, and other structures, and this aids their spread to new areas. Egg masses are buff-colored after they are initially deposited in late summer, but they become lighter in color as they bleach in the sun.



Egg masses and pupae cases

Egg mass size may indicate population trends. When populations are declining, most egg masses are around ½ inch long and contain about 100 eggs, while building populations have 1½ inch long egg masses containing up to a thousand eggs. Gypsy moths survive the winter in the egg stage and hatch from mid-April to mid-May in Pennsylvania when temperatures are above 60 degrees Fahrenheit. During the day, they rest under leaf litter and bark crevices near the bottom of the tree. Older caterpillars are able to eat conifers, while younger stages are usually found on deciduous hosts. Mature caterpillars pupate from mid June through early July in Pennsylvania. Mice, shrews, and ground beetles eat the pupae, and are an important regulator of gypsy moth in this stage.



Adult female and male

Adult gypsy moths emerge about two weeks after pupating. Adults only live about a week, and do not feed. Female gypsy moths use chemicals to attract a mate soon after they emerge. They lay eggs about a day after mating. Adult gypsy moth males have feathery antennae and brown wings and are able to fly to find females, while cream-colored females of European gypsy moths cannot fly and have threadlike antennae. There is also an Asian variety of gypsy moth with flying females that have luckily been eradicated in Western North America on several occasions following accidental introductions.



Adult female laying eggs



Pupae

It is fairly easy to identify gypsy moth because colors of caterpillars, adults, and egg masses are so distinct. Also, egg masses are large compared to those laid by most insects. Therefore, it is possible to predict defoliation for the following spring and prepare a suppression program to reduce the numbers of caterpillars. Caterpillars favor oak but will feed on the foliage

of many tree species, including some conifers. However, there are some trees such as ash, tulip poplar, dogwood, and black locust on which they will not feed. Defoliation by caterpillars of gypsy moth weakens trees, because without leaves the trees are not able to manufacture food. Weakened trees are susceptible to bark beetles and root diseases that can kill them.

History

Gypsy moth was introduced from Europe into Medford, Massachusetts in 1869 by Leopold Trouvelot, who was attempting to breed the insect for silk production. Unfortunately, some of the caterpillars escaped from his backyard rearing facility, and by the early 1900's they began defoliating large areas of New England.

Gypsy moth was first discovered in Pennsylvania near Pittston, in Luzerne and Lackawanna counties in 1932. During the 30's and 40's it continued to spread to Pike, Lackawanna, Wayne, Monroe, and Carbon counties. By 1969, it had spread west of the Susquehanna River, and by 1980, 38 Pennsylvania counties were infested. The gypsy moth has now moved beyond our state. It is found as far west as Minnesota, with populations reaching outbreak levels every 5-10 years.

Controls

Various natural environmental factors help control gypsy moth in North America. A disease-causing fungus known as *Entomophaga maimaiga* was first introduced in 1910-1911 to control gypsy moth. This fungus only affects select families of moth caterpillars that encounter infected soil and plants or through contact with other infected caterpillars. The spores of the fungus germinate in the spring and work best if rain is abundant. *E. maimaiga* was responsible for widespread gypsy moth mortality in 1989 and 1990, when wetter than normal conditions were reported in May. Since this time, *E. maimaiga* has become a significant regulator of gypsy moth populations at both low and high densities. Researchers are unsure whether the increased prevalence of the fungus is due to its initial introduction or if it is the result of a more recent reintroduction into the US. Older gypsy moth caterpillars that die as a result of the fungus die in a vertical position with their legs sticking outward.



Larva killed by fungus

A nucleopolyhedrosis virus (LdMNPV) kills enough gypsy moth caterpillars when populations are high to eventually end an outbreak. Caterpillars must eat the viral particles in order to become infected. Caterpillars infected with LdMNPV die in an inverted V position, which explains why the common name for LdMNPV is "the wilt". The activity of LdMNPV is specific in that it only kills gypsy moth caterpillars.



Larva killed by virus



Calosoma sycophanta

A large metallic green ground beetle known as *Calosoma sycophanta* was introduced into New England from Europe for gypsy moth control in 1906. It is now established throughout Pennsylvania. *C. sycophanta* larvae and adults eat older gypsy moth caterpillars that rest in the leaf litter during the daytime.

Other factors can impact of oak forests. Other insects, such as oak leafroller, oak leaf tier, two lined chestnut borer, and oak sawflies, as well as pathogenic fungi such as oak wilt and *Armillaria* can compound the impact of gypsy moth. In addition, high deer populations in Pennsylvania make oak regeneration a challenge.

**For the latest information on gypsy moth and other forest pest consult the most recent
Pennsylvania Forest Health Report
posted on the DCNR-Bureau of Forestry web site.**

www.dcnr.state.pa.us

