



Asian Gypsy Moth Revisited

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We've been hearing reports of gypsy moths in upstate New York feeding on spruce (especially blue spruce) but causing *little or no* damage to their usual deciduous host trees growing nearby. Rumors are flying that perhaps these are *Asian* gypsy moths, closely related to the "normal" European gypsy moth but with a broader host range and much more mobile females. The two "strains" look so much alike that the only way to conclusively distinguish them is to analyze DNA. And, thus far molecular analysis has indicated that moths on spruce are not the Asian strain. According to Dan

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Gilrein, Extension Entomologist from Suffolk County, they had a similar 'scare,' on Long Island many years ago with observance of unusual behavior of selected populations of larvae raising the specter of an 'Asian' gypsy moth

invasion. As with the current situation, gypsy moth damage on conifers, particularly on Colorado blue spruce ('Montgomery' was dramatically affected) but also on white pines in deference to broadleaved hosts, initially raised some eyebrows. The concern was heightened by reports of flying female gypsy moths. Since that episode, Dan and colleagues have even seen infestations on arborvitae; damage was very limited but egg masses (or remnants) on the plants caused rejection in shipping. Every time, samples from conifers sent to a USDA lab at Otis Air Force Base in Massachusetts (a lab dedicated to the detection and management of invasive insect pests) came back negative for diagnostic Asian markers, and flying females were never confirmed.

In fact, conifers are known hosts for the European gypsy moth albeit not as highly preferred as some deciduous hosts like oaks. Dan surmises what may be happening is that ballooning newly hatched larvae land on these less-preferred hosts at the whims of the wind, and those that are unable to leave cause the damage later observed.

With respect to *bona fide* Asian gypsy moth introductions, there have been some and they have been quickly followed by eradication efforts sufficient to ensure that Asian gypsy moth (AGM) has not become successfully established in the US. Nonetheless, with the enormous amount of foreign trade and travel through East Coast air and sea ports, we think it's important to review information about Asian gypsy moth and we'd be interested to hear if you are also seeing gypsy moth larvae feeding on conifers (and other unusual hosts?) while leaving typically favorite hosts alone.

Asian Gypsy Moth vs. European Gypsy Moth

Several factors make Asian strain moths concerning. First, the Asian moth females fly up to 20 miles, thus spreading more rapidly than the European strain with flightless females. Second, the Asian strain moths differ genetically from their European counterparts, especially with greater genetic diversity of the former. Along with the more genetically diverse population, the host range of the Asian strain is larger, with conifers—especially

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larch—as well as deciduous trees such as birch, willow, and oak. In addition, the Asian strain has a faster egg hatch in spring and the larvae are less sensitive to some biopesticides like Bt.

Hybrids of the Asian and European strains are also potential problems because the hybrids are more vigorous than the European strain. These hybrids are less susceptible to some biopesticides, and some adult hybrid females are able to fly.



Asian Gypsy Moth females (top) and European gypsy moth females (bottom)

Symptoms

The defoliation caused by the Asian strain is similar to that caused by the European strain. The young larvae chew shot-holes in leaves. The mature larvae consume entire leaves, at times down to the midrib.

Signs

The Asian strain is almost impossible to distinguish from the European strain without using molecular techniques. Like the European strain, the egg masses are felt-like, tan, and up to 1½ inches in length. In contrast to the European strain, they are laid in clusters on foliage and on objects associated with lights. The egg masses also occur on tree boles and rocks as is common with the European gypsy moth.

The Asian strain larvae have five different color forms (bright yellow, yellow, yellow-gray, gray, and black). These variations in color sometimes can be used to determine the presence of the Asian strain but only by an expertly trained eye.

The brown-black pupal cases of the Asian strain can be found on foliage. The adult males are dark brown and the females are white with black spots, attracted to light, and larger (though apparently not much) than the European strain.



Asian Gypsy Moth larval forms © USDA APHIS PPQ Archive, USDA APHIS PPQ, Bugwood.org

Life History

The life history of the Asian strain is similar to the European strain except for the fact that Asian strain larvae hatch earlier. (In a year like this past one, where everything was speeded up, that “fact” may actually be more confusing than helpful.) Both strains have just one generation per year. They overwinter as eggs. Five to twenty-five percent of the eggs prematurely hatch in the fall. The majority of the larvae emerge in the spring. They often remain on the egg mass for several days and then begin to feed on foliage during the night and rest on the host during the day. The first and second instar larvae spin silken threads from which they suspend themselves. If the wind velocity is high enough, these larvae become windborne and disperse from several hundred yards up to several miles. The Asian strain larvae purportedly grow faster and become bigger than the European counterparts, but the size difference is obviously not reliable enough to confirm strain distinction in the field. The larval stage lasts about seven weeks. Then, the Asian moths pupate on foliage. The male and female adults emerge before mid-July, disperse, and mate. The female lays eggs in clusters on foliage, tree boles, rocks, and light poles. Egg masses deposited on foliage are insulated by snow when the leaves fall to the ground.

More information on Asian gypsy moths can be found at:

www.nrs.fs.fed.us/pubs/gtr/gtr-nrs-p-75papers/19keena-p-75.pdf and pest.ceris.purdue.edu/pest.php?code=ITAXQBA and www.aphis.usda.gov/publications/plant_health/content/printable_version/fs_phasiangm.pdf