

Siberian Moth: Potential New Pest

United States
Department of
Agriculture

Forest Service

**Northeastern Forest
Experiment Station**

**Northeastern Area
State & Private Forestry**

NE/NA-INF-134-97

Yuri Baranchikov (Institute of Forest, Krasnoyarsk, Russia)
Michael Montgomery (Northeastern Forest Experiment Station, Hamden, Connecticut)
Daniel Kucera (Northeastern Area State & Private Forestry, Radnor, Pennsylvania)

The Siberian moth, *Dendrolimus superans* Butler (Family Lasiocampidae), is the most destructive defoliator of conifer forests in Northern Asia. Outbreaks defoliate millions of acres and occur at intervals of 8 to 11 years. The larvae feed on most conifers in the pine family, but outbreaks occur in fir, spruce, Siberian pine, and larch forests. The biology of the Siberian moth is unusual and complex, and it has been difficult to control in its native habitat. There are no known introductions of the Siberian moth to North America.

There are three subspecies: *D. superans superans* occurs in Japan, *D. superans albolineatus* occurs in the Sakhalin and the Kuril Islands, and *D. superans sibiricus* is continental and widespread.



Adult moths mating, female is above male.

Adult moths are larger than the gypsy moth, with a wing span of 1.5 to 3 inches for males and 2.5 to 4 inches for females. The color of adults varies from almost white to dark brown. The most common color pattern is gray-brown with dark cross bands and a crescent-shaped white spot on each forewing. The hindwing is the same base color as the forewing but without markings.

Moths fly and lay eggs from the end of June to the beginning of August. Female flight occurs in early evening to midnight, but little is known about mating and flight behavior.



Larva, showing dorsal setae.



Larva, side view.

Larvae are up to 4 inches long and covered with hair-or scale-like setae that form variable color patterns. The dorsal surface has distinctive silvery, scale-like setae. Reddish setae occur on the sides of the larvae, usually as small spots, but also as a broad, jagged band. Tufts of hairs occur on the first and second thoracic segments. The hairs are irritating to many people. Larvae often arch-up the thoracic segments when disturbed exposing the toxic hairs.



A female lays up to 450 eggs, 0.1" diameter, in clusters or chains on the foliage.

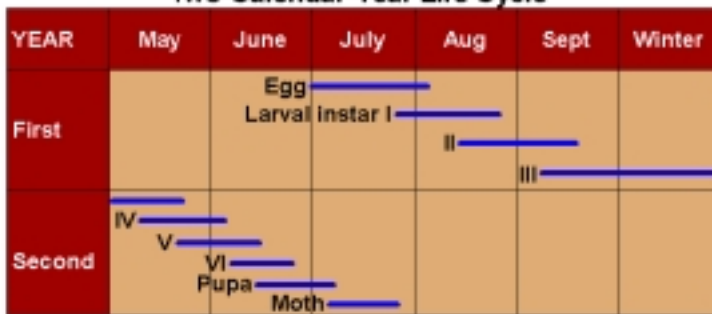


Pupal cocoon (in tree crown).

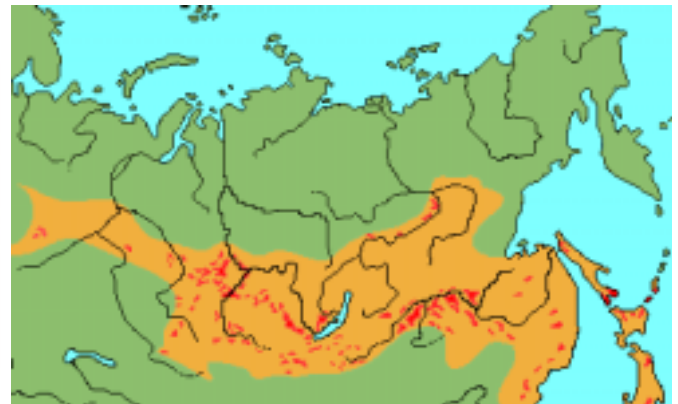
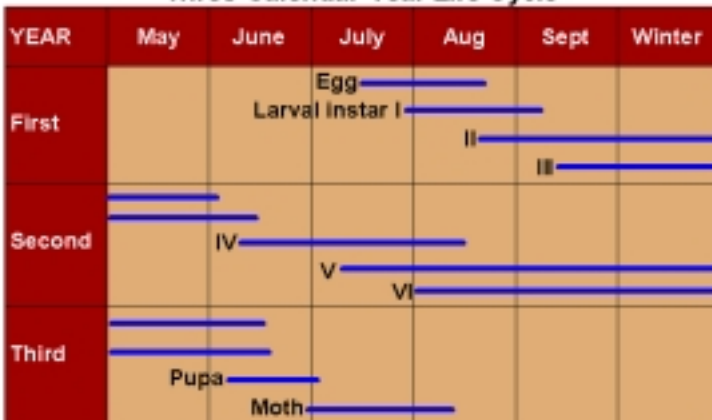
The life cycle of the Siberian moth spans 2 or more calendar years and 3 is typical. It overwinters in the larval stage, coiled-up under the forest litter. The number of larval instars varies from 5 to 8 for males and 6 to 9 for females. Drought, increasing population density, and other factors not well understood cause some of the larvae to have a shorter, 2-calendar-year life cycle. As a result, the adults of two generations emerge simultaneously and the population increases sharply.

The duration and effect of outbreaks also depends on the forest type. Outbreaks in fir and five-needled pines result in defined focal areas with very high densities of larvae that defoliate trees for 2 or 3 years in succession before the outbreak collapses. Tree mortality is nearly 100 percent in many stands. Outbreaks in larch forests are more prolonged but cause less tree mortality. Moths migrate from defoliated larch to new areas to lay eggs; hence, severe defoliation in successive years seldom occurs and the outbreak population becomes dispersed.

Two-Calendar-Year Life Cycle



Three-Calendar-Year Life Cycle



Map of the Siberian moth's range (orange) and areas where outbreaks have occurred (red).

Outbreaks can be suppressed by aerial application of pesticides. Synthetic pyrethroids are used frequently in Siberian Russia and are applied both in the spring and fall. *Bacillus thuringiensis* (Bt) can also be used in the fall to reduce populations of young larvae.

Natural regulation is primarily from egg parasites; the most important is *Telenomus tetratomus* Thomps. The major larval parasites are *Rogas dendrolimi* Mats. and several tachinids. Cytoplasmic polyhedrosis virus is the most important disease.