Nun moth *Lymantria monacha*

The nun moth is a serious defoliator of coniferous trees in Central Europe. Its hosts also extend to deciduous trees. Michigan is a high risk zone if this exotic moth becomes established in North America. Tree stands in natural forests, recreational and residential areas, tree nurseries and fruit orchards all provide potential hosts for the moth.

Michigan risk maps for exotic plant pests.

Other common names

Tussock moth, black arches moth, black arched tussock moth

Systematic position

Insecta > Lepidoptera > Lymantridae > *Lymantria monacha* (Linnaeus)

Global distribution

Europe, Central Asia (Turkey) and Eastern Asia (China, Japan, Koreas, Russia)

Quarantine status

This insect is listed as an exotic organism of high invasive risk to the United States (USDA 2009).

Plant hosts

A wide range of coniferous and deciduous trees including *Acer, Betula, Carpinus, Fagus, Fraxinus, Larix, Malus, Picea, Pinus, Prunus, Pseudotsuga, Quercus* and *Ulmus* (CFIA 2009). Outbreaks of the nun moth are often observed in the Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*) stands in Central Europe (Kolk and Starzyk 1996). In Britain, the moth is mainly confined to oak (Carter 1984).

Biology

Female moths lay clusters of 20 to 100 eggs in bark crevices under scales or lichens. The moths overwinter as eggs and hatch in spring around bud break. Young caterpillars are gregarious when at rest in sheltered locations. Larvae feed on needles and male inflorescence of conifers or leaves of broadleaf trees. Old caterpillars consume only the base of needles and the distant parts fall down. Pupation in a light silken cocoon usually takes place in a crevice of the trunk. Adults emerge and swarm from July through August. Male moths fly at night and female moths move very little and usually remain on the tree trunk (Carter 1984). One generation develops per year.

Identification

Adult. (Photo: Gyorgy Csoka, Hungary Forest Research Institute, Bugwood.org)

Adult dark form. Note the feathery antennae of male (Photo: Hannes Lemme, Bugwood.org)

- Adult: 35-55 mm wingspan; forewings white (dark forms also occur) with dark spots and wavy lines across; stout-bodied; males have feathery antennae and females have short, saw-like antennae.
- Larva: Up to 35 mm long; body grayish-yellow with tufts of hair of various lengths on the sides of the body; the first four abdominal segments have a dorsal pair of bluish spots; the sixth and seventh segments have dorsal orange warts; head pale brown with dense black markings.
- Pupa: 15-20 mm long; color changes from green to dark brown or metallic black and develops tufts of white hair.
- Eggs: Spherical, 1 mm in diameter, grayish-brown; laid in a mass of 20 to 100 eggs.

Signs of infestation:

- Moths resting on lower part of tree trunks.
- Thinned crowns from larval defoliation.
- Egg mass in bark crevices may be seen by peeling away outer bark.

Management notes

The nun moth is often found infesting monoculture stands of trees growing in poor conditions. On coniferous trees, female moths preferentially oviposit on the lower bole (CFIA 2009). Male moths fly at night and are attracted to light. Counts of female moths on trees are used to forecast the next year's moth density (Kolk and Starzyk 1996). Sex pheromones of the nun moth have been identified and used for male moth trapping (Morewood et

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Eggs exposed after removing outer bark scales. (Photo: H. Lemme, Bugwood.org)

Larva. (Photo: D. Adam, Office National des Forêts, Bugwood.org)

Pupa. (Photo: D. Adam, Office National des Forêts, Bugwood.org)

Needles of Norway spruce fed on by nun moth larvae. (Photo: P. Kapitola, State Phytosanitary Administration, Bugwood.org)

al. 2000. Control measures include microbial (*Bacillus thuringiensis*) and chemical control (chitin synthesis inhibitors and pyrethroids).

Economic and environmental significance to Michigan

Michigan appears to be a suitable home for the nun moth if it becomes established in North America. Midwestern spruce, fir or pine forests are considered a high risk region of establishment (Keena 2003). Michigan's broadleaf tree stands in recreational and residential areas are also potential hosts. In addition, this exotic moth may pose a risk to tree nurseries and tree fruit production.

Likely pathways of entry in Michigan

Egg masses deposited on crates, pallets and other packing materials are most likely the route of entry (University of Georgia 2009).

If you find something suspicious on a susceptible host plant, please contact MSU Diagnostic Services (517-355-4536), your county extension office, or the Michigan Department of Agriculture (1-800-292-3939).

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