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Nun Moth: Potential New Pest

The nun moth, *Lymantria monacha* (L.)(Lymantriidae), is a Eurasian pest of conifers that could be accidentally introduced into North America. Its establishment in this country would be disastrous because it feeds on a variety of vegetation and can migrate and colonize a variety of sites.

Nun moth has a high potential to be transported via commerce because females may deposit eggs in crevices on containers, pallets, and ships. Adults are readily attracted to artificial lights and have been observed in Russian Far East ports. Nun moth larvae feed on and kill primarily conifers (*Picea, Pinus*, *Abies*, and *Larix* spp.) but can also defoliate deciduous trees and shrubs (*Fagus, Carpinous, Betula,* and *Quercus* spp.). The nun moth is similar to a closely related species, they gypsy moth (*L. dispar*).

Life History

Nun moths fly from the middle of July to the beginning of September. These adults are most active after midnight. Although females can fly, they usually remain on tree trunks and attract males. Once mated, females lay one or more clusters of approximately 40 eggs in bark crevices or under lichens on the bark. They may fly to another location before depositing additional clusters of eggs.

The nun moth embryo completes its development 2-6 weeks after the egg is laid and then enters diapause, a period of arrested development. Larvae usually hatch in early May and go through 5-7 instars over the next 2 ½ months. First and second instars are capable of being dispersed by the wind for considerable distances. Pupation takes place in July.

Identification

Adults. The forewings of nun moths can vary from the characteristic chalk-white, decorated with numerous dark transverse wavy lines and patches, to dark brown with black flecks (Fig. 1). Hind wings are generally gray-brown with minute dark or light patches, or both, at the edge. The nun moth female has a wingspan of 45 to 55 mm, and the male, a wingspan of 35 to 45 mm.

In comparison, the gypsy moth exhibits sexual dimorphism: the male is predominantly brown and the female, predominantly white (Fig. 2). Nun moth females can be distinguished from gypsy moth females by their narrower abdomens and extremely long ovipositors, adapted for their specialized egg-laying habit (Fig. 1).

Figure 1. Color variation in nun moth females (top) and males (bottom). Color forms to the left are most common in Europe. Only the lightest forms of both sexes are present in Japan.

Nun moth males with any white on their wings are easily distinguished from gypsy moth males (Fig. 1 and 2). Dark nun moth males can be distinguished from gypsy moth males by the presence of black flecks on the forewings rather than the distinct wavy lines characteristically found on gypsy moth males.

Figure 2. Different coloration of gypsy moth adult male (bottom) and female (top).

Eggs. Eggs of both the nun moth and gypsy moth are spherical, about 1 mm in diameter and slightly concave in the center. Nun moth eggs are orange-brown when first laid and later turn brown with an opalescent shine (Fig. 3). Nun moth eggs are deposited in clusters without a covering of hair, while gypsy moth eggs are deposited in a single mass that is covered with tan hairs from the female's abdomen.

Figure 3. Nun moth eggs in a bark crevice

Larvae. Newly hatched larvae of both nun moth and gypsy moth are approximately 4 mm long. At first they are tan, but within several hours they turn black. First instars of both species have abundant hairs that have a translucent bulb-like structure in the middle of the shaft. The first instar of the nun moth can be distinguished from the first instar of the gypsy moth by the presence of a series of small, paired, black protuberances along the center of the back (Fig. 4).

Figure 4. Backs of first instar nun moth (left) with a row of small, paired, black protuberances (arrows), unlike gypsy moth larvae (right).

Mature nun moth larvae, 30 to 40 mm in length, are tan, green or dark gray, with extensive brown or black mottling (Fig. 5).

Figure 5. Nun moth second instar larva (left) and fifth instar larva on spruce foliage (right).

The hairy larvae have a white patch on each side of their back near the head (Fig. 6, right) and may also have a light patch in the middle of the back farther down the body (Fig. 5), unlike gypsy moth larvae (Fig. 6, bottom). Beginning with the third instar the larval heads of the nun moth and gypsy moth can be differentiated by the patterns of dark spots and stripes on their heads (Fig. 6). The two single large glands in the middle of the larva's back near the posterior end are orange in the nun moth and red in the gypsy moth (Fig. 6, left). The stripe down the middle of the larva's back is brown to black in the nun moth and white to yellow in the gypsy moth. The pairs of hairy mounds on the back of the nun moth larva are all bluish, while those of the gypsy moth are blue-violet near the head and red on the rest of the body (Fig. 6).

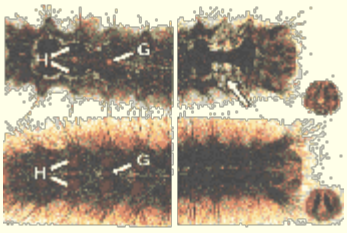

Figure 6. Posterior (left) and anterior (right) of mature nun moth (top) and gypsy moth (bottom) larvae showing hairy mounds (H) and glands (G). Insets show patterns on the heads.

Pupae. The nun moth pupa is reddish brown and shiny with light colored hair clumps and measures 18 to 25 mm long. The gypsy moth pupa is dark brown and dull with yellow to brown hair clumps, and measures 20 to 30 mm long (Fig. 7). Neither nun moth nor gypsy moth pupae have cocoons.

Figure 7. Female pupae of the nun moth (left) and gypsy moth (right).

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