

## Data Sheets on Forest Pests

### *Sphinx morio*

#### IDENTITY

- Name:** *Sphinx morio* Rotsch. et Jord
- Synonyms:** *Hyloicus morio* Rotsch. et Jord  
*Hyloicus laricis* Rozh
- Taxonomic position:** Insecta: Lepidoptera: Sphingidae
- Common Name:** Larch sphinx, larch hawk moth (English); лиственничный бражник (Russian)
- Bayer computer code:** SPHXMO

#### HOSTS

*S. morio* attacks mainly larch (*Larix sibirica*, *L. gmelinii* and other larch species) and *Pinus* (*Pinus sylvestris*, *P. sibiricus*, *P. koraiensis*).

#### GEOGRAPHICAL DISTRIBUTION

**EPPO region:** Russia (Siberia, Transbaïkalia, Far East).

**Asia:** Russia (Siberia, Transbaïkalia, Far East), Kazakhstan, China, Japan (Pleshanov, 1982; Litvinchuk, 1988; Epova & Pleshanov, 1995).

**EU:** Absent.

#### BIOLOGY

Flight of *S. morio* in its natural range usually occurs in the second half of June when the average temperature reaches 15°C and lasts until the end of July, with the maximum in the beginning of July. Males appear 1 – 3 days earlier than females. Males live for 7 – 8 days, females for approximately 10 days. The flight is most active in the early morning and the late evening. Mating usually occurs 1 day after hatching of moths and lasts for several hours. A half a day after mating, females begin oviposition and lay eggs each morning and each evening (one egg mass in the morning and one in the evening) during 5 – 7 days. One female may lay from 70 to 250 eggs, about 100 – 120 on average depending on the area. Most eggs are laid before the middle of July when first larvae hatches from eggs. The egg

development usually takes 5 – 8 days. Larvae eat needles of pine or larch. Their development usually takes from 30 to 70 days depending on temperature (usually 40 – 50 days). They moult 4 times before going to the soil in the second half of August and in September for pupation. Development of pre-pupae takes 5 – 7 days. Pupae overwinter in the soil under the tree. The full life cycle usually takes one year, though some of overwintering pupae may continue in diapause for another year or more in the soil (Gninenko, Plotnikov, 1979; Litvinchuk, 1988; Epova & Pleshanov, 1995).

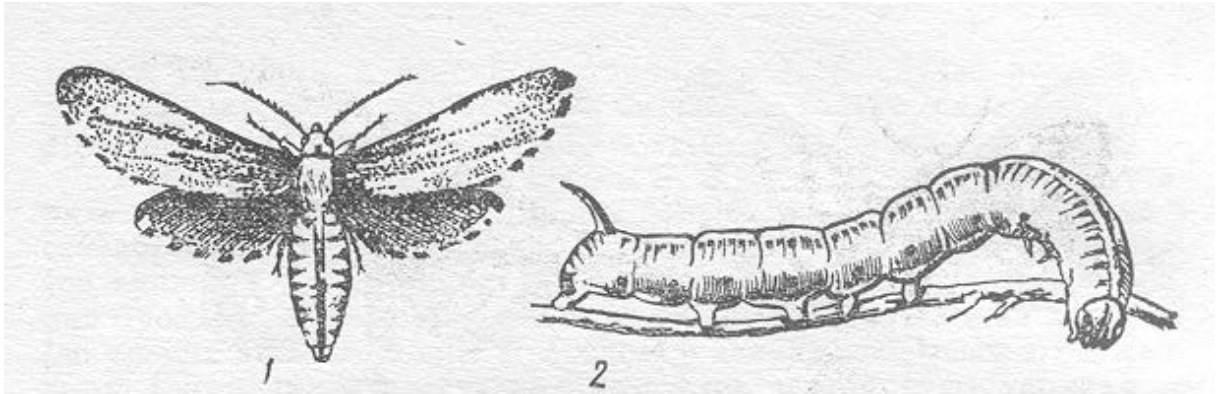


Fig. 1 *Sphinx morio*: 1 – adult, 2 – larva (Maslov, 1988).

## DETECTION AND IDENTIFICATION

### Symptoms

Defoliation of larch or pine is usually very spectacular. The presence of caterpillars is easily detected.

### Morphology

The adults and especially the caterpillars have characteristics which permit entomologists to easily distinguish the species from other species of moths. The only possible confusion may be with *Sphinx pinastri*.

### Eggs

About 2,02 mm long and 1,60 mm large, of oval form, light-green, slightly retinous. Micropile is in the form of an 11-petal daisy.

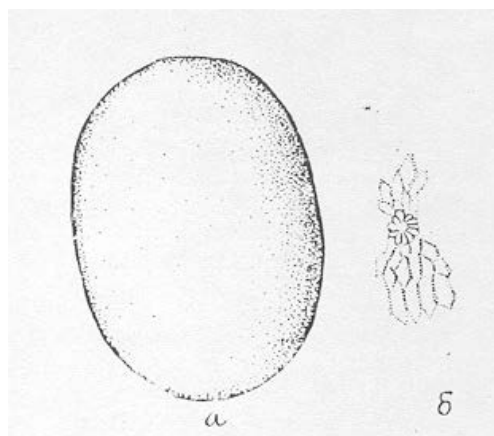


Fig. 2 - Egg of *S. morio*: a – egg, б – micropile (Litvinchuk, 1988)

### Larva

The caterpillar (before pupation) is up to 7 cm long, with a cylindrical body of green colour with microscopic hairs and 2 lateral and 1 dorsal red-brown stripes along it, a dark-brown head with black mandibles, and a dark-brown horn at the top of last segment.

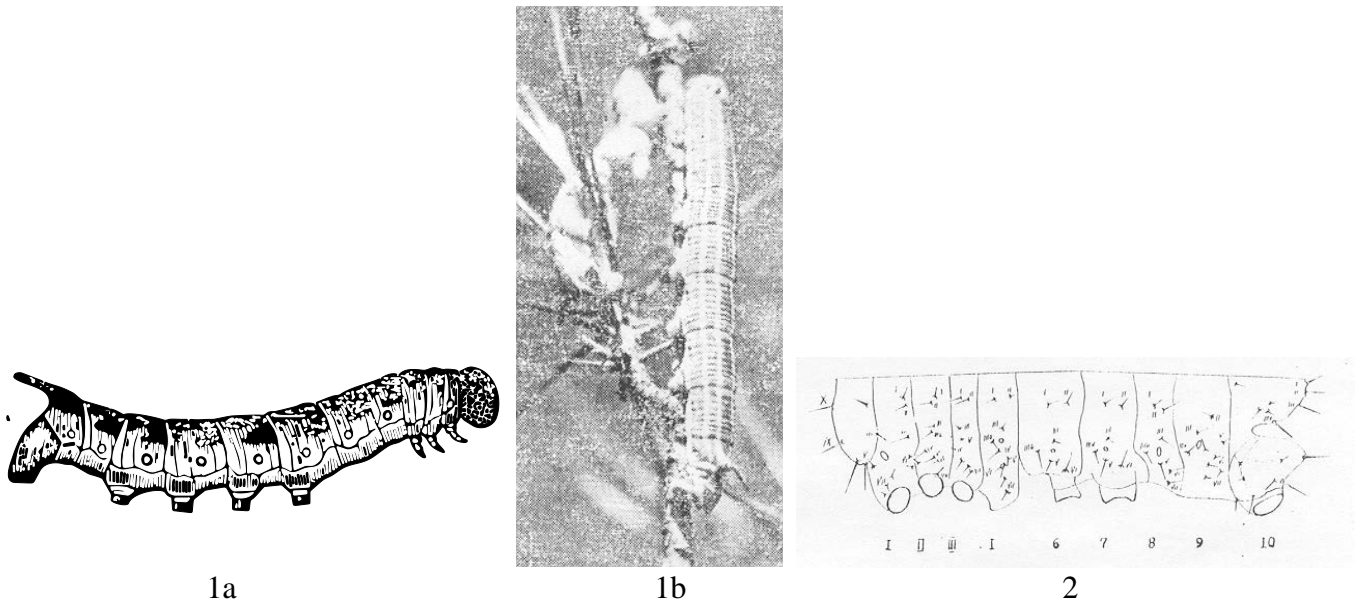


Fig. 3 - Caterpillar of *S. morio*: 1 – caterpillars before pupation, 2 – hairs of 1<sup>st</sup> instar caterpillar (Litvinchuk, 1988)

### Pupa

The pupa is 25–35 mm long and dark-brown. The borders of V to VII segments covered with small prominences making the surface rough and mat. Embryonal wings do not reach the lower border of the V<sup>th</sup> segment. Cremaster of conic form with characteristic knobs, teeth, longitudinal and transversal wrinkles.

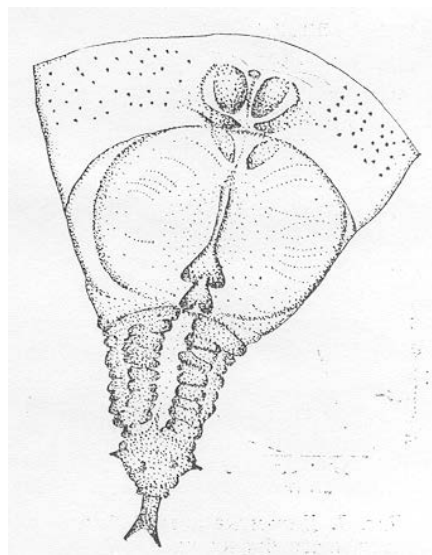


Fig. 4 - Cremaster of a pupa of *S. morio* (Litvinchuk, 1988)

### **Adult**

The upper wing is 25 – 35 mm long. The head, thorax and front wings are brown-grey. The back wings are light-grey-brown and unicolour. The abdomen has a dark-brown dorsal stripe. Front wings have one clear and one unclear transversal band.

## **MEANS OF MOVEMENT AND DISPERSAL**

*S. morio* can spread with flights of the adult moths. All stages of the life cycle can be transported on plants moving in trade particularly plants for planting and cut branches (including Christmas trees). Eggs and larvae may be associated in summer period with wood containing bark and may be hitchhikers on other products.

## **PEST SIGNIFICANCE**

### **Economic Impact**

*S. morio* is one of several important defoliators of larch and pine in Russia. Its outbreaks occur throughout large areas (thousands of hectares) and usually cause defoliation between 20 and 50% and decrease of wood and seed production. Sometimes, the defoliation reaches 100% and leads to the death of forests in Siberia, Kazakhstan and China. Serious outbreaks have been observed only since the 1970s. During outbreaks, trees can be seriously defoliated and stressed and are very often followed by outbreaks of wood borers (scolytids, cerambycids and others), particularly, *I. subelongatus*, *Scolytus morawitzi*, *Monochamus galloprovincialis*, *Xylotrechus altaicus*, *Melanophila guttulata* (Gninenko, Plotnikov, 1979; Plotnikov, Gninenko, 1980; Pleshanov, 1982; Litvinchuk, 1988; Zhao, Zhang, 1992; Epova & Pleshanov, 1995; Gninenko, 1998). These pests are able to kill trees, which are heavily stressed by the defoliator.

### **Environmental Impact**

*S. morio* sometimes causes the death of forests, either directly or by leaving the forest susceptible to subsequent attack by other forest pests, and/or by predisposing the forest to forest fires (Gninenko, Plotnikov, 1979; Plotnikov, Gninenko, 1980; Epova & Pleshanov, 1995). The reforestation of these areas is often very complicated and takes much time. This results in serious changes of environment over large areas.

### **Control**

Significant control efforts (mainly aviation treatments with chemical, for example, chlorophos, and bacterial preparations) against *S. morio* are undertaken during years of outbreaks in Russia (Plotnikov, Gninenko, 1980; Epova & Pleshanov, 1995) and other countries where the pest is present.

### **Phytosanitary risk**

*S. morio* is not declared a quarantine pest by any regional plant protection organization. It is considered as a serious defoliator of coniferous forests in eastern Russia. According to some publications, it is increasing its geographical range and economic importance (Gninenko, Plotnikov, 1979). It is very likely to be able to establish in most EPPO countries particularly those in the north and centre as well as in mountain areas. Coniferous species are important forest trees in the EPPO region.

## **PHYTOSANITARY MEASURES**

To prevent introduction of *S. morio* to other countries, the effective measure would be to prohibit import of coniferous plants for planting and cut branches from the infested areas. Inspection of wood with bark can detect eggs of the pest. Inspection of wood products, especially those with bark, can detect hitchhiking larvae and adults.

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