

Data Sheets on Forest Pests

Erannis jacobsoni

IDENTITY

- Name:** *Erannis jacobsoni* Diakonoff
- Synonyms:** *Hybernia jacobsoni*
- Taxonomic position:** Insecta: Lepidoptera: Geometridae
- Common name:** Geometrid of Yakobson (English); пяденица Якобсона (Russian).
- Bayer computer code:** ERANJA

HOSTS

E. jacobsoni can damage different species of *Larix* (mainly *Larix gmelinii* (= *Larix dahurica*) and *Larix sibirica* (= *Larix sukaczewii*)).

GEOGRAPHICAL DISTRIBUTION

EPPO region: Russia (east of Southern Siberia, Transbaikalia, south of North – Eastern Siberia, Southern Far East).

Asia: Russia (east of Southern Siberia, Transbaikalia, south of North – Eastern Siberia, Southern Far East), Mongolia.

EU: Absent

Main outbreaks of *E. jacobsoni* occurs in forests around Baikal lake (republic of Buryatia, oblast's of Chita and Irkutsk, northern Mongolia).

BIOLOGY

Adults of *E. jacobsoni* in its natural range usually appear in the middle of September and occur till the middle of October with the maximum of activity at the end of September. Females have no wings and do not fly. They have negative geotaxis and move actively on the surface of the soil and up on the trunks of larch trees. They lay eggs under scales of the trunks bark and in cracks of branches bark. Migrative capacities of *E. jacobsoni* are limited because of non-flying females. At this reason, pest populations develop on the same trees during many consecutive years and may rich the population density till 6000 caterpillars per tree. Eggs overwinter and neonate caterpillars appear at the end of May and in the beginning of June. They feed on needles and the maximum of defoliation is reached in the middle of July. Caterpillars moult 4 times before making cocoons in the soil at the end of July. The full life cycle takes one year (Pleshanov, 1982).

The outbreaks of *E. jacobsoni* are characterised by cycles of slow build-up of population numbers over several years, reaching a peak ('outbreak') followed by a population collapse. The outbreaks of *E.*

jacobsoni occur with a periodicity of about 6 – 7 years (Amsheev, 1996) and usually last 3 – 4 years (eruption phase of outbreak). Outbreaks are often preceded by periods of droughts and often occurs together with outbreaks of *Orgyia antiqua*, *Dendrolimus sibiricus* and/or *Lymantria dispar*. In general, *E. jacobsoni* prefers dry conditions and areas with continental climate. A very long eruption phase of *E. jacobsoni* outbreaks make the pest very dangerous for trees. The full defoliation during several (3 – 4) consecutive years often leads to death of forests. Furthermore, the outbreaks of *E. jacobsoni* are also very often followed by outbreaks of wood borers (scolytids, cerambycids and others), particularly, *I. subelongatus*, *Tetropium gracilicorne*, *Melanophila guttulata*, *Sirex ermak* (Epova & Pleshanov, 1995;). These pests are able to kill trees, which are already heavily stressed by *E. jacobsoni*. The natural enemies of *E. jacobsoni* (egg parasitoids *Telenomus mayri*, pupa parasitoids *Cratichneumon pachymerus*, *Cratichneumon nigrarius*, *Ceromasia rubrifrons*, larva parasitoids *Rogos rossicus*, *Phryxe vulgaris* and some other parasitoids, predators and diseases) play the important role in regulation of its populations (Boldaruev, 1972; Kondakov, 1979; Pleshanov, 1982; Amsheev, 1996).

DETECTION AND IDENTIFICATION

Symptoms

Defoliation of larch is usually very spectacular. The presence of caterpillars is easily detected. The adults and caterpillars have characteristics which permit entomologists to easily distinguish the species from other species of moths.

Morphology

Eggs

No information yet.

Larva

There exist “normal” and “dark-coloured” caterpillars. The difference between two forms appear since the second instar. Different scientists explain that effect of melanism occurs in cases of food deficit or of high density of pest populations (“group effect”). Dark-coloured caterpillars have a brown-red head with more light spots. Along the dorsal side of the body, there are two brown dotted lines. Lower, there are four similar sub-dorsal lines. Along each lateral side of the body between 1st and 6th segments, there is a yellow stripe, which is broken by stigmal spot. The ventral side of the body is more or less light with four brown dotted lines. Sometimes dark lines join each other and in these cases caterpillars become almost completely dark. There exist many transitional colour variations between “typical” and “dark” forms.

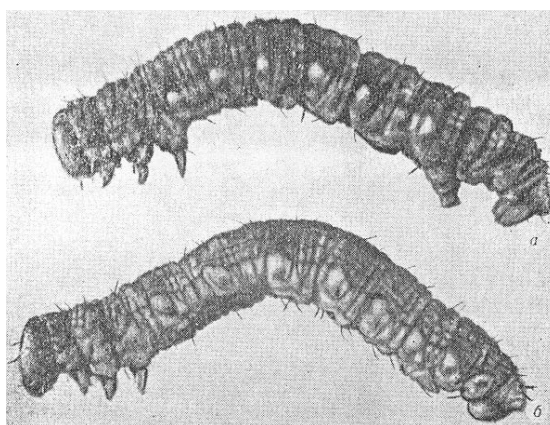


Fig. 1 - Larvae of *Erannis jacobsoni*: a - “dark” and б - “typical” forms

Pupa

No information yet.

Adult

In addition to the “typical” and “dark” forms, there exists a dark form described as *E. jacobsoni* ab. *nigra* Pleshanov (the existence of “dark” forms is characteristic to many species of the genus *Erannis*). Females have no wings. “Dark” females have an abdomen completely covered with dark scales, which form only dark spots on the white abdomen of “typical” females. Front wings of males are uniformly brown with darker transversal band, which is difficult to distinguish in the case of “dark” form. Back wings are creamy coloured, have not well developed dark transversal band and dark middle spot.

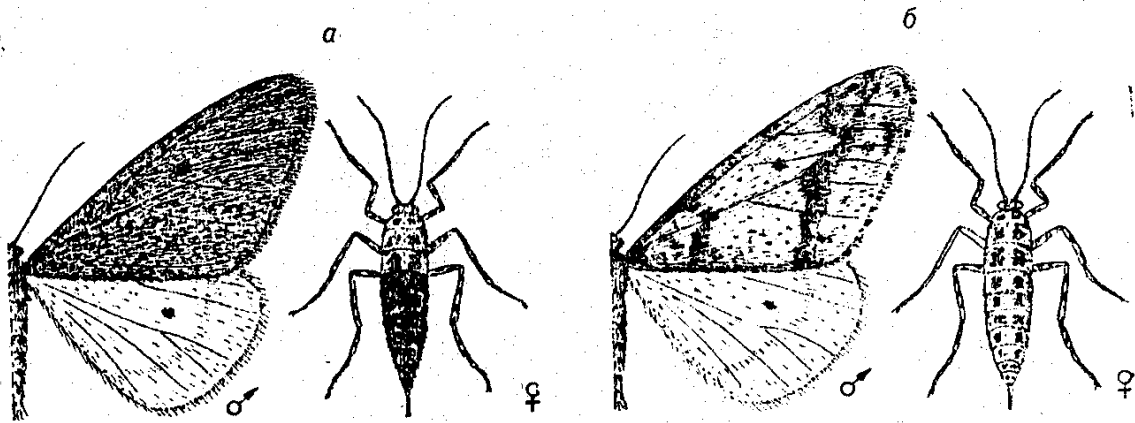


Fig. 2 - Adults of *Erannis jacobsoni*: a - “dark” and б - “typical” forms

MEANS OF MOVEMENT AND DISPERSAL

E. jacobsoni can not spread much with flights of the adult moths because females have no wings. Eggs may be easily transported on wood containing bark because they are well placed and masked under scales and in cracks of bark and stay there a long period of time (9 months since September to June). 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, larvae and adults may be associated with wood containing bark and may be hitchhikers on other products.

PEST SIGNIFICANCE

Economic Impact

E. jacobsoni is one of several important defoliators of larch in Russia. It attacks both stressed and healthy trees of different ages (Pleshanov, Vassilieva, 1974; Pleshanov, Issaev, 1981; Pleshanov, 1982). The damage became especially important since the end of 1950th. At the reason of non-flying females, pest populations develop on the same trees during many consecutive years and may reach the population density till 6000 caterpillars per tree. All young trees are killed rather quickly. The pest outbreaks occur throughout large areas (thousands of hectares) and usually cause important decrease of wood and seed production. The outbreaks of *E. jacobsoni* are characterised by a very long eruption phase (3 – 4 years), which make the pest very dangerous for trees. The 100% defoliation of larch during such a long period often causes the death of forests, either itself or in association with *Orgyia antiqua*, *Dendrolimus sibiricus*, *Lymantria dispar* and/or other defoliators (Boldaruev, 1972; Kondakov, 1979; Pleshanov, 1982; Amsheev, 1996).

Environmental Impact

E. jacobsoni often causes the death of forests, either directly or by leaving the forest susceptible to subsequent attack by other forest pests (scolytids, cerambycids and others), and/or by predisposing the forest to forest fires (Pleshanov, 1982). 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 and bacterial preparations) against *E. jacobsoni* are undertaken during years of outbreaks in Russia (Pleshanov, 1982) within the range of the pest.

Phytosanitary risk

E. jacobsoni is not declared a quarantine pest by any regional plant protection organization. It is considered as a serious defoliator of larch forests in eastern Russia (especially in regions around Baikal lake). It is very likely to be able to establish in most EPPO countries particularly those in the east, north and centre of the European part of the EPPO region where larch species are important forest trees.

PHYTOSANITARY MEASURES

To prevent introduction of *E. jacobsoni* to other countries, the effective measure would be to prohibit import of larch wood with bark and larch 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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