EUROPEAN AND MEDITERRANEAN PLANT PROTECTION ORGANIZATION
ЕВРОПЕЙСКАЯ И СРЕДИЗЕМНОМОРСКАЯ ОРГАНИЗАЦИЯ ПО КАРАНТИНУ И ЗАЩИТЕ РАСТЕНИЙ
ORGANIZATION EUROPEENNE ET MEDITERRANEENNE POUR LA PROTECTION DES PLANTES

Data Sheets on Forest Pests

Coleophora dahurica

IDENTITY

Name: *Coleophora dahurica* Fal'kovich

Synonyms: L. M. Yang (1984) believe that *Coleophora longisignella* Moriuti is a synonym of *Coleophora dahurica* Fal'kovich
Note 1: This species was previously often confused with *Coleophora laricella* Hübner (Ammossov, 1975; Pleshanov, 1982; Yang, 1984);
Note 2: Males of *C. dahurica* may give hybrids with females of *C. laricella* Hübner and *C. sibiricella* Fal'kovich (=*C. sibirica* Fal'kovich) (Pleshanov, 1982);
Note 3: in the group of *C. dahurica*, *C. laricella* and *C. sibiricella*, *C. dahurica* is the most morphologically specific; this species was formed separately in the Eastern Siberia since glacial epoch (Pleshanov, 1982).

Taxonomic position: Insecta: Lepidoptera: Coleophoridae.

Common name: Dahurian larch casebearer, Xingan larch casebearer (English); Лиственничная чехлоноска даурская (Russian).

Bayer computer code: COLEDA

HOSTS

C. dahurica attacks larch, especially *Larix gmelinii (= L. dahurica), L. sibirica* and *L. olgensis* (Ammossov, 1975; Pleshanov, 1982; Wang *et al.*, 1999).

GEOGRAPHICAL DISTRIBUTION

EPPO region: Russia (all North-Eastern Siberia, East of Southern Siberia, Transbaikalia, Far East).
Asia: China, Mongolia, Russia (all North-Eastern Siberia, East of Southern Siberia, Transbaikalia, Far East) (Ammossov, 1975; Pleshanov, 1982; Yang, 1984; Epova & Pleshanov, 1995).
EU: Absent.

BIOLOGY

The flight of moths of *C. dahurica* occurs in June – July. The female lays eggs singly on the flat side of larch needles (Fig. 1). Potential fecundity of a female is in average 37 eggs. Larvae appear since the middle of July. The neonate larva makes first a hole of an irregular form in the base of the egg and enter into the needle. The larvae feed first as needleminers (Fig. 2). The 1st and the 2nd instar larvae feed inside needles till the end of August and consumes from 1/4 to 1/3 of the needle. The 3rd instar larvae leave needles and begin to prepare protecting "cases", because later they live in case-like or tube-like shelters. The larva cuts the emptied part of its needle and receive a tube 2.1 – 3.1 mm long and 0.7 – 0.8 mm wide. The tube is usually cut from both sides, more seldom it is cut from one side, the other side representing the top of the needle. In the last case the tube is 2.9 – 3.7 mm long. The larva lives then completely inside the case. Only the head and thoracic legs stay outside.

The case protects and masks the larva. In the movement it stays perpendicular to the substratum. The larvae in their cases come to lower branches with the help of thin gossamer threats produced by them. Then they feed on parenchyma of needles moving from one needle to another until the second half of September. Then caterpillar begin to move in direction of the trunk and come up to the top of the tree. They fix there their cases to branches close to buds with the help of gossamer threats, close the entry to the case with the threat web and overwinter in this position. There are usually many caterpillars (till 20) at one bud. Cases are fixes parallel to trunks or branches (Ammossov, 1975; Pleshanov, 1982).

Fig. 1. An egg of *Coleophora dahurica* on the larch needle (Ammossov, 1975)

In spring, caterpillars become active since the second half of May. They begin to feed since the needles appear. The damage is the most spectacular in June. Needles without parenchyma turns white like under snow, then they turn red-brown. Caterpillars reach last instar in June. Before pupation, the caterpillar stops feeding, moves to the top of a needle, and fixes the case to the needle. The head of the pupa in the case is oriented to the back side. If the case is closed from the back side (the top of the needle was used), the caterpillar makes a hole before pupation. First caterpillars appear since the end of June (Ammossov, 1975).

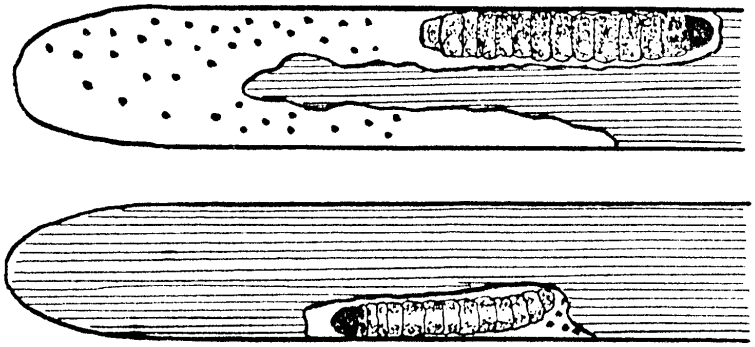

Fig. 2. Feeding of larvae of *Coleophora dahurica* inside larch needles (Ammossov, 1975)

DETECTION AND IDENTIFICATION

Symptoms

Damaged trees become reddened as though scorched (Ammossov, 1975).

Morphology

Eggs

The egg of *C. dahurica* is bright-yellow, hemispherical, meridionally ribbed, flattened and even depressed on the top (Fig. 3), 0.25 – 0.30 mm in diameter at the base (Rozhkov *et al.*, 1966; Ammossov, 1975).

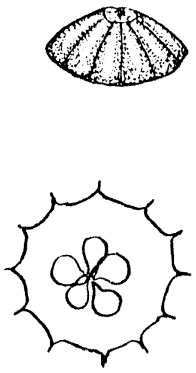

Fig. 3. An egg of *Coleophora dahurica* (above) and
the shape of the depression on the top of the egg (below) (Ammossov, 1975)

Larva

The neonate larva of *C. dahurica* is bright-yellow. The head of the 1st instar larva is 0.11 – 0.15 mm wide, the body is 0.6 – 1.0 mm long and 0.11 – 0.15 mm wide. The 2nd instar larva is 0.9 – 1.5 mm long, 3rd instar – 1.4 – 2.5 mm long. The larva of the 4th instar before pupation (Fig. 4) is light-brown, 3.0 – 6.0 mm long and 0.9 – 1.0 mm large. Its head is dark-brown, 3.1 mm large, of orthogonal type, with triangular front and dark ocelli. Head fissures are yellow. Antennae are short. Thorax and abdomen are light-brown, scutellae are dark-brown and bright. The first thoracic segment is less wide than others. Stigmae are very small. Thoracic legs are dark-brown. Abdominal legs are underdeveloped, only crochets are well visible. Anal prolegs are well developed, crochets forms transversal row on each of them (Rozhkov *et al.*, 1966; Ammossov, 1975; Pleshanov, 1982).
The case, in which the larva lives and feeds, is formed by the emptied larch needle. It is grey-white, 3.9 – 4.4 mm long and 0.95 – 1.05 mm wide, may be open from both sides or only from one side depending on what part of the needle was used to make the case. The case has no valves. That may be used as diagnostic characteristic to distinguish the pest from *Coleophora laricella* Hübner, which cases have valves (Ammossov, 1975).

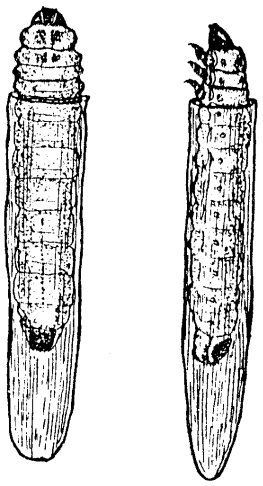

Fig. 4. Larvae of *Coleophora dahurica* before pupation (Ammossov, 1975)

Pupa

The pupa of *C. dahurica* is dark-brown, math-bright, 2.9 – 3.6 mm long and 0.8 – 0.9 mm wide (Fig. 5). The front is sleek, eyes are big and bright. Antennae are almost as long as wings. Legs are math. Tergites of pronotum and mesonotum forms a keel-form prominence. Mesonotum is the largest segment. There are small thorns at the lower border of the 8th abdominal segment. The end of the abdomen is rounded, math-bright (Ammossov, 1975).

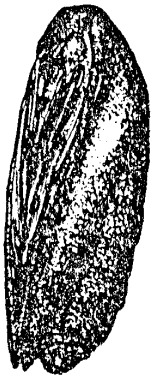

Fig. 5. A pupa of *Coleophora dahurica* (Ammossov, 1975)

Adult

The adult of *C. dahurica* is a tiny, silvery-grey moth with narrow fringed wings that fold along the body when at rest (Fig. 6). Its wingspan is 7.9 – 10.5 mm. The length of the body is 2.2 – 3.3 mm. The front is covered by silvery scales. Antennae are silvery, thin, not less long than 2/3^{rds} of the front wing. Basal antennal segment is much wider than others, its covering scales form a small brush. Palpae and maxillae are silvery-white. Tongue is yellow-brown, covered at the base by silvery scales. Thorax and abdomen are covered by bright white scales. Wings are covered by silvery scales. Male genitalia (Fig. 7) and female genitalia (Fig. 8) are shown on pictures (Rozhkov *et al.*, 1966; Ammossov, 1975).

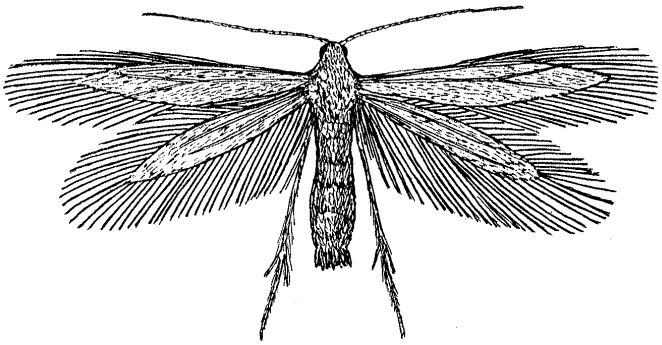

Fig. 6. An adult of *Coleophora dahurica* (Ammossov, 1975)

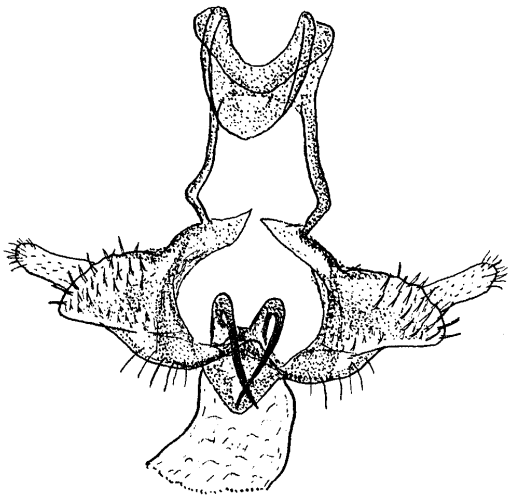

Fig. 7. Male genitalia of *Coleophora dahurica* (Ammossov, 1975)

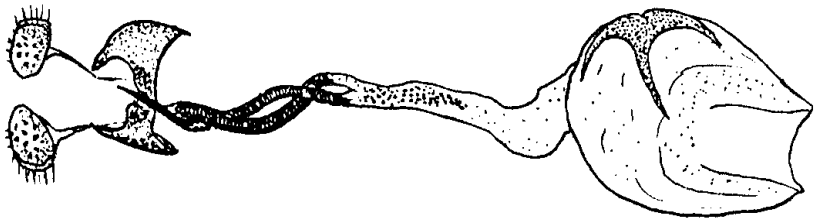

Fig. 8. Female genitalia of *Coleophora dahurica* (Ammossov, 1975)

MEANS OF MOVEMENT AND DISPERSAL

C. dahurica can spread with flights of the adult moths. Eggs can be transported in June – July with plant for planting or cut branches of larch with needles. Larvae and pupae (in cases) can be transported with larch plants moving in trade, particularly plants for planting and cut branches. Larvae and pupae may be associated with larch wood containing bark (especially in winter).

PEST SIGNIFICANCE

Economic Impact

C. dahurica is one of the most important defoliators of larch in forests and city plantations in the countries of its present distribution. Its outbreaks occur throughout large areas and belong to two types: permanent and seasonal. Permanent outbreaks persist at the same place for many years and usually cause defoliation not exceeding 20 or 30%, which decreases wood and seed production. Seasonal outbreaks usually last one season and cause defoliation of 60 to 80%, and sometimes 100%, which may lead to the death of forests especially if they are followed by outbreaks of wood borers (scolytids, cerambycids and others). These pests are able to kill trees, which are heavily stressed by the defoliator (Ammossov, 1975; Ammossov, 1976; Kondakov *et al.*, 1979; Pleshanov, 1982; Yang, 1984; Pleshanov *et al.*, 1988; Epova & Pleshanov, 1995; Wang *et al*., 1999).

Environmental Impact

C. dahurica sometimes causes the death of forests, either directly or more often by leaving the forest susceptible to subsequent attack by other forest pests, and/or by predisposing the forest to forest fires. 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 *C. dahurica* are undertaken during years of outbreaks in Russia and other countries where the pest is present.
The natural enemies of *C. dahurica* are not as well studied as those of *C. laricella*, for which 51 species of parasites are known. Nevertheless, it is clear that natural enemies may play an important role in regulation of its populations. Several species belonging to *Ichneumonidae* (*Itoplectis tunetana, Diadegma laricinella, Cremastus* sp. and others), *Braconidae* (*Bracon osculator*, *Microdus pumilus* and others), *Eulophidae* (*Cirrospilus pictus*, *Chrysocharis* sp. and others), *Chalcididae*, and other insects are recorded as parasitoids and predators of the pest. (Ammossov, 1975; Pleshanov, 1982; Wang, 1989). Birds also play an important role in decreasing the pest populations (Yang & Li, 1989; Wang et all., 1995). 38 species of natural enemies (including 11 parasitoids, 16 spiders and 11 birds) of *C. dahurica* in Jilin province of China were found very effective in controlling pest populations (Wang *et al.*, 1995)
The use of sex pheromones (for example, Z5-10:OH [(Z)-5-decen-1-ol]) for monitoring and control of *C. dahurica* is possible (Chu Dong *et al.*, 1995).]
A method of pest larvae sampling in larch crowns was elaborated by Yang L. M. *et al.* (1989).

Phytosanitary risk

C. dahurica is not declared a quarantine pest by any regional plant protection organization. It is considered as a serious larch pest in the countries of its present distribution. It is very likely to be able to establish in many EPPO countries particularly those in the north and centre as well as in mountain areas. Larch is an important forest and ornamental tree in the EPPO region.

PHYTOSANITARY MEASURES

To prevent introduction of *C. dahurica* to other countries, the effective measure would be to prohibit import of plants for planting and cut branches of larch from the infested areas. Inspection of wood products and other commodities can detect aggregations of larvae and pupae.

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