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

Data Sheets on Forest Pests

Monochamus impluviatus

IDENTITY

Name: *Monochamus impluviatus* Motschulsky
Synonym: none
Taxonomic position: Insecta: Coleoptera: Cerambycidae
Common names: Siberian speckled sawyer (English); крапчатый чёрный усач, восточносибирский хвойный усач (Russian)
Bayer computer code: MONCIM

HOSTS

Monochamus impluviatus attacks all available species of coniferous in its natural area (*Larix, Pinus, Picea, Abies* and others), but it prefers larch and Siberian pine-*Pinus sibirica* (Florov, 1951; Plavilshchikov, 1958; Issaev, Tarassova, 1965; Issaev, 1966; Cherepanov, 1983; Mamaev, 1985).

GEOGRAPHICAL DISTRIBUTION

EPPO region: Russia (All Siberia, Transbaikalia, Far East).
Asia: Russia (All Siberia, Transbaikalia, Far East), China, Korea, Mongolia (Pavlovskii, Shtakelberg *et al*., 1955; Plavilshchikov, 1958; Ivliev, Kononov, 1966; Averenski, 1971; Lindeman, 1979; Cherepanov, 1983; Mamaev, 1985; Vorontsov, 1995).
EU: Absent.

BIOLOGY

The mass flight of *M impluviatus* usually occurs in May and June; it is a species with the earliest flight in the genus *Monochamus.* Even in Yakutia and other areas in the extreme North, the flight begins in June. The pest prefers to fly during sunny days in wide open spaces such as large felled areas of conifers. As soon as flight begins, it begins the additional feeding occurs on needles, then on the bark on branches of young larch and pine trees and later, on the bark on branches of mature trees. The additional feeding usually lasts for 12-15 days. After the beginning of the additional feeding, the females begin to lay eggs. Beetles continue to fly and lay eggs in July. In the additional feeding, females feed not only on bark, but also on the base of needles. Between one and three eggs are laid into incisions 3-4 mm wide made by the female in the bark of the middle and top parts of trunks (and sometimes in the bark of thick branches). In the genus *Monochamus,* this species is considered to be the most likely to attack healthy and slightly stressed trees. It may also attack dying and cut trees (cut not more than one year ago) (Florov, 1951; Plavilshchikov, 1958; Rozhkov *et al.*, 1966; Cherepanov, 1983).

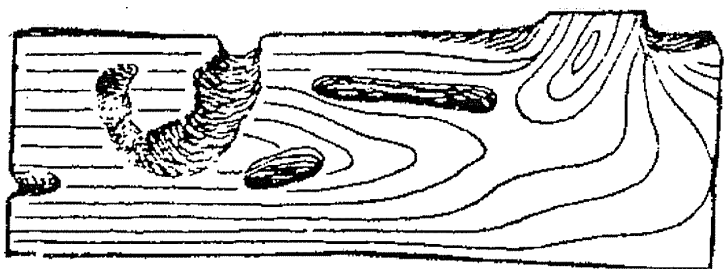

Fig. 1. Galleries of *Monochamus impluviatus* larvae in wood (Rozhkov *et al*, 1966)

Embryonic development usually takes from 10 to 27 days. The neonate larva feed first in the bark, phloem and sapwood making long irregular patches filled with frass. Twenty to twenty-five days after hatching from the egg, the larva enters the wood and makes a gallery 3-15 cm long and 0.5-2.0 cm wide, which goes firstly at right angles to the long axis of the trunk, then turns upwards and comes back to the surface of the trunk. Thus, the gallery always begins and finishes at the same side of the trunk and the emergence hole is situated above the entrance hole, usually at the distance of 1.5-2.0 cm. From time to time, the larva returns to clean the gallery from the frass and to feed in the phloem and sapwood. The entrance hole is oval, elongated along the trunk and measures from 5 x 2 to 9 x 4 mm. The emergence hole is round, 5-6 mm in diameter. The larva overwinters in the gallery. In spring, it slightly extends the gallery and prepares a cell for pupation at a depth of 2-3 mm from the bark. The pupation cell is 21-28 mm long and 6-8 mm wide. The head of the pupa is oriented in the direction of the bark. The pupal development takes 25-32 days in May and 7-13 days in June. According to some scientists, the developmental cycle of *M impluviatus*, normally, takes one year. In mountains (above 1000 m altitude), it may sometimes take 2 years (Florov, 1951; Pavlovskii & Shtakelberg, 1955; Plavilshchikov, 1958). According to other scientists, the developmental cycle of the pest, normally, takes two years, the first overwintering occurring at a stage of young larvae in the phloem and sapwood under the bark. Only in the second season the larvae make galleries deep in the wood (Rozhkov *et al*, 1966; Cherepanov, 1983).

DETECTION AND IDENTIFICATION

Symptoms

Characteristic symptoms are: large entrance and emergence holes in trunks, bark becoming detached, borings at the base of infested trees, beetles sitting on the trunks and horizontal tunnels made by big larvae. The leaves of attacked trees often show yellowing and wilting.

Morphology

Eggs

The egg is white, elongated, slightly curved, rounded at both ends, 3.1 mm long, and 1.0 mm wide. The chorion is mat silver-coloured, covered by small cells (Cherepanov, 1983).

Larva

The larva of *M impluviatus* is generally yellowish-white, without legs, 17-23 mm long. It may be distinguished from other *Monochamus* larvae by a number of characteristics including the distribution of hairs on the front border of the pronotum, the presence of a depression on the epistoma, the shape of the front corners of the pronotum. The head is brown, up to 3.2 mm wide, slightly narrowed in the front part, half retracted into the prothorax. The epistoma is orange in the front half and white in the back half. The antennae are short, orange brown. The mandibles are black. The width of the pronotum is twice as long as its length. The pronotum is yellow and narrowed in the front part. The basisternum is sclerotised on the front border and has reddish hairs on the lateral sides. The meso- and metasternum have multiple granules in the middle pa1i forming two transverse rows separated by a fissure. The abdomen is yellowish-white, with reddish hairs on the lateral sides. Dorsal ambulatory warts (ampullae) are prominent with white granules forming four transverse rows and one curved row from each lateral side. A spot of five granules is situated between the lateral curved row and the transverse rows. Ventral ampullae are separated by transverse fissure. One or two transverse rows of granules are situated on the front side of the fissure, and one transverse row of granules is situated on the back side of the fissure. The weight of the larva before pupation is 140-301 mg (Florov, 1951; Rozhkov *et al*, 1966; Cherepanov, 1983).

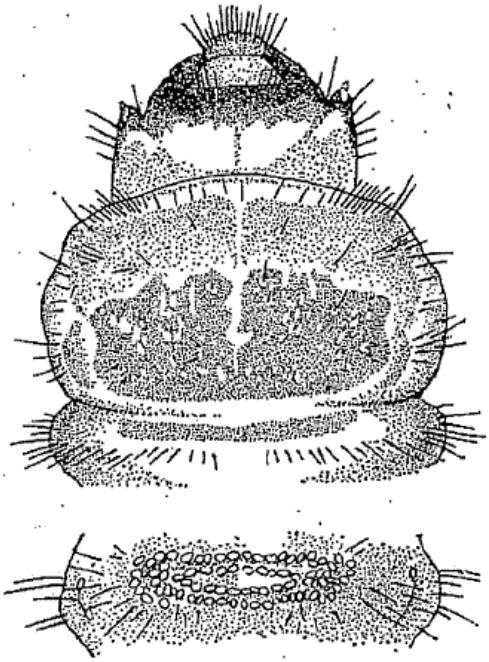

Fig. 2. Larva of *Monochamus impluviatus:* above-head and pronotum; below-abdominal tergite with a dorsal ampulla (ambulatory wart) (Cherepanov, 1983)

Pupa

The pupa is white, 15-20 mm long and 4.5-6.0 mm wide (in the abdomen part). It is easily recognised by the distribution of small thorns on the frons, short antennae curved in rings. The head is large with a longitudinal fissure with curved rows of small acute thorns on each side in the front part of the antennae. A transverse row of six bristles is situated on the front border of the frons. The pronotum is transverse and prominent. The femurs have a transverse row of small acute thorns at the top. The abdomen is large at III and IV segments, then narrows to the back, with a longitudinal fissure on the dorsal side. Tergites have 2-3 transverse rows of small acute thorns on the back part and on each side of the fissure. These thorns form narrow transverse stripes. The top of the abdomen has a conic urogomphal outgrowth, which finishes with a sclerotised thorn. The weight of the pupa is 126-274 mg (Florov, 1951; Rozhkov *et al.*, 1966; Cherepanov, 1983).

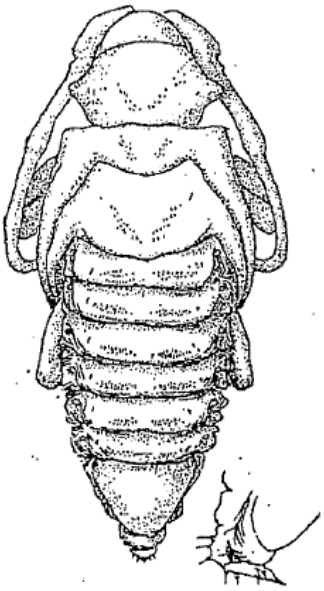

Fig. 3. Pupa of *Monochamus impluviatus* (Cherepanov, 1983)

Adult

The adult of *M. impluviatus* is blackish, 11-20 mm long. It may be easily distinguished from other *Monochamus* beetles by a number of characteristics including the well-developed sharp punctuation at the base of elytra, the presence of speckles formed by small grey hairs on the elytra, rather thick antennae, and short (for *Monochamus*) elytra. The head is rounded and widely punctuated at the back border. The vertex has a depression and a round yellow spot. The frons is prominent, covered by grey hairs and has a small punctuation and a central longitudinal fissure. The eyes are sharply facetted. The pronotum is transverse, with a conic lateral prominence on each side, with wide irregular punctuation and irregular ochre and grey hairs forming four round spots on the back part. The scutellum is triangular and short, covered by yellowish and grey hairs, with a longitudinal stripe. The length of the elytra is two to three times longer than their width. The elytra have parallel borders, narrowed at the back part, with well-developed sharp punctuation at the base, covered by ochre and grey hairs forming a small- speckled pattern. The length of front legs is almost equal to the length of the other legs. The mid tibia has a brush of golden-brown b1istles on the external distal part. The underside of the body is covered by grey hairs lying flat. The female antennae are striped (the base of the segments have rings of grey hairs), slightly longer than the body or almost of equal length. Male antennae are black, 1.5 times longer than the body. The weight of the young beetle is 125-246 mg (Florov, 1951; Plavilshchikov, 1958; Rozhkov *et al.*, 1966; Cherepanov, 1983).

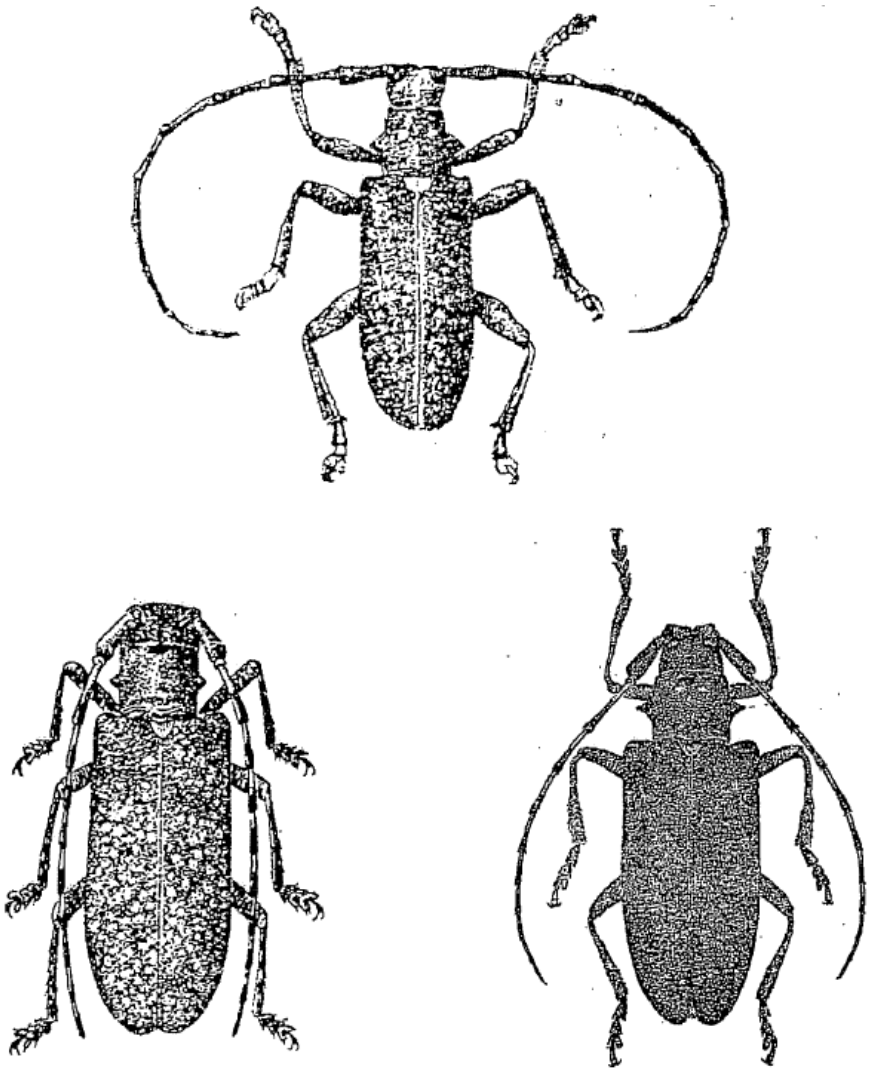

Fig. 4. Adults of *Monochamus impluviatus* (above-Florov, 1951; below left-Rozhkov *et al.*, 1966; below right-Cherepanov, 1983)

MEANS OF PEST MOVEMENT AND DISPERSAL

The natural spread of the pest with flying adults is fast. Because larvae of *M impluviatus* may be hidden in the wood and therefore difficult to detect, it may be easily transported with untreated coniferous wood products moving in trade. The pest may also be carried as a hitchhiker on planting material.

PEST SIGNIFICANCE

Economic Impact

Opinions about the importance of *M. impluviatus* are divided. According to many scientists, *M impluviatus* is one of the most important and frequent pests of larch, Siberian and other pines and other conifers in the region of its present distribution It may attack slightly stressed and healthy trees of different ages and continues to damage the same trees during several consecutive years causing their death. This species prefers to attack mature trees and, even in cases when it does not kill them, the infestation results in significant loss of vigour and of wood marketability (because of the bore holes). It is one of the most frequent pests of Siberian forests, stressed by *Dendrolimus sibiricus* and other defoliators or damaged by forest fires. The pest occurs in all types of forests and landscapes, including mountains (Florov, 1951; Zemkova, 1965; Ivliev, Kononov, 1966; Averenski, 1971; Krivosheina, Kompantsev, 1987).

Some other scientists, however, believe that the importance of *M. impluviatus* is not very high, that the pest is not frequent and not widely distributed (Plavilshchikov, 1958; Issaev, 1966; Rozhkov *et al.*, 1966; Kondakov *et al.*, 1979). This difference of opinion is possibly due to differences between the importance of the pests in the different regions and different tree species studied by different authors.

M. impluviatus has not been yet found to be a vector of wood nematodes of the genus *Bursaphelenchus*, but it is considered as a possible vector (Kulinich & Orlinskii, 1998).

Environmental Impact

Because it is a tree-killer, *M impluviatus* is able to alter ecological relationships where conifers are an important component of the ecosystems.

Control

Control efforts are undertaken in the area of the present distribution of *M. impluviatus*. Control measures include forestry and sanitary measures (improving the resistance of forests, cutting and elimination of all infested trees), treatments with chemical and biological preparations (Rozhkov, 1966; Vorontsov, 1995).

Phytosanitary risk

M impluviatus is not a quarantine pest for any individual country (as far as is known) or any regional plant protection organization. It is considered as a very serious forest pest in areas where it occurs. It is very likely to establish in all coniferous areas within the EPPO region. It is unlikely to be transported in planting material since the species does not attack branches, small trunks or root which constitute planting material (except during the phase of additional feeding). Adults may, however, be resting on the surface of such material. Conifers are important forest trees in many parts of the EPPO region.

PHYTOSANITARY MEASURES

The major risk of spreading of *M impluviatus* is with coniferous wood in which eggs, larvae, pupae and young adults may be under the bark and in the wood. Adults may also be transported on the surface of trunks. Wood should be debarked and inspected for bore holes. Cut branches and plants for planting should be inspected.

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