

## Data Sheets on Quarantine Pests

# *Gilpinia hercyniae*

### IDENTITY

**Name:** *Gilpinia hercyniae* (Hartig)

**Synonyms:** *Lophyrus hercyniae* Hartig  
*Diprion hercyniae* Hartig  
*Diprion polytoma* Hartig

**Taxonomic position:** Insecta: Hymenoptera: Diprionidae

**Common names:** European spruce sawfly (English)  
Tenthrière européenne de l'épinette (French/Canadian)  
Fichtenbuschhornblattwespe (German)

**Notes on taxonomy and nomenclature:** This species was separated from *G. polytoma* in 1940 (Reeks, 1941). Accordingly, in publications prior to that date it is uncertain which species authors refer to.

**Bayer computer code:** GILPPO

**EU Annex designation:** II/B

### HOSTS

The insect occurs only on *Picea* spp., e.g. *P. abies*, *P. glauca*, *P. sitchensis*, *P. pungens*, *P. mariana*, *P. rubens*.

### GEOGRAPHICAL DISTRIBUTION

**EPPO region:** Belgium, Czech Republic, Denmark, Estonia, Finland, France (unconfirmed), Germany, Hungary, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Romania, Sweden, Switzerland, UK, Ukraine.

**Asia:** Japan, Korea Democratic People's Republic, Korea Republic, Pakistan.

**North America:** Canada (eastern areas, including Ontario), USA (north-east).

**EU:** Present.

**Distribution map:** See CIE (1953, No. 35).

### BIOLOGY

*G. hercyniae* overwinters as cocooned prepupae in the litter and moss layers. The prepupae within the cocoons pupate in early spring and develop into adults, which emerge in early summer. In most areas there is only one generation per year; however, in southern UK in particularly warm summers a second generation may occur, and in North America the number of successful generations increases southwards with the increasing length of season. The male:female ratio is highly skewed, males being extremely rare (down to 1:1200) and the species is mainly parthenogenetic. Adult females start ovipositing soon after emergence and lay 20-30 eggs. Eggs are inserted singly in a pocket in the distal part of the old needles. Eggs hatch in approximately 10 days. The larvae pass through six stages in about 40 days. During the final stage no feeding takes place, and within a short time of

the final moult they drop to the forest floor and spin cocoons in the litter layer. Diapause is totally inhibited if the light:dark ratio is above 16h:8h.

First-generation larvae mainly feed on old spruce needles, as newly flushed needles apparently contain repelling secondary compounds (Jensen, 1988). Second generation larvae feed on all age-classes of needles.

## **DETECTION AND IDENTIFICATION**

### **Symptoms**

Older needles are eaten from the tip. Faeces can be found accumulated on foliage or on the forest floor.

### **Morphology**

#### **Eggs**

Green, oval, 1.8-2.4 x 0.5-0.6 mm.

#### **Larva**

Length 3 mm (1st instar) to 22 mm (6th instar). 1st to 3rd instar needle-green, 4th and 5th with five white longitudinal stripes. In the 6th instar these stripes disappear. Abdominal legs on segments 2-8 and 10. Abdominal segments with six sub-segments, those of segments 1, 2 and 4 carrying small, light-brown hairs. Stigmata light-brown, thoracic legs brown to black. Head capsule in 1st instar mainly black, in 2nd to 4th instar more brownish, in 6th instar green. Clypeus and labrum each with 2 x 2 hairs. Antennae with two flat segments and one peglike segment. Head with a stripe of dark-brown punctures (Lorenz & Kraus, 1954).

#### **Adult**

Female: Stout-bodied sawflies. Length of body 6.0-8.5 mm. Head and body black except a cream-coloured stripe above the ocellae, on stigma and dorso-medially on thorax. Hind femur black except for the pale apex; hind tibia and tarsi yellowish-white with black apices (Benson, 1951). For differences between *G. polytoma* and *G. hercyniae* see Goulet (1981).

Male: Abdomen mostly black above, with at most the lateral margins of the tergites yellow. Pronotum broadly marked with yellow.

## **MEANS OF MOVEMENT AND DISPERSAL**

The adults can fly strongly and over long distances when assisted by air currents. Larvae only disperse over short distances. Larvae can be transported among the needles of plants being moved in international trade.

## **PEST SIGNIFICANCE**

### **Economic impact**

In mainland Europe *G. hercyniae* is of little significance. A few limited outbreaks in Christmas tree crops have been recorded. In the UK (England and Wales) severe outbreaks cause a general loss of increment and vigour and "top-kill" due to repeated defoliation of the crown (Billany, 1978). However, in the west of the UK (Wales) it seems that *G. hercyniae*, being at the extreme edge of its range, is only able to reach outbreak numbers after several consecutive seasons of favourable weather (Billany *et al.*, 1983).

The species was introduced to North America and there have been widespread outbreaks, especially in Canada in the 1930s, causing enormous losses of spruce timber, e.g. more than 40 million/m<sup>3</sup> in the Gaspé peninsula (Pschorn-Walscher, 1982). In Canada the outbreaks ceased by the 1940s and the species has lost its economic importance, probably because it is controlled by biological agents.

## Control

In Central Europe control measures have not been necessary. Control of the pest introduced into North America and the UK has been attempted by import of insect parasitoids, e.g. from Austria. In Canada, *G. hercyniae* is controlled by parasitoids (e.g. the hymenopteran parasitoid *Exenterus vellicatus*, and the dipterous parasitoid *Drino bohémica*), in combination with a host-specific, nuclear polyhedrosis virus (NPV), *Borrelinavirus hercyniae* (Magasi & Syme, 1984). In the UK the virus has proved to be highly effective in controlling *G. hercyniae* at high population levels. The virus is dispersed by birds, which eat infected larvae (Entwistle *et al.*, 1978), and by adult sawflies (Buse, 1977).

## Phytosanitary risk

*G. hercyniae* is not listed as a quarantine pest by any regional plant protection organization. It is widely distributed throughout the range of *Picea* in the EPPO region (where it is not a serious pest) but can cause outbreaks of damage when it and its host move outside this range. Experience in the west of the UK indicates that, at that point, it is at the extreme of the ecoclimatic zone where it can multiply sufficiently to cause damage. Its population levels are anyway well controlled by natural enemies, both within and outside of its natural range. From these characteristics, *G. hercyniae* fails to have the features necessary for being declared a quarantine pest. Furthermore, it is doubtful whether phytosanitary measures would have a significant effect, given the ability of the adults to travel long distances in flight.

## PHYTOSANITARY MEASURES

To ensure that plants for propagation do not carry the pest, the plants should have been inspected during the previous summer and found free of larvae on the shoots.

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